SOAP 2026

ANNUAL MEETING

SOAP
Society for Obstetric Anesthesia and Perinatology

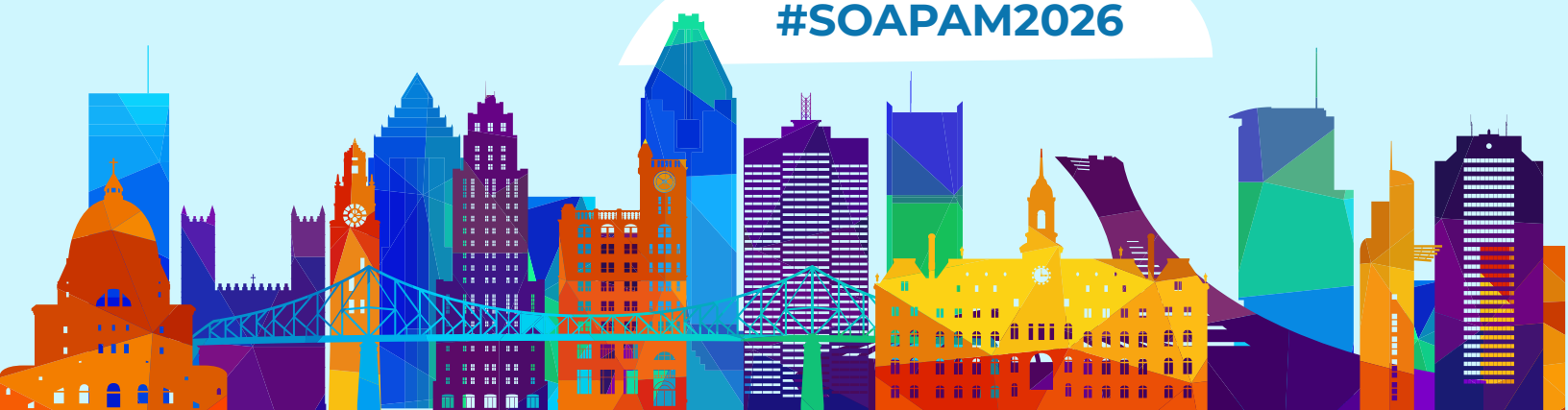
MONTRÉAL, QUÉBEC, CANADA

LE WESTIN MONTREAL

APRIL 29-MAY 3, 2026

SOAP 2026
ABSTRACT SYLLABUS

#SOAPAM2026



Society for Obstetric Anesthesia and Perinatology

ABSTRACT SYLLABUS

SOAP 58th Annual Meeting

From Discovery to Delivery:

Bridging Research and Clinical Care in Obstetric Anesthesia

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Welcome to Montréal!

On behalf of the SOAP Board of Directors and the 2025–2026 Annual Meeting and Live Events Committee, we are delighted to welcome you to Montréal for the **SOAP 58th Annual Meeting**.

This year's meeting continues SOAP's tradition of bringing together clinicians, scientists, educators, and trainees dedicated to advancing the care of mothers and babies around the world. Through collaboration, innovation, and shared expertise, we aim to translate new discoveries into meaningful improvements in obstetric anesthesia and perinatal care.

The 2026 Annual Meeting promises an engaging and dynamic scientific program featuring cutting-edge educational sessions, interactive workshops, and opportunities to connect with colleagues from across the globe. Attendees will enjoy many of SOAP's most anticipated traditions!

We are especially pleased to feature a **Keynote Address by Dr. Beverley Orser**, whose pioneering work in anesthetic pharmacology and patient safety has profoundly influenced modern anesthetic practice. The program will also include the **Fred Hehre Lecture delivered by Dr. Valerie Arkoosh**, a physician and health policy leader whose work has focused on improving maternal health and healthcare systems. In addition, the meeting will feature the prestigious **Ostheimer Lecture by Dr. Richard Monks**, one of SOAP's most distinguished educational traditions, celebrating innovation and excellence in obstetric anesthesia. Finally, the meeting will open with the always exciting **Gertie Marx Research Competition**, which highlights outstanding trainee research and the future leaders of our specialty.

Of course, the SOAP Annual Meeting is not only about outstanding science and education—it is also about community. We look forward to gathering together for some of SOAP's favorite traditions outside the lecture halls, including the **SOAP FUN Run**, a wonderful opportunity to start the day with colleagues while enjoying Montréal, and the **Party with a Purpose**, a special event that brings our community together in support of maternal health initiatives around the world.

When you're not immersed in the meeting's educational sessions, Montréal offers a vibrant and unforgettable setting. Known for its rich culture, historic architecture, and exceptional culinary scene, Montréal blends European charm with North American energy. Wander through the cobblestone streets of **Old Montréal**, visit the stunning **Notre-Dame Basilica**, or enjoy the cafés, markets, and festivals that make this city one of North America's most beloved destinations.

The SOAP Annual Meeting is more than a conference—it is a gathering of a passionate community committed to improving the lives of mothers, babies, and the clinicians who care for them. We hope this meeting sparks new ideas, strengthens collaborations, and inspires continued progress in our field.

We are thrilled to welcome you to Montréal and look forward to an inspiring and memorable meeting.

Sincerely,

Daniel Katz, MD
Annual Meeting and Live Events Committee, Chair

Ron George, MD, FRCPC
SOAP President

Thank You, Planning Committees

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With special thanks to members of the following subcommittees who volunteered their time and expertise to the planning of the 58th Annual Meeting.
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Special thanks are due to Michaela Farber, MD, MS, chair of the Abstract Review Subcommittee, and the dedication of these volunteers who reviewed hundreds of abstracts to help in creating the educational program.
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SOAP 2026 PROGRAM SCHEDULE ABSTRACTS ONLY

THURSDAY, APRIL 30

2:45pm – 5:45pm Breakout Session: Case Reports & Oral Research Presentations – **NO CME**
Breakout Session: Research Abstracts **– NO CME**

Case Reports Room 1: *McGill (8th floor)*
Oral Research Presentations Group 1: 2:45 PM – 3:45 PM

1. Association between Systolic and Diastolic blood pressure and lung water in patients with preeclampsia – a point-of-care USG-based observational study - Shreya Goswami MD
2. Women's short-term recall of their multidimensional labor pain, experienced just prior to epidural insertion, is reliable 20-30 minutes after receiving neuraxial pain relief - Pamela Angle MD FRCPC MSc (oxon)
3. Pregnancy-related outcomes in patients with pulmonary hypertension: a multicenter retrospective cohort study - Braydon Bak MB,BCh,BAO
4. Preeclampsia with Severe Features: How Do We Track Severe Features? - Kristen Harris
5. Lead contamination in donated packed red blood cells: implications for intrauterine transfusions and neonates receiving transfusions - Olivia Nelson MD
6. Experiences of trauma after delivery in critically ill obstetric patients: a case-control qualitative pilot study -Yael Sarig

Case Reports Room 1: *McGill (8th floor)*
Oral Research Presentations Group 2: 3:45 PM – 4:45 PM

1. New gadgets at Labor floor: A preliminary comparison of ROTEM Sigma, ROTEM Delta< and Clauss Fibrinogen for the Obstetric Patients - Aymen Alian MD, MSc, MBBCh
2. Early Thromboelastographic Phenotypes in Severe Postpartum Hemorrhage: A< Multicenter Observational Cohort Study - Grace Lim MD MSc MBA
3. Association of general anesthesia with postpartum hemorrhage following cesarean< delivery among patients who did not attempt labor: a single-center retrospective study - Isabella Hardej BS
4. Impact of Postpartum Hemorrhage on Early Recovery After Cesarean Delivery - Jeroen< De Haes MD, EDAIC, EDIC
5. Optimal Programmed Intermittent Epidural Bolus Volume of Ropivacaine and< Dexmedetomidine in Dural Puncture Epidural Technique for Labor Analgesia: A<Biased-Coin Up-and-Down Sequential Allocation Study - Yongxin Liang
6. Risk of General Anesthesia for Cesarean Delivery by Race: Results from Multicenter< Perioperative Outcomes Group (MPOG) Registry -**Alexander Butwick, MS, MBBS**

Case Reports Room 1: *McGill (8th floor)*
Case Reports: 4:45 PM – 5:45 PM Challenging Acuity

1. ECMO is in the Birth Plan: Peripartum Management of Severe Pulmonary Hypertension Requiring Preterm Cesarean Delivery - Ian Funk MD

2. Placenta Accreta Syndrome with Iliac Artery Invasion - Brooke Freese MD
3. Surprise! A Sneaky Invasion of the Bladder by Uterus Causing Massive Hemorrhage - Anwesa Basa BS
4. When Seconds Matter: Emergent ECMO Cannulation for Cardiac Arrest in the Setting of Life-Threatening Amniotic Fluid Embolism - Chelsea Holbrook MD
5. Ante In Extremis: Acute Management of Prepartum Amniotic Fluid Embolism - Connor McElwee MD
6. Life-Threatening Peripartum Cardiomyopathy (PPCM) in a Previously Healthy Parturient - Interplay Between Genetic Susceptibility and Pregnancy-Related Stress - Lauren McHenry MD
7. Anesthetic Considerations for Cesarean Delivery and Type A Aortic Dissection Repair in a patient with Marfan Syndrome - Kelley Smith MD
8. Pulseless Pregnancy: Navigating Cesarean Delivery with an LVAD Christopher Mukasa MD
9. Lipid Emulsion Use During Maternal Cardiac Arrest with Suspected Amniotic Fluid Embolism - Alex Hydock MD
10. Management of Cocaine-Induced Type A Aortic Dissection at 30 Weeks Gestation- Lucas Steele MD

2:45pm – 5:45pm Breakout Session: Case Reports – **NO CME**

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Potpourri: 2:45 PM – 3:45 PM

1. It Takes a Village: A Multidisciplinary Approach to a Complex Case of Placenta Accreta Spectrum - Tyler King MD
2. Transversus Abdominis Plane Catheters for Opioid-Free Analgesia Following Cesarean Delivery in a Patient with Mast Cell Activation Syndrome - Brian Vickers MD
3. Beyond the Expected: Anesthetic Management of an Elderly Parturient with Triplet Gestation Kelechi Anyaehie MD/ MPH
4. Amniotic Fluid Embolism: Early detection and aggressive treatment leading to a good outcome - Shobana Bharadwaj MBBS
5. Navigating the Hemodynamic Stress Test: Successful Pregnancy in a Paced Fontan Patient with Situs Inversus - Erin Ross DO
6. General Anesthesia for Cesarean Delivery in a Parturient with Pre-eclampsia and New-Onset Complete Heart Block - Shobana Bharadwaj MBBS
7. Multidisciplinary Management of a Parturient with Recent SCAD-Induced STEMI for Combined Cesarean Delivery and Myomectomy - Feras Alhourani MD, MBA
8. A Case Report of Takotsubo Cardiomyopathy in Pregnancy: When Form Reflects Dysfunction - Trenton Dawson MD
9. Navigating the Mitochondrial Maze: A Case Report of Emergent Cesarean Delivery Following Labor Induction in a Patient with Leigh Syndrome - Nancy Greenspon MD
10. Management of a Parturient with a History of Thoracic Sympathetic Ganglion Ablation - Alaya Bodepudi MD

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Respiratory Challenges: 3:45 PM – 4:45 PM

1. Management of a Previable Patient with Severe Aortic Valve Endocarditis with Aortic Valve Insufficiency, Requiring VV-ECMO for Bronchospastic Respiratory Failure - Afif Kraitem MD

2. A Case of Peripartum Decompensated Nonischemic Cardiomyopathy with Real-Time Hemodynamic Demonstration of Postpartum Autotransfusion and Early Right Heart Failure Management - Caroline Miller
3. Peripartum Cardiomyopathy: A Rare Cause of Acute Heart Failure in Pregnancy Alexis Toy DO
4. Anesthetic Management of Labor Analgesia in a Pregnant Woman with Heart Failure with Reduced Ejection Fraction, Thromboembolism and Morbid Obesity - Ashka Surve MBBS MD
5. Prolonged Hospital Course complicated by Pulmonary Hypertension, Congestive Heart Failure, and Tracheostomy during Pregnancy - Sydney Labat MD
6. BMI 104 with Shortness of Breath and Active Lower Extremity Thrombus Cesarean Section - Ashley Del Bianco DNAP, CRNA
7. When Neuraxial Is the Only Safe Airway: Managing a Non-Intubatable Parturient with Myasthenia Gravis and Anticoagulation - Gabrielle Migliozzi MD
8. High risk delivery in a patient with significant hemoptysis: a neuraxial strategy supported by inhaled tranexamic acid - Kenneth Nguyen DO
9. A Breath of Fresh Air: Considerations for Parturients with Idiopathic Tracheal Stenosis - Natalie Campbell MD
10. Shortness of Breath… Pleural Effusion… Anterior Mediastinal Mass… Stage IV Lymphoma - Susanne Rupert MD

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Coagulopathy: Congenital and Iatrogenic (4:45 PM – 5:45 PM)
1. Isolated Hypofibrinogenemia in an Obstetric Patient - Xavier Cortez MD
2. Spinal Anesthesia for Cesarean Section Delivery in a Primigravida with Type 3 Von Willebrand Disease - Hayley Turnbow DO
3. When Pregnancy's Prothrombotic State Is Not Enough: Refractory Acquired Hemophilia A - Jacob Selph MD
4. Navigating Neuraxial Risk in Bernard–Soulier Syndrome: An Evidence-Informed Obstetric Approach - Daniel Ratushnyak MD
5. Obstetric Anesthesia Without Neuraxial: Management of Rare Platelet Disorders - Nicole Russell MD
6. Neuraxial Anesthesia after Intradialytic Heparin: A Knowledge Gap in Pregnant Patients with ESRD - Bethany Lutter MD
7. Use of Fondaparinux for DVT prophylaxis in High Risk Obstetric Patients with Heparin Allergy - Miles Sullivan MD
8. Pulmonary Hypertension, Prostacyclin Analogs, and Platelet Function: A Case Series - Daniel Webster MD
9. Obstetric Anesthesiology at the Forefront: Management of Submassive Saddle Pulmonary Embolism for Safe Vaginal Delivery - Mariana Acosta MD
10. Peripartum Management of a Parturient with a History of Truncus Arteriosus and Mechanical Aortic Valve on Warfarin - Margaret Duval, MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*
Potpourri: 2:45 PM – 3:45 PM
1. Peripartum management of Hypodysfibrinogenemia: A Case Report - Christine Ha MD
2. Gravid Hysterectomy Treatment for Bleeding Placenta Accreta with Concomitant Factor V Leiden-Associated Pulmonary Embolism - Damon Wallace MD
3. Plasminogen Activator Inhibitor Deficiency in Pregnancy - Michael Vogel DO
4. When The Best Laid Plans Go Awry: Peripartum Management of Type 2B von Willebrand Disease - Adanna Ekekwe BS

5. Intravenous Thrombolysis Following Epidural Placement and Removal - Antanina Voit MD
6. A Multidisciplinary Approach to Cesarean Delivery in a Patient with Hypertrophic Cardiomyopathy and Amide Local Anesthetic Allergy - Dillon Patel MD
7. Anesthetic Considerations of Severe Mitral Stenosis in the Peripartum Period - Emma Stoltz MD
8. Ebstein Anomaly in the Parturient: Management Considerations - Robert Guidangen MD
9. Anesthetic Management of a Cesarean Section with Severe Mitral Stenosis and Pulmonary Hypertension - Coleman Harber MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*
Call for ECMO! (3:45 PM – 4:45 PM)

1. ECMO for resuscitation of a patient with an amniotic fluid embolism - Ani Chilingirian MD
2. Seconds to Deliver: Maternal Arrest and Resuscitative Cesarean Delivery in Suspected Amniotic Fluid Embolism - Brianna Hidreth MD
3. Regional Anesthesia with Extracorporeal Membrane Oxygenation (ECMO) Backup and Remifentanil Infusion for Cesarean Delivery and Mediastinal Biopsy in a Parturient with a Large Anterior Mediastinal Mass - Vinay Khare MBBS
4. Triple (Threat) Therapy: Acute Exacerbation of Pulmonary Hypertension During Cesarean Delivery - A Case Report - Jessica White MD
5. Obesity and ECMO Challenges in Postpartum Code Blue Fiona Chambers
6. Peripartum Decompensation in a Patient with History of Septal Myectomy for Hypertrophic Obstructive Cardiomyopathy - Lauren Brown MD
7. From Postpartum Hemorrhage to Cardiac Arrest: Multidisciplinary Management With VA-ECMO - Anne Bryden MD
8. Anesthetic Management of Repeat Cesarean Delivery in a Patient Supported by a HeartMate 3 Left Ventricular Assist Device - Kevin Bennett MD
9. Veno-Arterial ECMO for Cardiac Arrest and Severe Hypoxia from Pulmonary Edema Associated with Massive Transfusion caused by Necrotizing Chorioamnionitis - Anika Tanwani MD
10. Multi-system Crises and Postpartum Hemorrhage Requiring ECMO and Subsequent Neurosurgical Intervention – Alexander Storm

Case Reports Room 2B: *Ste- Hélène (8th floor)*
A TRAP and many EXITS - FETAL HOUR (4:45 PM – 5:45 PM)

1. Making rarity routine: anesthetic and systems approach to TRAP sequence laser ablation in a smaller center J- essica Bonilla DO
2. An Early EXIT - Andrea Fritz MD, MPH
3. Dynamic Maternal Anesthetic Strategies in a Complex Fetal Airway during an Ex-Utero Intrapartum Treatment - Sanaz Bayani MD
4. Anesthetic Management of High-Risk EXIT for Fetal CHAOS in Preterm Labor With Suspected Concealed Abruption - Austin Zheng MD Candidate
5. Simulation-based Interprofessional team training to prepare for Ex Utero Intrapartum Treatment-to-Airway for fetal neck mass - Darragh O'Reilly MBBS, MSc, FCAI
6. The EXIT Procedure and Considerations for the Obstetric Anesthesiologist -Lilly Fang MD
7. Ex-Utero Intrapartum Treatment (EXIT) for Parturient with Maternal Hyperthyroidism and Goiter Complicated by Fetal Goiter and Potential Fetal Airway Obstruction - Sayo McCowin MD, PhD
8. Balancing the Lifeline: Anesthetic Management of Uterine Relaxation During an EXIT Procedure for Treacher Collins Syndrome - Noorul Asyikeen Kasim Anaesthetist

9. Integrated Ex-Utero Intrapartum Treatment and Postnatal Resection of Giant Cervical Teratoma: Anesthetic Management Across the Perinatal Continuum - Marina Noia MD
10. Application of finger guided blindy vision orotracheal intubation in resuscitation of neonatal asphyxia - Mingjun Xu, PhD

Case Reports Room 3: *Beaver Hall (8th floor)*
Triple A: Airway, Angioedema, Anaphylaxis (2:45 PM – 3:45 PM)

1. Pregnancy Risk Assessment and Anesthetic Management for Oocyte Retrieval in a Patient with Severe Airway Pathology - Elana Kreiger-Benson MD
2. Airway Management Planning for Delivery in a Parturient with Congenital Mandibular Hypoplasia: A Case Report- Maria Santa Cruz DO
3. Prepared Before the Push: Peripartum Management in a Parturient with Gorlin and Sotos Syndromes and a Known Difficult Airway- Sophia Jacob MD
4. Navigating a High-Risk Airway in an Obstetric Patient: A Case of Venolymphatic Malformation - Desby Cheribin
5. Serial Assessment of the Airway in a Single Parturient: Transnasal Endoscopic Laryngoscopy, Mallampati Evolution, and Multidisciplinary Collaboration - Daniel Conti MD
6. Successful Use of Continuous Chloroprocaine Epidural Analgesia for Labor in a Patient With Confirmed Lidocaine Allergy- Maegan Tupinio MD
7. Angioedema following Cesarean Section under General Anesthesia Damon Wallace MD
8. Anesthetic Management of Emergent Cesarean Delivery in a Patient with Hereditary Angioedema Type III - Lamiya Rahman BA
9. Peripartum Management of Progesterone Hypersensitivity: A Multidisciplinary Approach to Catamenial Anaphylaxis in Pregnancy - Sunitarani Kucharlapati MD
10. Suspected Intravenous Carboprost Administration Mimicking Anaphylaxis and Severe Preeclampsia During Cesarean Delivery: A Case Report - Jacelyn Lever MD, PhD

Case Reports Room 3: *Beaver Hall (8th floor)*
Heart: Congenital and Valve Challenges: 3:45 PM – 4:45 PM

1. Cesarean Delivery in a Parturient with Severe MS, PH, and VSD: A Case Report – Kristin Falce
2. Right Heart, Wrong Time: Severe Tricuspid Regurgitation During Labor - Jacob Davis MD
3. Anesthetic Management for Cesarean Delivery in a Parturient with Severe Bicuspid Aortic Stenosis and Left Ventricular Hypertrophy: A Case Report – Kristin Falce
4. Use of Remimazolam for Neuraxial Placement and Cesarean Delivery in a Parturient with Severe Aortic Stenosis and Active Methamphetamine Use Thais - Peclat MD, PhD
5. Anesthetic Considerations for Mitral Valve Replacement During Pregnancy - Kelley Smith MD
6. Emergent cesarean section in a parturient with an unbalanced atrioventricular (AV) canal defect status post complete repair - Alexia Gagliardi MD
7. Caesarean section in Rheumatic Heart Disease with simultaneous severe Mitral Stenosis, moderate Mitral Regurgitation and Pulmonary Hypertension - Reda Hafiane
8. Midnight VACTERL Challenge: A Complicated Cesarean Delivery After Dark Emily Bliss MD
9. Management of Cesarean Delivery in a Patient with Fontan Physiology - Kevin Rivera MD
10. Anesthetic Management of a Parturient with Single-Ventricle Physiology and Congenitally Corrected Transposition of the Great Vessels during Cesarean Delivery - Emily Breland Edwards MD

Case Reports Room 3: *Beaver Hall (8th floor)*
PDPH: Management and Morbidity (4:45 PM – 5:45 PM)

1. Navigating the Nuances: A Case of Post Dural Puncture Headache Followed by Massive Cerebral Venous Sinus Thrombosis - Jean-Paul Russo MPH
2. Clinical Course and Management of Pneumocephalus Complicated by Postdural Puncture Headache After Labor Epidural Anesthesia: Update in Management -Samuel Sobarzo
3. Aborted Epidural Blood Patch in an Obstetric Patient With Undiagnosed Lumbar Spinal Stenosis and Epidural Lipomatosis- Briel Lee MD
4. Beyond post-dural puncture headaches: Subdural hematomas after neuraxial placements - Emily Styslinger MD, MPH
5. Cortical Vein Thrombosis Presenting After Apparent Resolution of Post-Dural Puncture Headache Following Epidural Blood Patch - Juliana Kruthof MD, MSc, FRCPC
6. More Than Just Air: A Case of Pneumocephalus, PDPH, & CVT - Niketu Patel MD
7. Murphy's Law in Neuraxial Anesthesia: A Case of Iatrogenic Pneumocephalus After Repeat Epidural Blood Patch - Anna Wright MD
8. Cerebral Venous Sinus Thrombosis Following Suspected Post–Dural Puncture Headache After Neuraxial Labor Analgesia - Adrienne Clark MD
9. Epidural Blood Patch Through an Epidural Catheter - Jennifer Garcia MD
10. Fluoroscopic Evidence of Retrograde Contrast Spread from the Epidural to Subarachnoid Space During an Epidural Blood Patch in an Obstetric Patient - Charlotte Bloom DO

Case Reports Room 3: *Beaver Hall (8th floor)*
Uterine Rupture!: 2:45 PM – 3:45 PM

1. Unusual Presentation of Uterine Rupture - Silvia Chiang MD
2. From Spontaneous Unscarred Uterine Rupture With Occult Retroperitoneal Hematoma To Upper Extremity Phlegmasia Cerulea Dolens: A Cascade Of Coagulopathy And Paradoxical Thrombosis - Francinni Mambrini Pires Rego MD
3. Early Gestational Uterine Rupture: A Rare Anesthetic Emergency at 13 Weeks - Chloe Abbott
4. Spontaneous Uterine Rupture In An Unscarred Primigravida: Diagnostic Challenges Under Epidural Analgesia - Wun Kuk MS
5. Posterior Uterine Rupture: Pain as Presenting Symptom - Abigail Cantwell MD
6. Severe Pain and Diagnostic Pitfalls: Two Cases of Uterine Rupture in a Scarred Uterus - Borislava Pujic MD
7. A case of uterine rupture requiring emergent cesarean delivery in a patient with minimal risk factors - Hanna Mandl MD
8. Conservative management of uterine rupture after Vaginal Birth After Cesarean - Flavia Dumitrascu MB BCh BAO
9. A Case of Uterine Rupture in a Patient with Sickle Cell Disease - Margaret Duval MD

Case Reports Room 3: *Beaver Hall (8th floor)*
Chiari and Other Neuraxial Challenges: 3:45 PM – 4:45 PM

1. Neuraxial Anesthesia for Cesarean Delivery in a Parturient with Spinal Epidural Lipomatosis and Chiari I Malformation: A Case Report - **Paulina Blanc, DO**
2. Planned General Anesthesia for Cesarean Delivery in Parturient with Chiari Malformation - Victoria Buckman MD
3. Anesthetic management of a parturient with Ebstein anomaly and Tethered cord syndrome: A Case Report - Shu Zhao MD
4. Tethered Spinal Cord Precluding Neuraxial Anesthesia in a Parturient with Congenitally Corrected Transposition of the Great Arteries - Manrit Gill MD

5. Anesthetic Management of Cesarean Delivery in a Patient With Prior Tethered Cord Release - Madisen Faulkner MD
6. Interstitial Fluid Mimicking Cerebral Spinal Fluid Leak After Epidural Catheter Removal: A Case Report - **Praeophayom Clarke, Nicole Cho, Zakery Dabbagh**
7. Management of Accidental Dural Puncture and Intrathecal Catheter- No CSF return? A Clinical Conundrum - Karen Izquierdo MD
8. Cerebrospinal Fluid Cutaneous Fistula Following Uncomplicated Neuraxial for Labor Analgesia: A Case Report - **Paulina Blanc, DO**
9. Pneumocephalus Following Combined Spinal-Epidural for Labor Analgesia - Chelsi Flanagan DO, MPH
10. Pneumocephalus without obvious dural puncture in a laboring patient with prior lumbar discectomy - Austin Burrows MD

Case Reports Room 3: ***Beaver Hall (8th floor)***
Pharmacology Challenges: 4:45 PM – 5:45 PM

1. Reversible Cerebral Vasoconstriction Syndrome Following Methylergonovine Maleate Administration During Cesarean Delivery - Carolina Aravera MD
2. Intravenous Methylergonovine Maleate during Cesarean Section: A Case Series Riley - Hales MD MBA
3. Is Nitrous Oxide Contraindicated in Patients with MTHFR Gene Mutations? Kaylea Gunn MD
4. Perioperative Considerations for an Obstetric Patient with Allergies to Lidocaine and Bupivacaine - Damon Wallace MD
5. Anesthetic Challenges in GLUT-1 Deficiency: A Case Report and Review of Perioperative Considerations - Xiao Lu Zhang DO, PhD
6. Gaucher Disease in Pregnancy: Anesthetic and Peripartum Considerations in a High-Risk Parturient - Jacob Weber MD
7. Navigating Labor Analgesia in SAPHO Syndrome: A Case of Intrathecal Pump Associated Complexity - Katrina Kerolus MD
8. Withdrawal From Medetomidine-Adulterated Fentanyl During Pregnancy: A Case Report - Chloe Kern MD, MAS
9. Dilutional Danger in Labor: Oxytocin Exacerbation of Severe Peripartum Hyponatremia - Sophia Wu MD
10. Peripartum Management of Carbamoyl Phosphate Synthetase I Deficiency: A Case Across Two Pregnancies - Antanina Voit MD

2:45pm – 5:45pm Breakout Session: Research Abstracts – **NO CME**

Research Abstracts Room 1: ***Palais (8th floor)***
Recovery: Morbidity, Depression: 2:45 pm – 3:45 pm

1. Association between Severe Perioperative Surgical Morbidity with Cesarean Delivery and Postpartum Readmission - Alexander Butwick, MBBS, FRCA, MS
2. Severe Maternal Morbidity and Comorbidity Burden Among Transgender and Gender Nonconforming Birthing Patients - Jil Decker, MD
3. Hospital Variation in Severe Perioperative Surgical Morbidity Associated with Cesarean Delivery - Alexander Butwick, MBBS, FRCA, MS
4. Association Between Postoperative Opioid Exposure and Postpartum Depressive Symptoms Following Cesarean Section- Josephine Reed BS
5. Association of Perinatal Mood and Anxiety Disorders With Anesthesia-Related Complications in Cesarean Delivery Hospitalizations -Anna St. Denis
6. Outcomes after positive postpartum depression screening at 4–8 weeks: a single US center retrospective cohort study - Aleesha Jethwa MBBS, BMedSci, MSED

7. Association of Patient Anxiety and Time of Delivery with Duration of Urinary Catheterization Following Cesarean Delivery Under Neuraxial Anesthesia: A Prospective Cohort Study - Aislynn Sharrock BA (Hons), MScR Candidate

Research Abstracts Room 1: *Palais (8th floor)*
Potpourri (3:45 pm – 4:45 pm)

1. Inherited Bleeding Disorders Carry a High Hemorrhage Burden: A Retrospective Cohort Study in a Large Healthcare System (2015-2025) - Yalda Toofan MS, MD
2. Optimizing hemodynamics and analgesia for patients undergoing caesarean delivery with spinal anesthesia in a limited resource setting - Kimberly Mendoza MD, PhD, MPH
3. Anesthetic Perspectives and Practices Toward Procedural Abortion: A Survey of Society for Obstetric Anesthesia and Perinatology Members - John Markley MD, PhD
4. Results from the Making Every Baby Count Initiative in Four Regional Hospitals in Ghana - Medge Owen MD
5. Long-Acting Intrathecal Opioids Decrease Postoperative Opioid Requirements following Scheduled Cesarean Hysterectomy for Placenta Accreta Spectrum - Damon Wallace MD
6. Analgesic efficacy of transversalis fascia plane block for post-caesarean pain management. A systematic review and meta-analysis - Jocelyn Wang
7. Apgar score according to neonates' race and associations with skin-to-skin initiation and resuscitative interventions - Charlotte Thompson BA

Research Abstracts Room 1: *Palais (8th floor)*
Potpourri #2: 4:45 pm – 5:45 pm

1. Incidence Of Postpartum Hemorrhage and Related Risk Factors: A Retrospective Study - Monica Siaulys PhD MD
2. Increased Distressed Community Index Score Demonstrates Higher Morbidity and Mortality in Laboring Patients with Known Inherited Coagulopathies - Meet Patel MD
3. A single-center retrospective analysis of inadequate neuraxial anesthesia for postpartum tubal ligation - Mindy Kim BS
4. Association of patient and clinical characteristics with successful external cephalic version: a single-center retrospective study - Danielle Sader MD
5. Two doses of antepartum betamethasone reduces airway complications in neonates compared to 1 dose in 32-36 week population - Andrew Warburton MD
6. Prevalence of Peripartum Anemia and Iron Deficiency Anemia at Delivery in a Large Urban Safety-Net Cohort - Jean-Paul Russo MPH
7. Failure Mode and Effects Analysis of Iron Deficiency Anemia Management in Pregnancy: Identifying High-Priority Risks for Obstetric and Perinatal Care - Jean-Paul Russo MPH
8. Impact of Postpartum Hemorrhage on Quality of Recovery After Vaginal Delivery - Jeroen De Haes MD, EDAIC, EDIC

Research Abstracts Room 2: *Viger (8th floor)*
Making Epidurals Better: 2:45 pm – 3:45 pm

1. The Effect of Painful Contractions on Time Perception during Epidural Placement for Labor Analgesia - Katherine Hatter MD
2. Impact of a Spring-Loaded Epidural Syringe on the Learning Curve of Labor Epidural Placement in Anesthesia Residents: A Quasi-Randomized Controlled Trial - Noor Raheel MD, MPH
3. Association between opiate use disorder and physician provided epidural boluses for labor analgesia - Amnon Berger, MD, PhD
4. Making Labor Epidural Analgesia Better: A Quality Improvement Project: Part 3 - Wei Ni Zhou BA

5. Reducing Labor Epidural Failure Through Targeted Interventions: A Quality Improvement Initiative - Beth Clayton, DNP, CRNA
6. Prepare to Fail? The impact of developing an institutional protocol on improving confidence in the management of the failing epidural - Darragh O'Reilly MBBS, MSc, FCAI
7. Pain with Labor Epidural Analgesia (PLEA): A Scoping Review - Christine Ha, MD
8. Factors Associated with Unintended Dural Puncture (UDP) and Failed Neuraxial Anesthesia in Obstetric Anesthesia: Targeting Anesthesia Residency Quality Improvement - Manuel Vallejo, MD, DMD, FASA

Research Abstracts Room 2: *Viger (8th floor)*
Recovery: Pain, Sleep, Anxiety: 3:45 pm – 4:45 pm

1. Burden of chronic postsurgical pain after caesarean delivery on maternal quality of life: a systematic review - Samira Alwahabi BS
2. Chronic Pain in Pregnancy: Implications for Labour Outcomes and Peripartum Anesthetic Management - Manuela Morgan
3. Prevalence and Association of Postpartum Pain According to the Anesthetic Technique Used: a Retrospective Study - Monica Siaulys, PhD, MD
4. A systematic review and meta-analysis to determine the minimal clinically significant difference for Obstetric Quality of Recovery 10 scores - Moe Takenoshita BSc, MBBChir, MRCS
5. Association between Sleep Duration and Vagal Activity during the Postpartum Period: Insights from Wearable Digital Health - **Marie-Louise Meng, MD**
6. Development of adapted postpartum PROMIS sleep disturbance (PROMIS+PP-SD) and sleep-related impairment (PROMIS+PP-SRI) item banks - Moe Takenoshita BSc, MBBChir, MRCS
7. Predictors of delayed urinary catheter removal following enhanced recovery after cesarean delivery: a retrospective cohort study Sunti Barahi MD, FRCPC

Research Abstracts Room 2: *Viger (8th floor)*
Leadership: Operations and Research: **4:45 pm – 5:45 pm**

1. Fate of Survey Research Presented at the Society for Obstetric Anesthesia and Perinatology Annual Meetings (2015–2019) - Markus Gulilat MD, PhD
2. Cost awareness of common neuraxial anesthesia medications and materials among obstetric anesthesia providers: A cross-sectional survey-based pilot study - Leah Han
3. Health System Resilience During the COVID-19 Pandemic: A Multicenter Analysis of Cesarean Delivery Efficiency - Sherry Wu BA
4. Reducing practice variability in obstetric anesthesia in a private hospital through a structured, team-based implementation of SOAP Centers of Excellence recommendations - Eliane Soares MD
5. Workplace-related Reproductive Hazards, Exposures and Mitigation Strategies for Anesthesiologists who are Pregnant and/or Conceiving: A Scoping Review - Namhee Kim
6. IJOA at a Glance: a digital information tool to enhance engagement and rapid knowledge dissemination for obstetric anesthesiologists - Eliane Soares MD
7. Publication Rate of Research Abstracts Selected for Oral Research Presentations at the Society of Obstetric Anesthesia and Perinatology Annual Meetings (2015-2019) - Kaitlin Nelson BSc, MSc

Research Abstracts Room 3: *Ramezay (8th floor)*
Uterotonics and TXA: 2:45 pm – 3:45 pm

1. Uterotonic Practices During Cesarean Delivery – A Survey of the Society for Obstetric Anesthesia and Perinatology Centers of Excellence - Alva Powell MD

2. Effect of Sequential Tranexamic Acid Timing Strategies on Postpartum Hemorrhage After Cesarean Delivery: A Multi-Phase Quality Improvement Evaluation - Ruhi Patil BS
3. Optimizing Oxytocin Delivery: Comparing IV and IM routes in cesarean delivery - Philip A Feinberg MD, PhD
4. The Origin Sites for Uterine Contractions in Pregnant Mice - David Combs MD PhD
5. Can a tablet do the job? The effect of oral calcium on maternal plasma concentration - Lauren Blake MD, MHS
6. Prophylactic vs Therapeutic Tranexamic Acid for Cesarean Delivery with PPH and Hemorrhage Outcomes: A Multicenter Retrospective Cohort Study - Lillian Liao MD, MS
7. Clinical Efficacy of Carbetocin as Primary Uterotonic in High-Risk Cesarean Deliveries: A Retrospective Case Series from a Brazilian Public Tertiary Center francinni mambrini - Pires Rego MD

Research Abstracts Room 3: *Ramezay (8th floor)*
Patient Voices: **3:45 pm – 4:45 pm**

1. Language-based disparities in obstetric blood transfusion: a retrospective cohort study - Lauren Blake MD, MHS
2. Evaluation of Patient-Reported Outcomes Measurement Information System (PROMIS)-29 v2.1 for Postpartum Women - Aswini Kuberan MD, DNB
3. Food for Thought: Patient Perspectives on Diet During Labor with Epidural Analgesia - Mahathi Kosaraju
4. Patient-centered care during neuraxial placement and operating room preparation for cesarean delivery: allowing support people in the operating room - Sebastian Seifert MD
5. Factors affecting Patient Satisfaction with Labor Pain Management: A Qualitative Analysis of Patient Interviews - Bansri Doshi MS
6. Patient Satisfaction and Preference Valuation in Neuraxial Labor Analgesia Across a Diverse Population - Diana Ruiz BS
7. Cesarean Deliveries under Unplanned General Anesthesia: A Qualitative Thematic Analysis of Patient Perspectives - Mariah Johnson BSc (Hons)

Research Abstracts Room 3: *Ramezay (8th floor)*
Pain Control: 4:45 PM – 5:45 PM

1. Utilization of Multimodal Analgesia after Cesarean Delivery with Neuraxial Anesthesia Following Enhanced Recovery and ACOG updated Guidelines - Alana Davidson
2. Effects of a Multimodal Analgesic Approach on Opioid Exposure Among Vaginal Delivery Patients: A Retrospective Study - Tyler Chau BS
3. Utilization of Multimodal Analgesia after Cesarean Delivery with General Anesthesia 2018-2023 - Alana Davidson
4. Intravenous methadone vs intravenous hydromorphone for analgesia following cesarean delivery under general anesthesia: a retrospective study - Breta Awuku MD
5. Postoperative Opioid Use and Pain After Repeat Cesarean Delivery: A Within-Patient Retrospective Cohort Study - Briel Lee MD
6. Intravenous methadone versus intrathecal morphine for analgesia following cesarean delivery: a randomized clinical trial - Catherine Gao MD
7. A Single-Center Feasibility Study of a Single Pain Skills Session (Empowered Relief®) for Postpartum Pain at 6 Weeks after Cesarean Delivery - Aleesha Jethwa MBBS, BMedSci, MSED

SATURDAY, MAY 2

8:00am – 9:30am Breakout Session: Case Reports – **NO CME**

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Cardio Obstetric Challenges (8:00 am – 8:45 am)

1. Reflections on 2 high-risk cardio-obstetrical patients - **Ali Mubarki, MD**
2. Anesthetic Considerations Of Cardiomyopathy In The Periparum Period - Emma Stoltz MD
3. Peripartum anesthetic considerations for patients with high-risk congenital heart disease - Braydon Bak MB,BCh,BAO
4. Anesthetic Management of a PArturient with Co-arctation of Aorta and Noonan Syndrome Undergoing Cesarean Section: A Case Report - Ashka Surve MBBS MD
5. Early Recognition and Anesthetic Implications of Pericardial Effusion in Pregnancy - Kayla Walker BS
6. Anesthetic Management of a Patient with Rheumatic Heart Disease Undergoing Cesarean Delivery - Tyler Austin MD
7. Anesthetic Management for the Pregnant Patient with a Moderate-sized Right Ventricle Pericardial Effusion - Lucas Steele MD

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Coagulation, Hemorrhage, And Hemoglobin (8:45 am – 9:30 am)

1. Successful Embolization of Spontaneous Uterine Artery Rupture Following Vaginal Delivery - Haylee Bergstrom MD
2. When Expectations Mislead: Anchoring Bias in Postpartum Hemorrhage - Margaret Lund MD
3. Anesthetic Considerations in an Obstetric Patient with Hemoglobin Casper Complicated by Moyamoya - Damon Wallace MD
4. Thromboelastography-Guided Neuraxial Anesthesia in a Parturient with Delta Storage Pool Disease - Thaha Afridi
5. When Collagen and Clotting Fail: Catastrophic Postpartum Hemorrhage in a Patient with Ehlers–Danlos Syndrome and Functional Platelet Disorder - Nicholas Mangano
6. Perioperative Management of a Pregnant Patient with Hereditary Spherocytosis - Katina Kassicieh MD
7. Neuraxial Anesthesia for Urgent Cesarean Delivery at 25 Weeks in a Patient with Severe Heart Failure with Reduced Ejection Fraction (< 20%) – Neil Panwalker, BS, BA

Case Reports Room 2B: *Ste- Hélène (8th floor)*
Ethics (8:00 am – 8:45 am)

1. Respecting Autonomy at the Edge of Risk: Cesarean Refusal Following Prior Uterine Rupture - Megan Howell DO
2. Ethical Challenges in Obstetric Anesthesia: Managing Medically Indicated Cesarean Delivery in the Setting of Acute Psychosis - Emma James Barksdale MD
3. Ethical and Logistical Challenges during Emergent Cesarean Delivery for an Incarcerated Patient with HELLP Syndrome and Schizophrenia - Shreya Goswami MD
4. A Preventable Delay: Cesarean Scar Ectopic Pregnancy Complicated by Restrictive Reproductive Policy - Jil Decker MD
5. Ethical Considerations in Acutely Intoxicated Obstetric Patients Safwat Choudhury MD
6. Peripartum Management of Acute Psychosis - Katherine Rosecrance MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*
Critical Decisions (8:45 am – 9:30 am)

1. Ruptured Hepatocellular Adenoma in Pregnancy: Navigating Maternal-Fetal Conflict - Miriam Griffin MD, MSCR
2. When Magnesium Masquerades: Complexity in Obstetric Anesthesia - **Vivienne Pham, BS**
3. Balancing Relative Contraindications: Epidural Anesthesia in a Pregnant Patient with Cardiac and Hepatic Dysfunction - Anna Bragg MD
4. Paternal Malignant Hyperthermia and Risk to Susceptible Fetus During Maternal Anesthesia - Monika Martinek MD
5. A Triple Threat at the Incision: Severe Pulmonary Hypertension, Impending Thyroid Storm, and Preeclampsia with Severe Features in Cesarean Delivery - Saheb Dhillon MD
6. A Pivot in Plans: Preeclampsia and PPROM in a Patient with PAH - Andrea Fritz MD, MPH
7. Pregnancy-Preserving Management of a Uterine Artery Pseudoaneurysm - Justine Lewis MD

Case Reports Room 3A: *Beaver Hall (8th floor)*
Cesarean Delivery, Unusual Issues (8:00 am – 8:45 am)

1. Decompensated Cirrhosis in Pregnancy Complicated by Placental Abruption - Silvia Chiang MD
2. Cesarean Delivery in a Parturient with Refractory Epilepsy and Neurosyphilis - Mohammad Nawaz MD
3. Anesthetic Management of a Morbidly Obese Parturient Requiring Preterm Delivery due to Severe-Range Hypertension - Maria Santa Cruz DO
4. Delivery Management in Marfan Syndrome with Aortic Root Dilation and Failed Combined Spinal-Epidural - Colette Jones
5. Anesthetic Considerations for Cesarean Delivery in a Patient with History of Antepartum Hemicraniectomy - Jeremy Altman MD
6. Intentional Minimalism: Anesthetic Choice for Cesarean Section in Patients with Myotonic Dystrophy - Katherine Fortson, MD

Case Reports Room 3A: *Beaver Hall (8th floor)*
Misc Hematology (8:45 am – 9:30 am)

1. Second Trimester Abortion Complicated by Atypical Hemolytic Uremic Syndrome - Elizabeth McCarthy MD, PhD
2. Management Considerations in a Parturient Patient with BENTA Disease Daniel Stevens MD
3. Thinking Outside the Epidural Space: Labor Analgesia in a Patient With PNH and Prior TBI - Briel Lee MD
4. Anesthetic management of a parturient with May-Hegglin anomaly Reagan Hattaway MD
5. Needles, Numbers, and Nuance: Two Cases of Neuraxial Anesthesia in FXI Deficiency - Fatine Karkri MD
6. Anesthetic decision-making under diagnostic uncertainty in suspected pregnancy-associated thrombotic microangiopathy with intrauterine fetal demise - Shingo Tanaka MD
7. Neuraxial Denied: Anesthetic Management of Severe Pancytopenia and Presumed Myelodysplastic Syndrome in a Patient with Superimposed Preeclampsia - Nicholas Mangano

Case Reports Room 3B: *Beaver Hall (8th floor)*
Complex Cesarean (8:00 am – 8:45 am)

1. Anesthetic Management for an EXIT Procedure in a Parturient With Fetal Cervical Teratoma - Xinhao Liu MD/PhD

2. Successful management of extended cesarean section and hysterectomy with neuraxial blockade - Flavia Dumitrascu MB BCh BAO
3. Case Report: Emergent Total Colectomy for Toxic Megacolon During Pregnancy - Katherine Dunshee DO
4. Case Report: Anesthetic Management for Cesarean Delivery in a Pancreas-Kidney Transplant Recipient with Renal Graft Failure - Parth Rajguru DO
5. Third Trimester Polytrauma after High Speed MVC: A Lesson in Triage - Nilang Shah MD
6. A case of acute kidney injury following resuscitative endovascular balloon occlusion of the aorta for management of postpartum hemorrhage due to partial placenta previa - Mana Takizawa MD
7. Recurrent Severe Postpartum Abdominal Complications After Cesarean Delivery - Kristen Harris

Case Reports Room 3B: *Beaver Hall (8th floor)*
Complex Accreta (8:45 am – 9:30 am)

1. Anesthetic Management of Cesarean Delivery in a Heterotopic Twin Pregnancy with Extrauterine Placenta Percreta - Shakthi Jayanthy Venkatachalam MBBS
2. Anaesthetic considerations in rudimentary horn twin pregnancy with placenta accreta - a case report - Suji Pararajasingam FRCA
3. A Case of Collaterals – Extensive Cervical and Vaginal Varices in a Placenta Accreta Case - Jennifer Garcia MD
4. Placenta Percreta involving the bladder requiring massive transfusion protocol - Andrew Tseng DO, MPH
5. What Caused the Bleed - Placenta Accreta in the Setting of Factor V Leiden - Miranda Marcucci DO
6. Coordinated Multidisciplinary Management of Placenta Percreta With Cervical Invasion - Neveada Raventhiranathan MD
7. General Anesthesia for Cesarean Delivery Complicated by Placenta Accreta and Fetal Omphalocele - Xinhao Liu MD/PhD

8:00am – 9:30am Breakout Session: Research Abstracts – **NO CME**

Research Abstract Room 1: *Palais (8th floor)*
Hemorrhage: Transfusion (8:00 am – 8:45 am)

1. Blood Transfusion Protocol Significantly Reduces Blood Product - Kristen Harris
2. Association of patient characteristics with blood loss during planned cesarean hysterectomy for placenta accreta spectrum: a single-center study - Michael Hofkamp, MD
3. Platelet dysfunction in postpartum hemorrhage and transfusion approaches assessed in a microfluidic platform - Emily Mihalko PhD
4. Quantra QStat Characteristics in Obstetrics versus a Cardiac Surgery Control Group - Austin Smith MD
5. Effect of intraoperative uterine artery embolization on transfusion requirements during cesarean section for suspected placenta previa and placenta accrete spectrum - Yoon Ji Choi

Research Abstract Room 1: *Palais (8th floor)*
Efficiency, Education, Access (8:45 am – 9:30 am)

1. Optimizing Obstetric Pre-Admission Unit Efficiency and Enhancing Patient Experience through an AI-Powered Chatbot - Mostafa Abbasi Dezfouly MD, Bsc
2. Understanding Public Interest in Epidural Anesthesia for Labor: A 10-Year Google Trends Study - Tarick Ahmad BS

3. Online Patient Resources for Cesarean Delivery: Are Pain and Anesthesia Prioritized in Education? - Kalli Fautsch, MD
4. Accuracy and Quality of Social Media YouTube, TikTok, and Facebook on Cesarean Anesthesia - Yoojin Kang MD
5. Patterns of intravenous access used for labor and delivery at Society for Obstetric Anesthesia and Perinatology Centers of Excellence – a cross-sectional survey study - Lauren De La Ossa MD

Research Abstracts Room 2: *Viger (8th floor)*
Refining Hemorrhage Management (8:00 am – 8:30 am)

1. Impact of Maternal Vulnerability on Hemorrhage Severity in Placenta Accreta Spectrum at a High-Volume Referral Center - Joshua Smith BS
2. Preoperative Risk Stratification in Suspected Placenta Accreta Spectrum - Emily Boyd MD
3. Revisiting the Adoption of a Hemorrhage Bundle at a Single Tertiary Center: A Delphi Survey Assessment of Compliance and Continued Barriers to Implementation - Yalda Toofan MS, MD
4. Timing is everything: An evaluation of best practices for quantitation of blood loss after vaginal delivery - Pin Jung Cheng MD
5. Real-Time Risk Prediction of Postpartum Hemorrhage: An Online Tool for the Labor & Delivery Time Course - Mahesh Challapalli BS

Research Abstracts Room 2: *Viger (8th floor)*
Leadership: Education For All (8:45 am – 9:30 am)

1. Eating in Labor: A Cross-Sectional Survey of Obstetric Providers via Social Media - Shelby Crants, MD
2. Content and Consistency of Informed Consent for Neuraxial Labour Analgesia: A Prospective Observational Study - Juliana Kruthof, MD, MSc, FRCPC
3. Staff Culture of Respectful Care in Antenatal and Postpartum Units: A Qualitative Concept Elicitation Study - Moe Takenoshita, BSc, MBBChir, MRCS
4. Novel Education Image to Improve Recognition and Reporting of an Urgent Maternal Warning Sign: A Pilot Study - Shayna Levine, MD

Research Abstracts Room 3: *Ramezay (8th floor)*
POCUS (8:00 am – 8:30 am)

1. Examining the gastric emptying half-time of water versus carbohydrate beverage in early labor in patients with epidurals - Stefan Rodriguez, MD
2. Incidence of pulmonary interstitial syndrome and it's correlation with N-terminal pro-B-type natriuretic peptide in preeclamptic women with severe features: A Prospective cohort study - Aswini Kuberan, MD, DNB
3. Comparison of Patient-Perceived and Ultrasound-Defined Midline in Parturients: Implications for Neuraxial Anesthesia - Payton Gore, MD
4. Teaching an Ultrasound-Guided Median Interspinous In-Plane Approach for Spinal Anesthesia in Obese Parturients – Wun Kuk, MS
5. Ultrasound assessment of gastric contents in patients with epidural analgesia in advanced labor or requiring cesarean delivery- Saranya Lertkovit, MD

Research Abstracts Room 3: *Ramezay (8th floor)*
PDPH (8:45 am – 9:30 am)

1. AI-assisted comparison of institutional protocols with 2024 SOAP/ASRA consensus report on post-dural puncture headache: a multi-institution analysis - Alexander Peres, MD, MSc
2. Lost in Translation: Limited English Proficiency and Suboptimal Management of Postdural Puncture Headache - Meeseo Lee, BA

3. Management of Postdural Puncture Headache: Continuity of Care, But For How Long? A Mixed-Methods Quality Initiative Study - Emma Rahilly, BS
4. Nebulized Dexmedetomidine for Post-Dural Puncture Headache after Cesarean Delivery: A Systematic Review - Hassan Kiani, MSc
5. Fluoroscopic versus Conventional Epidural Blood Patch for Post-Dural Puncture Headache in Obstetrics: A Retrospective Cohort Study of Efficacy - Rachel Pinkhasov, BS

3:00pm – 5:15pm Breakout Session: Case Reports - **NO CME**

Case Reports Room 1: *McGill (8th floor)*

Can't Do A Neuraxial? (3:00 pm – 4:00 pm)

1. When Neuraxial is a No-No: General Anesthesia for a Parturient with Heart Failure and Cerebral Midline Shift - Taylor Catalano MD
2. Screening and Anesthetic Management of Hereditary Hemorrhagic Telangiectasia in Parturients -Nicholas Cirrone MD
3. Urgent Cesarean Delivery in a Patient with Charcot-Marie-Tooth Disease, Scoliosis, and Preeclampsia -Elise Costa MD
4. Wired for Success: Labor Analgesia in a Patient with a Sacral Nerve Stimulator - Rohini Loke MD
5. Gluteal Augmentation: A Contraindication for Neuraxial Anesthesia? - Erik McKee MD
6. Combined Spinal-Epidural for Cesarean Delivery in Complex Congenital Heart Disease and Recent Stroke: A Case Report - Deval Jhaveri DO
7. A Multidisciplinary, Multi-operator Approach to Neuraxial Anesthesia in Parturient with BMI of 101 kg/m² - Dipti Punjabi
8. From Triage to Delivery Planning: Management After Massive Pulmonary Embolism - Mohammad Nawaz MD
9. Neurofibromatosis Type 1 in Pregnancy: Implications for Delivery Planning - Margaret Lund MD
10. Anesthetic Approach and Delivery Planning in Peripartum Aneurysmal Subarachnoid Hemorrhage Sanjana Dayananda MD

Case Reports Room 1: *McGill (8th floor)*

Strange Conditions (4:00 pm – 5:15 pm)

1. Anesthetic Management of Cesarean Delivery in a Parturient With Glycogen Storage Disease Type IIIa and Multisystem Involvement- Alexander Meshel MD
2. Multidisciplinary care in Vascular Ehlers Danlos Syndrome Pregnancy - Shreya Dey MD
3. Factor VII deficiency and Remifentanil use - David Nguyen MD, MS
4. Balancing Maternal Risk in Refractory Immune Thrombocytopenic Purpura: Safety & Systems Errors with Remifentanil Patient-Controlled Analgesia for Labor Analgesia - Kimberly Peloza MD
5. Weathering the Sympathetic Storm: A Precisely Orchestrated Cesarean Delivery as a Therapeutic Strategy for Refractory Paroxysmal Hyperactivity in a Parturient - Emilie Cohn MD
6. Avoiding Pheochromocytoma Crisis During Delivery in a Parturient with a Large Tumor and Lynch Syndrome - Julio-Santiago Perez MD
7. Multidisciplinary Approach to Electroconvulsive Therapy in a Pregnant Patient - Olga Diomede MD, MS
8. Challenges during labor anesthesia in a patient with Klippel-Trenaunay syndrome - Andrew Lee MD
9. Diastematomyelia in Pregnancy: Implications for Neuraxial Anesthesia - Elizabeth Cifuentes MD

10. Remifentanil-induced fetal heart rate changes during labor in a patient with active malaria and thrombocytopenia: a case report - Walter Taylor MD

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Pulmonary Morbidity (3:00 pm – 4:00 pm)

1. Anesthesia and Multidisciplinary Management in a High-Risk Obstetric Patient with Severe Pulmonary Disease Undergoing Cesarean Delivery - Damon Wallace MD
2. Navigating the Danger Zone: Cesarean Delivery in a Patient with Idiopathic Pulmonary Hypertension - Jeroen De Haes MD, EDAIC, EDIC
3. Urgent Cesarean Delivery in a Patient with Newly Diagnosed Pulmonary Hypertension at 34 Weeks - Paxton Walton MS
4. Peripartum anesthetic management of a patient after heart-lung transplant Laura Nerb MD
5. Anesthetic Management of a Pregnant Patient with Post-Radiation Supraglottic Stenosis Undergoing Laser Excision - Alva Powell MD
6. A Case Report: Trial of Labor in a Parturient with Fibrosing Mediastinitis and Superior Vena Cava Syndrome - Christa Saelinger MD
7. Managing cesarean delivery complicated by severe pulmonary arterial hypertension secondary to newly diagnosed conotruncal ventricular septal defect - Vrinda Shukla MD
8. Prolonged Neuromuscular Weakness Following Emergent Cesarean Delivery Revealing Undiagnosed Pseudocholinesterase Deficiency - Ola Shana MD
9. Perioperative Anesthetic Management of Pulmonary Hypertension: A Case Report - Kimberly Hughes MD
10. Intervention for Grade 3 Subglottic Stenosis in the Third Trimester: A Case Report - Hannah Schmucker MD

Case Reports Room 2A: *Ste- Hélène (8th floor)*
Dilemmas In Labor (4:00 pm – 5:00 pm)

1. Persistent labor pain that should trigger alarm, not a repeat bolus - Bilal Qarni DO
2. My Legs Fell Asleep and They Won't Wake Up! Managing HNPP During Labor and Delivery - Joshua Hamburger MD
3. Labor pain management of a parturient with Friedreich ataxia, cardiomyopathy, super morbid obesity and challenging lumbar epidural catheter placement, a case report - Ashka Surve MBBS MD
4. Anesthetic Management of Super-Obese Parturients: A Two-Case Series -Xiao Lu Zhang DO, PhD
5. Management of Cramp Fasciculation Syndrome During Childbirth - Garrett Buechner MD
6. Multidisciplinary Management of Labor and Neuraxial Anesthesia in a Parturient with Complex Cardiac and Hematologic Disease- Carter Pacheco
7. Labor in Pregnant Patient with Epidermolysis Bullosa Stephanie Nguyen-Abella DO
8. Knot at our Hospital-Case Reports - William Obrecht MD
9. Presentation of Atypical Hemolytic Uremic Syndrome in a Peripartum Patient - Michael Yakobi-Shvili MD
10. Percutaneous Umbilical Blood Sampling and Intrauterine Transfusion in the Setting of Fetal-Maternal Hemorrhage - Coleman Harber MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*
Tricky Cesareans (3:00 pm – 4:00 pm)

1. Anesthetic management of a patient with achondroplasia undergoing cesarean delivery: A Case Report - Shreya Majagi MD
2. Single shot spinal anesthesia with intrathecal dexmedetomidine for an emergent 10th cesarean delivery: a case report - Sandy Kim MD

3. Cesarean Delivery for Autonomic Dysreflexia with Synovial Sarcoma of T7 Causing Pathologic Burst Fracture - Timothy Hellerer
4. Emergent intraoperative intraosseous catheterization during cesarean delivery in a morbidly obese parturient with sudden loss of intravenous access - Sarah Baum MD
5. Difficult surgical exposure imposes additional hemorrhage risks: a case of extra-uterine bleeding postpartum - Janet Kim MD
6. Buying Time in Obstetric Anesthesia: Emergent REBOA for Life-Threatening Postpartum Hemorrhage - Anastazia Gilman-Hood MD
7. Delayed Postpartum Hemorrhage Requiring Multisite Intervention: The Essential Role of Obstetric Anesthesiology - Gabrielle Migliozzi Doctor of Medicine
8. Management of a parturient with severe pre-eclampsia complicated by hypokalemic periodic paralysis - Alan George MSc, MBChB
9. A case of undifferentiated shock and hypoxemic respiratory failure in a pregnant patient with placenta previa and vasa previa - Hanna Mandl MD
10. Anesthetic challenges of a cesarean delivery for a parturient with neurofibromatosis type 1 and an ICD - Sagar Patel MD
11. Cesarean Delivery in a Patient with Severe Peripartum Cardiomyopathy – Ashley Thomson, MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*
Oncology and Neuromuscular (4:00 pm – 5:00 pm)

1. Labor Epidural in a Patient with Amyotrophic Lateral Sclerosis - Riley Hales MD MBA
2. Peripartum Management of a Parturient with Bilateral Renal Angiomyolipomas and Lymphangioleiomyomatosis Complicated by Pulmonary Gel-Foam Embolization and Recurrent Pneumothorax - Isaiah Coleman Sr. MD
3. Severe Hemoperitoneum After Transvaginal Oocyte Retrieval in a Patient With Advanced Rheumatoid Arthritis: An Anesthetic Challenge- Borislava Pujic MD
4. Anesthetic considerations for a patient presenting at term with newly diagnosed lymphoma complicated by large pelvic mass and neurologic deficits - Jennifer LaPier MD
5. Anesthesia In Parturients With Disproportionate Skeletal Dysplasia Complicated By Lumbar Disc Herniation And Spinal Stenosis - Abigayle Castine MD, MS
6. Neuraxial Anesthesia for a Parturient with a Spinal Cord Tumor - Chinwendu Amazu
7. Impact and Anesthetic Considerations of Breast Cancer in the Pregnant Patient - William Grant DO, MEd, BSN
8. From needle phobia to neuraxial success: a multi-disciplinary, patient-centered approach for cesarean delivery complicated by spinal muscular atrophy Autumn Lupotsky MD
9. Management of a Parturient with a Full-Term Extrauterine Abdominal Pregnancy and Large Overlying Ovarian Cyst- Lucy Xu MD
10. Peripartum Considerations in a Patient with New Diagnosis of Acute Lymphoblastic Leukemia (ALL) - Rex Michitsch DO

Case Reports Room 3A: *Beaver Hall (8th floor)*
Preeclampsia and Coagulopathy (3:00 PM - 4:00 PM)

1. Anesthetic Management of Spontaneous Hepatic Rupture in HELLP Syndrome - Fatemeh Ashtari MD
2. Refractory Postpartum Hypertension and Status Epilepticus Secondary to Eclampsia With PRES: An Anesthetic and Critical Care Challenge - Hanna Campbell
3. Social Barriers and Postpartum Safety: Managing Preeclampsia with Severe Features Amid Real-World Constraints - Erin Brandon DNAP, CRNA
4. Catastrophic postpartum sequelae of severe preeclampsia with HELLP syndrome following cesarean delivery - Paul Francois MD

5. A Series of Unfortunate Events in Preeclampsia and HELLP Syndrome - Kyle Kellett
6. No Platelets, No Problem: Management of Cesarean Delivery in a Patient with Refractory ITP in the Setting of Pre-Eclampsia with Severe Features - Rachel Pedreira MD, MS
7. Intrauterine fetal demise (IUFD) complicated by Disseminated Intravascular Coagulation (DIC) leading to ischemic stroke with hemorrhagic transformation - Abdal-Aziz El-Hussain MD
8. Disseminated Intravascular Coagulation Following Intrauterine Fetal Demise: A Case Report - Elizabeth Gray DO
9. Pregnancy-Associated Thrombotic Thrombocytopenic Purpura Presenting as Severe Thrombocytopenia With Fetal Compromise - A. Taylor Thomas MD, MPH
10. Fibrinogen Replacement in Postpartum Hemorrhage due to Uterine Atony - Christine Daly MD, MS

Case Reports Room 3A: *Beaver Hall (8th floor)*
Challenging Blocks (4:00 pm – 5:00 pm)

1. Quadratus lumborum peripheral nerve catheter for refractory abdominal pain due to a degenerating fibroid in a pregnant patient. - Riddhi Patodia DO
2. Bilateral continuous rectus sheath blocks for post-operative pain management after caesarean section in a parturient with osteochondrodysplastic dwarfism: a case report - Mrinmoyee Kalasikam BA
3. Management of a Postpartum Patient with an Entrapped Epidural Catheter - Sigal Israilov MD
4. Simultaneous Intravascular Migration and Knot Formation of an Epidural Catheter: A Rare Mechanical Complication - Austin Martindale MD
5. Transnasal topical sphenopalatine ganglion block for temporary symptom relief in two parturients with mild to moderate post-dural puncture headache who either declined or deferred epidural blood patch- Kiyoyuki Miyasaka BS MS MD PhD
6. A Bundle of Joy and a Bundle of Nerves: Safe Epidural Placement in a Pregnant Patient with a Schwannoma - Kaitlyn Dempsey MD
7. Getting ahead of the pain: prophylactic epidural blood patch in a patient with substance use disorder - Bryanna Buchman MD
8. Rare Neuraxial Complication in Obstetric Anesthesia: Cerebrospinal Fluid-Cutaneous Fistula -Nana Yaa Kwansa
9. Multimodal Analgesia for Postoperative Pain Control in Patient with Opioid Tolerance Stefan Rodriguez MD
10. When Pain Relief Causes Pain: Morphine-Induced Sphincter of Oddi Spasm During Preterm Labor Margaret Akey BS

Case Reports Room 3B: *Beaver Hall (8th floor)*
Call A Consult! (3:00 PM - 4:00 PM)

1. New Post-conceptional Diagnosis of Marfan, Bicuspid Aortic Valve, and Ascending Aorta Dilation: Case Considerations and Multidisciplinary Management Through Pregnancy and Delivery - Iryna Chugaieva MD
2. Through the Looking Glass: Anesthetic Challenges in Mirror Syndrome Samantha Smith MD
3. Peripartum cardiomyopathy: Point-of-Care Ultrasound Utilization and Anesthetic Considerations - Shobana Bharadwaj MBBS
4. Transient Focal Neurological Deficits Following Epidural Placement During First-Stage Labor -Ronza Zoorob DO
5. Laser Ablation for Idiopathic Subglottic Stenosis in Pregnancy: Should Continuous Fetal Monitoring be the Standard of Care? - Erik Ovrom MD

6. Paralysis, Pregnancy, and the Delivery Plan: Navigating Anesthesia in Atypical Guillain–Barré Syndrome - Sanaz Bayani MD
7. Peripartum Anesthetic Management of Severe Stiff Person Syndrome: Anticipatory Planning in a High-Risk Parturient- Vinay Khare MD
8. Anesthesia for Anterior Mediastinal Mass in Pregnancy: Anesthetic Management and Considerations - Zenobia Faussett MD
9. Dual Presentation of Severe Pre-Eclampsia and Fungemic Endocarditis in the Parturient - Liz James MD
10. Eye Enucleation for Endophthalmitis in Pregnancy - Ketty Consuegra MD

Case Reports Room 3B: *Beaver Hall (8th floor)*
Blood, Platelets, Vessels (4:00 pm – 5:00 pm)

1. Beyond Preeclampsia: A Case of Sickle Cell Disease, Hemolysis, and Prolonged Expectant Management in Pregnancy - Chante Strong MD
2. Crisis Averted: A Multidisciplinary Approach to Sickle Cell Disease in Pregnancy - Meghna Jayaraman MD
3. Anesthetic Management of a Patient with Known Sickle Cell Disease Presenting with Acute Chest Syndrome and Preeclampsia with Severe Features Requiring Cesarean Delivery: A Case Report - Noel Cercizi BA
4. Challenges in Diagnosis and Management of Sickle Cell Disease and HELLP - Claire Herzog MD
5. Anesthetic Management of a Preeclamptic, Morbidly Obese Parturient With Von Willebrand Disease: A Case Report - Isabella Griffay MD
6. Platelet-sparing peripartum hemostatic management in Glanzmann thrombasthenia: prophylactic rFVIIa plus tranexamic acid for planned vaginal delivery Raffaella Fantin Dr
7. Placental Vascular Malformation: A High-Risk Cesarean Delivery - Erica Chemtob MD
8. Cerebral Vasoconstriction Syndrome in Peripartum Patient- Meron Teklu BA
9. When Dialysis Meets Delivery: Anesthetic and Multidisciplinary Challenges in a Pregnant Patient with Type 1 Diabetes, End-Stage Renal Disease on Intensive Dialysis, and Chronic Hypertension - Nicholas Mangano
10. Multidisciplinary Management and High-Risk Cesarean Delivery in Mosaic Turner Syndrome with Complex Aortic Pathology: A Case Report - Payton Gore MD
11. Peripartum Management of Hypodysfibrinogenemia – Rachel Brock MD

3:00pm – 5:15pm Breakout Session: Research Abstracts – **NO CME**

Research Abstracts Room 1: *Palais (8th floor)*
Cardiac and Misc (3:00 pm – 4:00 pm)

1. Peripartum Cardiomyopathy Increases the Risk of Venus Thromboembolism and Coagulopathy: A Complex Physiology of Hemostatic Morbidity - Jeffrey Lee, MD
2. Contemporaneous reported clinical outcomes of pregnancy in maternal cardiac patients: a systematic review - Cheryl Achary FRCA
3. Anesthetic management in cardiac surgery during pregnancy: a 16-year clinical study of 138 patients - He Jing, MD
4. Avoidance of Long-Acting Neuromuscular Blocking Agents Decreases the Risk of Postoperative Pulmonary Complications in Pregnant Patients Undergoing Fetoscopic Myelomeningocele Repair - Claire Naus, MD
5. Rethinking Reversal: Sugammadex Use During Pregnancy in Nonobstetric Surgery - Kalli Fautsch, MD
6. Beyond Severe Maternal Morbidity: Exploring Reasons for ICU Transfer during Delivery Hospitalizations - Alana Davidson

7. Arrival Physiology and Racial Disparities in Pregnant Trauma: A National Analysis - Alina Siddiqui, MD

Research Abstracts Room 1: *Palais (8th floor)*
Potpourri (4:00 pm – 5:15 pm)

1. Ankle Blood Pressure as a Predictor of Neonatal Outcomes in Obese Women Undergoing Cesarean Delivery (CD) under Spinal Anesthesia (SAB) - Srija Konduru, BS
2. Prevalence and Severity of Anemia in Term Pregnant Women Admitted for Delivery: A Retrospective Study - Monica Siaulys, PhD, MD
3. Cesarean Delivery in a Patient with Severe Peripartum Cardiomyopathy - Ashley Thomson, MD
4. A retrospective analysis of neuraxial anesthesia failures for postpartum tubal ligation procedures: could umbilical sparing be to blame? - Caroline Thomas, MD
5. Optimizing Anesthetic Practice for Cervical Cerclage: A Quality Improvement Study - Cecilia Uong, MD
6. Trends in Neuraxial Dosing for Cervical Cerclage at a Large Academic Medical Center - Catharine Keim, MD
7. Hypopituitarism in pregnancy does not increase the risk of PPH despite disruption to oxytocin axis - Alexander Meshel, MD

Research Abstracts Room 2: *Viger (8th floor)*
High Risk and Crisis Management(3:00 pm – 4:00 pm)

1. Frequency, Characteristics, and Management of Parturients with Fontan Circulation Delivering with Anesthesia: A Multicenter Retrospective Cohort Analysis - Kate Frost, MD
2. Outcomes of Temporary Mechanical Circulatory Support in Peripartum Patients with Amniotic Fluid Embolism – Fariha Hanif, BS, MPH
3. Escalation of Peripartum Care - Emily Naoum, MD
4. Emergency Surgery in Pregnancy Isn't the Catastrophe We Fear: Outcomes After 55 Emergent Non-Obstetric Cases - Christopher Mukasa, MD
5. Identifying timepoints of critical communication breakdown in the care of obstetric patients: A cross-sectional cohort survey-based study - Jordan Francke, MD, MPH
6. Maternal Outcomes by Mode of Delivery in Pregnant Patients with Valvular Heart Disease: A Retrospective Cohort Study - Heather Acuff, MD, PhD
7. Risk Factors for Neonatal Acidosis Among Patients with Umbilical Cord Prolapse: a Single Center Study - Hannah Berland, MD

Research Abstracts Room 2: *Viger (8th floor)*
Rare Conditions (4:00 pm – 5:15 pm)

1. Anesthetic Management for Parturients with Klippel-Trenaunay Syndrome: A Case Series -Amanda Ruiz, MD
2. Inhibiting TRPV4 ameliorated the hyperalgesia in sciatic nerve injury-induced neuropathic pain via restraining the SGCs activation - Mingjie Mao
3. Acute Fatty Liver of Pregnancy Increases Postpartum Hemorrhage and ICU Admission: Implications for Peripartum Anesthesia - Edward Sutanto, BS
4. Anesthetic and Obstetric Outcomes in Pregnant Individuals with Sickle Cell Disease: A Retrospective Observational Study at a Tertiary Academic Center - Margarita Blajeva, MD, MBA, FCAI
5. Failed Induction of Labor Rates in Class Three Obesity: A Retrospective Study - Hannah Schmucker, MD
6. Postpartum Plasma-Derived Exosomes Confer Mitochondrial Stabilization and Neuroprotection against Ischemic Stroke - Creed Stary, MD, PhD

Research Abstracts Room 3: *Ramezay (8th floor)*
Patient Voices 2 (3:00 pm – 4:00 pm)

1. Recovery and mental health outcomes in patients with placenta accreta spectrum after cesarean delivery under neuraxial anesthesia - Noor Raheel MD, MPH
2. Humanizing the Cesarean Experience: Standardizing Trauma-Informed, Patient-Centered Care in the Obstetric Operating Room. Darragh O'Reilly MBBS, MSc, FCAI
3. "I didn't think it was what my story would be": A qualitative analysis of maternity patients' experiences in critical care - Anna Stout
4. Birth experiences of stigma and discrimination amongst critically ill pregnant patients: a prospective case-control patient-reported outcome pilot study - Craig Thomas
5. Critical Care Obstetrics (CCOB) Program Year One: Risk Stratification and Outcomes for Patients who Received Care on Labor and Delivery (L&D) and Those Transferred to an Intensive Care Unit (ICU) - James Conwell DO
6. VOICE-ICU: Voices of Obstetric Intensive Care Experiences - Informing Care and Unit Design: A Scoping Review - Kyeisha Laurence BS
7. A New Interdisciplinary Patient Support Tool to reduce psychological trauma amongst women undergoing urgent or emergency cesarean sections: Results from a Modified Delphi study- Pamela Angle MD FRCPC MSc (oxon)

Research Abstracts Room 3: Ramezay (8th floor)
Cesarean Delivery and other Surgery (4:00 pm – 5:15 pm)

1. Perioperative Efficiency for Cesarean Delivery Differs by Care Model: A Comparison of Community and Academic Hospitals - Sherry Wu BA
2. Dynamic Machine Learning Model for Prediction of Unplanned Intrapartum Cesarean Delivery Risk in Patients with Neuraxial Labor Analgesia - Nancy Greenspon MD
3. Comparing the Effects of Sitting Duration and Lateral Positioning on Hemodynamics and Neonatal Outcomes During Spinal Anaesthesia for Elective Caesarean Section - Raghvendra Singh MBBS, MD
4. The effect of prophylactic low-dose norepinephrine infusion on perioperative hypothermia during cesarean section: a retrospective cohort study - Rimu Suzuki RN MSN
5. Feasibility of Maintaining Maternal Systolic Blood Pressure ≥90% Baseline During Elective Cesarean Delivery Under Spinal Anesthesia and Association with Neonatal Outcomes: A Retrospective Cohort Study - Anna Wilkinson MBChB BMSc FRCA
6. The Pannus Retention System and Hypotension during Cesarean Section; an Observational Study - Ashir Bansal MD
7. Association of patient and clinical characteristics with successful vaginal birth after cesarean delivery: a single-center retrospective study - Hannah Berland MD

SUNDAY, MAY 3

8:00am – 9:30am Breakout Session: Oral Research Presentations - **NO CME**
Room 1: *McGill (8th floor)*

1. Development and Evaluation of a Low-Cost 3D-Printed Scoliosis Neuraxial Training Model - Man Kuan, Lei, MD
2. Development of an EMR-Embedded Obstetric Anesthesia Quality Dashboard - Christine McKenzie, MD
3. Escape Room for Inter-professional Complex Obstetric Care - Felicia Rustandy, MD
4. A Novel Ultrasound-Compatible Lumbar Simulation Jacket: Impact on Ultrasound and Palpation Skills Among Anesthesiology Residents - Katherine Chan, MD

5. Between Promise and Practice: Provider Challenges in Adopting AI for Clinical Workflows – Sadaf Tayafeh, MSc
6. Implementation of a Virtual Reality Neuraxial Masterclass In Medical Education For Trainees - Catharine Keim, MD
7. Visualizing Intrathecal Drug Spread With a 3D-Printed Spine Model: Effects of Trendelenburg and Pre-Supine Sitting Duration – Austin Zheng
8. Development of a Virtual Reality Educational Module Using a Scoliosis Patient-Specific Three-Dimensional Model - Catharine Keim, MD

8:00am – 9:30am Breakout Session: Case Reports - **NO CME**

Case Reports Room 2A: *Ste- Hélène (8th floor)*

OB Emergencies (8:00am – 9:30am)

1. Spontaneous Coronary Artery Dissection in the Third Trimester - Shobana Bharadwaj, MBBS
2. Preeclampsia and Spontaneous Coronary Artery Dissection: A Rare Cause of Postpartum Myocardial Infarction - Fatemeh Ashtari, MD
3. Anesthetic Management of Scheduled Cesarean Delivery in a Patient With Pregnancy-Associated Spontaneous Coronary Artery Dissection - Stefan Rodriguez, MD
4. Cesarean Delivery in a Patient with History of Unprovoked Spontaneous Coronary Artery Dissection - Fallon Babcock, MD
5. Intraoperative Discovery of Massive Hemoperitoneum from Subcapsular Liver Hematoma in a Patient with Preeclampsia and Intrauterine Fetal Demise - Abhinav Prasad, MD
6. New-onset Peripartum Cardiomyopathy with Focal Pulmonary Edema Masked as Pneumonia Leads to Acute Decompensation in Labor Necessitating Urgent Cesarean Delivery - Payton Marshall, MD, PhD
7. Intraoperative Decompensation with Placenta Percreta Requiring Aortic Compression and Emergent Conversion to General Anesthesia: A Case Report - Anna Pham
8. Seizure is the Great Masquerader in the Peripartum Period - Patricia Rusli, MD
9. Suspected Amniotic Fluid Embolism During Vaginal Delivery of Dichorionic Diamniotic Twins Under Epidural Anesthesia – Alexander Storm
10. Cesarean Section for Parturients with Ascending Aortic Aneurysm: Two Case Reports with Anesthetic Recommendations - Amy Yan, MD
11. Anesthetic Management for Emergent Cesarean Delivery in the Setting of Acute Infective Endocarditis and a Right Atrial Mass - Mariana Acosta, MD
12. Eclamptic Seizure at the Time of Neuraxial Anesthesia for Scheduled Cesarean Delivery - Niharika Gupta, MD

Case Reports Room 2B: *Ste- Hélène (8th floor)*

Neurovascular Challenges (8:00am – 9:30am)

1. Functional Neurologic Disorder Mimicking Stroke in the Immediate Postpartum Period - Niharika Gupta MD
2. Vascular malformations near the spine highlight the importance of outpatient pre-delivery planning in a high-risk obstetric anesthesia clinic - Rachel Pedreira MD, MS
3. Management of Delivery in a Parturient with Vascular Ehlers Danlos Syndrome - Sarah Baum MD
4. Against All Odds: Successful Pregnancy in a Patient with Autotransplanted Kidneys and Spinal Arteriovenous Malformation: a case report - Alison Williams
5. Use of lumbar ultrasound in neuraxial anesthesia for a pregnant patient with Klippel–Trenaunay syndrome: a case report - **Alfonso Wildner, MD**
6. Epidural Labor Analgesia in a Parturient With Neurofibromatosis Type 1 - Xinhao Liu MD/PhD

7. Inflammatory Polyneuropathy Following Neuraxial Labor Analgesia in a Patient with Chiari I Malformation - Katherine Fortson MD
8. When the Pressure Breaks: Pituitary Apoplexy in the Setting of Pre-Eclampsia Anthony Fraga MD
9. Blue Rubber Bleb Nevus Syndrome in Pregnancy: A Case Report- Jeremy Latham MD
10. Balancing Maternal and Fetal Risk: Preterm Cesarean to Facilitate Neurosurgical Resection of a Giant Craniopharyngioma - Akansha Tarun MD
11. Through A Vascular Minefield - Cesarean Delivery Under Spinal Anesthesia - Keerthana Jayabalan MBBS, MD,DNB
12. Pulmonary and Vertebral Arteriovenous Malformation in Pregnancy with Hereditary Hemorrhagic Telangiectasia: A Case Report - Ashka surve MBBS MD

Case Reports Room 3A: *Beaver Hall (8th floor)*
Elevated ICP (8:00am – 9:30am)

1. Anesthetic Management of a Pregnant Patient with Elevated Intracranial Pressure - Christopher Keenan MD
2. Postpartum Reversible Cerebral Vasoconstriction Syndrome Concurrent with Pre-eclampsia After Cesarean Delivery: Balancing Conflicting Goals - Anna Wilkinson MBChB BMSc FRCA
3. Delivering Under Pressure: A Parturient with Intracranial Hemorrhage - Rechna Korula MD, MS
4. Anesthetic Management of Vaginal Delivery in a Pregnant Patient with Symptomatic Intracranial Meningioma - Gabriella Shayani
5. When the Aqueduct Is Closed: Anesthetic Decision-Making for Cesarean Delivery in Non-Communicating Hydrocephalus - Margarita Blajeva MD, MBA, FCAI
6. Mind Blowing Connections: A Case Report On The Management Of A Ruptured Arteriovenous Malformation During Pregnancy - Andrea Monica Lee MD, MBA
7. Increased ICP in the Parturient with Alport Syndrome - Brannon Broussard MD
8. Posterior Reversible Encephalopathy Syndrome in the Setting of Preeclampsia, Substance Use, and Peripartum Cardiomyopathy Following Cesarean Delivery - Reshu Chandra MD Candidate
9. Neuraxial Anesthesia for Cesarean Delivery in a Parturient with New-Onset Seizure and Intracranial Meningioma - Isabella Valente MD
10. Post-dural Puncture Headache Complicated by Intracranial Hemorrhage: Case Report - Jennifer Guevara MD
11. Peri-Cesarean Seizure in a High-Risk Parturient: An Anesthesia Case Study Shilen Thakrar MD
12. Diagnostic Challenges of Postpartum Headache after Neuraxial Analgesia in a Parturient with a Reported History of Idiopathic Intracranial Hypertension - Nicolas Ferry MD

Case Reports Room 3B: *Beaver Hall (8th floor)*
Room 3B: Arrhythmias, Aicds, And Pacemakers (8:00am – 9:30am)

1. Anesthetic Management of Cesarean Delivery in a Parturient with Congenital Long QT Syndrome and an Implantable Cardioverter-Defibrillator - Nicolas Ferry MD
2. Wolf-Parkinson-White Syndrome and a Scheduled Cesarean Delivery in a Pregnant Patient - Tayyaba Saeed MDE
3. Balancing Risk and Benefit: Dexmedetomidine for a pregnant patient with refractory tachyarrhythmia - Reda Hafiane
4. Neuraxial Anesthesia for Cesarean Delivery in a Patient with Brugada Syndrome: A Case Report and Systematic Review - Andrew Woodman MD, PhD

6. Peripartum Anesthetic Management of a Patient with Pacemaker-Induced Cardiomyopathy - Simran Patel MD
7. Anesthetic Challenges in a Parturient with history of Peripartum Cardiomyopathy status post AICD Implantation, and Morbid Obesity: A Case Report - Kristin Falce MD
8. Continuous Spinal Anesthesia for Cesarean Delivery in a Parturient with Severe Cardiomyopathy, Pulmonary Hypertension, and Wolff–Parkinson–White Syndrome - Marcos Latimer-Fantauzzi MD
9. Mobitz Type II AV Block in a Healthy Cesarean Delivery Srija Konduru BS
10. Anesthesiologic Considerations in a Parturient with Brugada Syndrome and Immune Thrombocytopenia - Thomas Quisenberry MD
11. New Onset Complete Heart Block In A Parturient With Corrected Tetralogy Of Fallot - Shobana Bharadwaj MBBS
12. Peripartum Cardiovascular Collapse Following Cesarean Delivery in a Parturient with Severe Biventricular Failure and Pulmonary Hypertension - Emily Breland Edwards MD

8:00am – 9:30am Breakout Session: Research Abstracts – **NO CME**

Research Abstracts Room 1: *Palais (8th floor)*

Labor Analgesia Challenges and Tips (8:00am -9:30am)

1. Pain-Selective Epidural Analgesia:Isobolographic Analysis of Lidocaine and Chloroprocaine - Hussam Shehabi, MD
2. Assisted Reproductive Technology Is Not Associated With Satisfaction With Labor Epidural Analgesia - Chinami Tone
3. Neuraxial Anesthesia in Parturients With Syphilis: Safety and Short-Term Outcomes - Antanina Voit, MD
4. Management of Accidentally Disconnected Labour Epidural Catheters: A Canadian Modified-Delphi Consensus Study - Ilana Sebbag, MD
5. A Surrogate Evaluation of Dura Proximity Across Loss-of-Resistance Techniques During Combined Spinal–Epidural Analgesia: A Prospective Cohort Study - Javiera Vargas, MD, MSc
6. Comparative Study of the Onset Time of Labor Analgesia Initiated with Epidural Technique with Lidocaine vs Dural Puncture Epidural Technique with Bupivacaine: a Prospective, Randomized Clinical Trial - Xinzhong Chen, MD
7. Epidural catheter insertion depth of 4 cm versus 5 cm for labor analgesia: a double-blind randomized trial - William Turner, BMBS

Research Abstracts Room 2: *Viger (8th floor)*

Cesarean Delivery Quality (8:00am – 9:30am)

1. Management of indwelling labor epidural catheters for intrapartum cesarean delivery: a single-center retrospective study - Sahithi Puvvala BS
2. Racial and Ethnic Disparities in Modes of Anesthesia for Cesarean Delivery Among American Indian and Alaskan Native Patients - Melissa Torbey MHA
3. A Survey Study to Assess Patient Opinions of Anxiolysis Prior to Neuraxial Anesthesia for Cesarean Delivery - Patrick Hesketh MD
4. Comparison of Enhanced Recovery after Surgery Protocol and Standard Protocol for Cesarean Delivery: a Two-center, Double-blind, Randomized Controlled Trial - **Sherry Wu**
5. Patterns of postoperative nausea and vomiting prophylaxis in patients undergoing cesarean delivery: a multicenter retrospective cohort study - Allison Dear BS
6. Effect of Standardization of Care on Racial and Ethnic Disparities in Pain Management After Cesarean Delivery - Kelley Smith MD

7.< Association between guideline-compliant prophylaxis and the incidence of post-operative nausea and vomiting in patients undergoing Cesarean Delivery: a multicenter retrospective cohort study - Allison Dear BS

Research Abstracts Room 3: *Ramezay (8th floor)*
Preeclampsia (8:00am – 9:30am)

1. A High-Precision Machine Learning Approach Comparing AGT/VASN Ratio and sFlt-1/PlGF for Severe Preeclampsia Diagnosis: A Case-Control Study - Teshi Kaushik, MD
2. Eclampsia Is a Perioperative Emergency: Delays to Magnesium and Anesthetic/ICU Utilization in a Timestamped Multi Hospital Electronic Health Record Cohort - Zara Adamou, MD
3. Sleep Trajectories During Pregnancy and Postpartum: Insights from Digital Health on Cardiovascular Health and Preeclampsia - Alana Davidson,
4. Evaluation of Myocardial Function and Metabolism in Patients with Early Onset Preeclampsia with Severe Features - Adrienne Shami, MD PhD
5. Puerperal Cerebrovascular Complications of Preeclampsia with Severe Features: A Case Series on Anesthetic Management - Victoria Brookshire, MD, MPH
6. Blunted Autonomic Adaptation in Preeclampsia: A Prospective Digital Biomarker Study - Marie-Louise Meng, MD
7. Loss of EV-miR-125a-5p in CSF may permit local sFLT1-mediated neurovascular injury in severe pre-eclampsia - David Melton, MD/PhD
8. Physical Activity and Total Sleep Levels in Patients with Cardiovascular Risk Factors Using the Oura Ring - Alana Davidson, BS

Program Material
Thursday, April 30, 2026

Breakout Session #1 – 2:45pm – 5:45pm

Room 1 (McGill) - Oral Research Presentations Group 1 (Breakout Rooms)

Room 1 (McGill) - Oral Research Presentations Group 2 (Breakout Rooms)

Case Reports (Breakout Rooms)
Room 1 (McGill) – Challenging Acuity
Room 2A (Ste-Helene) – Potpourri
Room 2A (Ste-Helene) – Respiratory Challenges
Room 2A (Ste-Helene) – Coagulopathy: Congenital and Latrogenic
Room 2B (Ste-Helene) – Potpourri
Room 2B (Ste-Helene) – Call for ECMO!
Room 2B (Ste-Helene) – A TRAP and many EXITS – FETAL HOUR
Room 3A (Beaver Hall) – Triple A: Airway, Angioedema, Anaphylaxis
Room 3A (Beaver Hall) – Heart: Congenital and Valve Challenges
Room 3A (Beaver Hall) – PDPH: Management and Morbidity
Room 3B (Beaver Hall) – Uterine Rupture!
Room 3B (Beaver Hall) – Chiari and Other Neuraxial Challenges
Room 3B (Beaver Hall) – Pharmacology Challenges

Research Abstracts (Breakout Rooms)
Room 1 (Palais) – Recovery: Morbidity, Depression
Room 1 (Palais) – Potpourri #1
Room 1 (Palais) – Potpourri #2
Room 2 (Viger) – Making Epidurals Better
Room 2 (Viger) – Recovery: Pain, Sleep, Anxiety
Room 2 (Viger) – Leadership: Operations and Research
Room 3 (Ramezay) – Uterotonics and TXA
Room 3 (Ramezay) – Patient Voices
Room 3 (Ramezay) – Pain Control

Association between Systolic and Diastolic blood pressure and lung water in patients with preeclampsia – a point-of-care USG-based observational study

Presenting Author: Shreya Goswami, MD

Presenting Author's Institution: Washington University School of Medicine - St. Louis, Missouri

Co-Authors: Danish Jaffer, MD - Washington University School of Medicine
Arvind Palanisamy, MD, FRCA - Washington University School of Medicine

Abstract :

Background and Hypothesis:
Early detection of pulmonary edema is essential for preventing cardiopulmonary complications in pre-eclampsia (Pre-E). Although point-of-care lung ultrasound (US) studies suggest that extravascular lung water (EVLW) is significantly increased in patients with pre-E who exhibit severe features (e.g.BP ≥ 160/110 mm Hg)[1,2], data involving Pre-E patients without severe features is lacking. Additionally, it is unclear whether there is a correlation between systolic blood pressure (SBP) or diastolic blood pressure with EVLW. This knowledge would be clinically valuable in guiding fluid management, and for allowing risk stratification in settings where US is not readily available. Here, we hypothesize that Pre-E patients, including both those with and without severe features, will exhibit ccorrelations between increased SBP, DBP and EVLW.

Methods:
In this cohort study, patients at ≥ 20 weeks' gestation (both Pre-E and non-Pre-E controls) were enrolled following informed consent. BP criteria for Pre-E is ≥140/90 mm Hg. Exclusion criteria included patient refusal, clinical instability, and if ≥ 2 h after initiation of anti-hypertensive treatment. A simplified four-zone lung USG protocol, previously validated in critical care settings[3], was utilized. Scans were performed in the semi-recumbent position using a curvilinear probe as soon as patients presented to labor and delivery or within 2 h of receiving anti-hypertensive medication. The arbitrary choice of 2 h was a compromise based on the assumption that any treatment-associated changes in EVLW would take longer than 2 h to resolve, while allowing appropriate concomitant medical management. Bilateral intercostal spaces (ICS) were assessed between the 3rd-4th and 6th-7th ribs, within the parasternal to midclavicular regions. The total number of single and confluent B-lines per ICS was recorded, with scores ranging from 0 to 8 per ICS (maximum total score: 32 across 4 ICS). All scans were validated independently by two providers.

Results:
In this ongoing study, a total of 52 patients were recruited: 23 with Pre-E and 29 without Pre-E. Patients with Pre-E demonstrated higher EVLW scores than their non-Pre-E counterparts ($P < 0.001$), consistent with previous reports. We also observed that SBP ≥ 150 mm Hg and DBP ≥ 90 mm Hg were both associated with significantly elevated EVLW ($P < 0.001$) **(Table 1).**

Conclusions:
This study demonstrated a correlation between SBP ≥ 150 mm Hg and DBP ≥ 90 mmHg and increased EVLW in patients with Pre-E, suggesting that even patients without severe features may be at risk for pulmonary edema. At study completion, we will perform subgroup analysis, correlation analysis

between different SBP category and EVLW, propensity matching for confounders altering EVLW, and assess the impact of antihypertensive therapy (including Magnesium) on EVLW.

References:

1. Yagani S, et al, Anest.Analg 2023 137(6)
2. Laurent Z, Anesthesiology 2014;120
3. Enghard P, Crit Care 2015;19(1)

SOAP 2026 Table 1 EVLW SOAP.pdf

THURS - ORP- BS 1 - BR 1 - Oral Research Presentations 1 - 02

Women's short-term recall of their multidimensional labor pain, *experienced just prior to epidural insertion*, is reliable 20-30 minutes *after receiving neuraxial pain relief*

Presenting Author: Pamela Angle, MD FRCPC MSc (Oxon)

Presenting Author's Institution: Obstetrical Anesthesia Research Unit, Sunnybrook Research Institute, Sunnybrook Health Sciences Centre, University of Toronto - Toronto, Ontario

Co-Authors: Alex Kiss, PhD - University of Toronto
Janice Montbriand, PhD - Obstetrical Anesthesia Research Unit, Sunnybrook Research Institute, University of Toronto
Brooke Pardy, MSc - Obstetrical Anesthesia Research Unit, Sunnybrook Research Institute, University of Toronto

Abstract :

Introduction
Use of multidimensional, condition-specific pain instruments is recommended for pain research. The lack of use of such tools in obstetrical anesthesia research and the limited study of pain relief in obstructive/late-stage labor have left significant gaps in our knowledge [1]. We hypothesized that women's short-term recall of their labor pain, experienced before epidural insertion, would be reliable 20 to 30 minutes after epidural drug administration using the Angle Labor Pain Questionnaire (A-LPQ). If reliable, this would permit multidimensional pain assessments over the course of labor/delivery based on short-term pain recall in women receiving epidurals, providing an almost "real-time" measurement of their pre-treatment pain. This study examined the reliability of women's short-term pain recall using the A-LPQ (primary outcome), Numeric Rating Scale (NRS), Verbal Rating Scale (VRS), and Pain Mastery Scale (PMS).

Methods
Following Research Ethics Board approval/written informed consent, the A-LPQ, NRS, VRS, and PMS were administered to laboring women of mixed parity requesting epidural analgesia at three tests. Test 1 had women rate their labor pain just before epidural insertion; Test 2 had them re-rate that same pain, based on recall, 20-30 minutes after epidural drug administration. Test 3 had participants rate their current labor pain. Women were unaware that they would be asked to recall their labor pain during the study. The reliability of women's short-term pain recall between Tests 1 and 2 using A-LPQ summary/subscale scores, NRS, VRS, and PMS scores was assessed using the Intraclass Correlation Coefficient (ICC); short-term recall agreement was assessed with Bland-Altman plots.

Results
112 complete datasets were analyzed; 90% of women reported moderate (61/112) or severe (39/112) labor pain (VRS) before epidural insertion. Most women (71%, 80/112) described their pain as *very much improved* 20-30 minutes after epidural drug administration; 2% (2/112) reported *worsened* pain. The reliability of short-term pain recall of their pre-treatment pain at 20-30 minutes was good for A-LPQ

summary scores (ICC=0.89, 95% CI [0.85, 0.93]); Bland-Altman plots supported this finding with 95% agreement. Recall-reliability was good to excellent for all A-LPQ subscales (ICCs≥0.80), with moderate reliability for Uterine Contraction Pain (ICC=0.71); NRS, VRS, and PMS scores also showed good recall reliability (ICCs≥0.75).

Discussion

Women's short-term recall of their labor pain, experienced just before epidural insertion, was good to excellent 20-30 minutes after epidural treatment using the A-LPQ and other pain tools. A-LPQ findings show that women can reliably recall their pain after receiving epidural analgesia, making multidimensional pain assessments after pain relief more feasible.

References: 1. Pain 2023; 164:2642-2652

Table 1. Participant Characteristics (n=112)

Participant Characteristics		Mean (SD) or Proportion (%)
Age (Years)		33.0 (4.0)
BMI		28.3 (4.5)
Gestational Age (Weeks)		39.1 (1.2)
Cervical Dilation at Study Entry (cm)		3.3 (1.3)
Contraction Frequency at Study Entry (min)		3.9 (2.0)
Singleton Gestation (% Yes)		100% (112/112)
Birth Weight (grams)		3418.8 (434.5)
History of Chronic Back Pain (% Yes)		8% (9/112)
Delivery Mode	SVD	71% (80/112)
	Mid-forceps	2% (2/112)
	C-section	10% (11/112)
	Vacuum or Low Forceps	17% (19/112)
Highest Education	Grade School	2% (2/112)
	High School	4% (4/112)
	Community College	11% (12/112)
	University	84% (94/112)
Martial Status	Married	89% (100/112)
	Common Law	9% (10/112)
	Single	2% (2/112)

THURS - ORP- BS 1 - BR 1 - Oral Research Presentations 1 – 03

Pregnancy-related outcomes in patients with pulmonary hypertension: a multicenter retrospective cohort study

Presenting Author: Braydon M. Bak, MB, BCh, BAO
Presenting Author's Institution: Duke University Hospital - Durham, North Carolina
Co-Authors: Erin Dengler, MD, MBA - UNC Rex Hospital
Jerome J. Federspiel, MD, PhD - Duke University
Ian N. Gaston, MD - Northwestern University Feinberg School of Medicine
Christine P. McKenzie, MD - University of North Carolina
Sonal N. Zambare, MD, FASA - Baylor College of Medicine

Abstract :

Background:
Pulmonary hypertension (PH) in pregnancy carries significant maternal morbidity and mortality risk, especially in severe disease.[1] Small sample sizes in existing studies have limited analysis by PH etiology and severity.[2,3] This study evaluates morbidity and mortality among 165 pregnancies complicated by PH, stratified by severity and planned delivery mode. We hypothesize that outcomes vary by PH severity, and that planned delivery mode does not significantly impact morbidity or mortality.

Methods:
We conducted a multicenter retrospective cohort study across eight U.S. academic institutions, including 165 pregnancies with PH between 2001-2023. Echocardiography was used to suggest the presence of PH, with confirmation by right heart catheterization when available. Severity was classified as nonsevere (mean pulmonary arterial pressure 25–49 mmHg) or severe (mean pulmonary arterial pressure ≥50 mmHg or systolic pulmonary arterial pressure/right ventricular systolic pressure ≥70 mmHg) Patients were categorized by World Health Organization (WHO) PH group and planned delivery mode: trial of labor (TOL), planned caesarean delivery (CD), or termination. Primary outcome was severe maternal morbidity (SMM); secondary outcomes were one-year mortality and extracorporeal membrane oxygenator (ECMO) utilization. Outcomes were compared between planned delivery mode and PH severity using Fisher's exact tests. A p-value of less than 0.05 was considered statistically significant.

Results:
SMM rates did not differ by PH severity (non-severe 40% vs severe 44%, p=0.622) or planned delivery mode (TOL 42% vs CD 44%, p=0.86). One-year mortality was 9% (n=15) overall and significantly higher in severe versus non-severe PH (18% vs 5%, p=0.01) and similar between TOL and CD (6% vs 10%, p=0.53). For patients undergoing TOL, severe PH was associated with higher mortality rates compared to non-severe PH (16% vs 3%, p=0.09). Mortality was highest in WHO PH groups 1 (14%) and 4 (19%), with no deaths in WHO PH groups 2 or 5. Eight pregnancies required ECMO initiation: two at delivery and six >24 hours postpartum. Five pregnancies required veno-arterial (VA) ECMO: four had severe PH, all had

WHO PH group 1, three had severely reduced right ventricular function, and two had Eisenmenger's Syndrome.

Conclusions:
In this multicenter cohort, largest of its kind, planned delivery mode did not significantly affect morbidity or mortality, suggesting that TOL may be a reasonable option, especially for those with non-severe PH. Severe PH and severe right ventricular dysfunction were factors common to those who required ECMO. Mortality varied by PH severity and WHO PH group, highlighting the importance of incorporating PH severity and etiology into multidisciplinary pregnancy planning and future cardio-obstetric guidelines.[4]

References:

1. *J Thorac Dis. 2025;17:5108–5121.*
2. *Int J Obstet Anesth. 2024;57:103964.*
3. *Obstet Gynecol. 2017;129:511–520.*
4. *Eur Heart J. 2025;46:4462–4568.*

SOAP Research Abstract 2026 - Figure.pdf

THURS - ORP- BS 1 - BR 1 - Oral Research Presentations 1 - 04

Preeclampsia with Severe Features: How Do We Track Severe Features?

Presenting Author: Kristen E. Harris

Presenting Author's Institution: Vanderbilt University School of Medicine - Nashville, Tennessee

Co-Authors: Kim Boggess, MD - UNC at Chapel Hill
Laura L. Sorabella, MD - Vanderbilt University Department of Anesthesiology

Abstract :

Background:
Preeclampsia with severe features occurs in 40% of all cases of preeclampsia and increases the risk of acute cardiac morbidity fourfold.[1] Certain features, such as pulmonary edema, pose greater risk than others like elevated blood pressure or headache, and multiple features further amplify this risk. However, these features are often inconsistently documented, limiting epidemiologic research, and risk stratification. Typically, only the diagnosis of preeclampsia with severe features is recorded, not individual markers. We aim to assess whether ICD codes capture organ dysfunction linked to severe features. We hypothesize that identifying severe features using ICD codes alone is not feasible.

Methods:
Using deliveries in the Premier Database from 2016-2020, we identified cases of preeclampsia with severe features, HELLP, and eclampsia. We created a list of ICD-10 codes corresponding to specific organ dysfunctions, including hypertension, neurologic symptoms (headache, visual changes), pulmonary edema, heart failure, renal insufficiency, right upper quadrant pain, hemolysis, impaired liver function, and thrombocytopenia. We then identified rates of use of these severe features organ dysfunction codes in patients who had preeclampsia with severe features, HELLP, and eclampsia.

Results:
Across preeclampsia with severe features, HELLP syndrome, and eclampsia, ICD-10 coding rates for individual organ system involvement were low. ICD-10 codes for organ system dysfunction were present across the preeclampsia spectrum as follows: blood pressure 0-1.8%, headache 0-1.6%, visual changes 0-1.1%, pulmonary edema 0.6-5.3%, heart failure 0.2-5.2%, right upper quadrant pain 0-0.5%, hemolysis 0-0.4%, elevated liver enzymes 0.2-5.3%, thrombocytopenia 0-4.2%, and renal insufficiency 0.9% to 10.5%.

Conclusion:
Preeclampsia with severe features signals significant maternal short and long-term cardiovascular risk, underscoring the need for precise documentation of organ-specific dysfunction. ICD-10 codes largely fail to capture these manifestations, collapsing a heterogeneous condition into a single diagnosis and limiting research and risk stratification. Systematic recording of organ involvement alongside the diagnosis is essential to improve care and maternal health outcomes.

References: 1. Anesth Analg 2023;136:728–737

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THURS - ORP- BS 1 - BR 1 - Oral Research Presentations 1 - 05

Lead contamination in donated packed red blood cells: implications for intrauterine transfusions and neonates receiving transfusions

Presenting Author: Olivia A. Nelson, MD

Presenting Author's Institution: Department of Anesthesiology and Critical Care, Children's Hospital of Philadelphia, University of Pennsylvania Perelman School of Medicine - Philadelphia, Pennsylvania

Co-Authors: Sasha Capers, BA - Children's Hospital of Pennsylvania, University of Pennsylvania
Jaleah Hawkins, MD - Department of Clinical Pathology and Laboratory Medicine
Julia Mewha, BS - Division of Hematology and Transfusion Medicine, Children's Hospital of Philadelphia
Shelly Soni, MD - Department of Surgery, Children's Hospital of Philadelphia, University of Pennsylvania Perelman School of Medicine
Christopher S. Thom, MD - Division of Neonatology, Children's Hospital of Philadelphia, University of Pennsylvania Perelman School of Medicine

Abstract :

Background

According to the United States (US) Centers for Disease Control and Prevention, a safe blood lead level has not been identified in infants and children.[1] The benchmarking blood lead levels associated with 1 IQ point decrement are 1-10µg/L (0.1-1µg/dL),[2] with one expert group recommending steps to decrease the lead level to < 10µg/L in all children in the US by 2030.[3] Critically ill fetuses and neonates can require multiple blood transfusions, yet donated adult packed red blood cells (PRBCs) are not routinely screened for lead.

Our primary aim was to assess the number of units of adult donated PRBC units with a lead level of ≥ 10µg/L. We secondarily assessed the number of units from which a 15mL transfusion would contain ≥ 0.19µg of lead. As previously reported, this reference dose is associated with loss of 3 IQ points at a population level.[4]

Methods

This pilot study tested the lead level in 51 deidentified PRBC units from our institution's Blood Bank. Elevated lead was defined as ≥ 10µg/L since critically ill infants may receive a transfusion volume equal or greater to their circulating blood volume. A threshold of ≥ 0.19µg for a 15mL transfusion was based on a more conservative definition of lead toxicity.[4]

Samples were obtained from the 1 mL segments on the PRBC units. A 50 µL aliquot was digested overnight in 250µL of nitric acid at 60 °C. Following digestion, samples were diluted to a final volume of 5 mL with metal-free ultrapure water and directly injected into the Thermo iCAP RQ. Calibration curve was prepared concurrently by using a premix of metal ions, starting from 125 ppb by serial dilution 1/2 to 0.015 ppb. The limit of detection was 0.015 ppb.

Results

Lead was detected in all 51 PRBC samples with median 8.1µg/L [IQR 4.6, 14.6]. 43% of donated PRBC units had lead levels of ≥10µg/L (22/51 samples). The median lead dose from a hypothetical 15 mL transfusion was 0.12µg [IQR 0.06, 0.23]. 29% of these transfusions would have contained ≥0.19µg lead (15/51).

Discussion

Although population lead levels in US children have decreased over time, exposure to low levels of lead is associated with decreased IQ and other adverse neurodevelopmental sequela.[1-4] We report that lead was present at a level associated with these adverse outcomes in many PRBC units. Fetuses receiving intrauterine transfusions, critically ill neonates undergoing surgery or receiving ECMO support, and premature infants who require serial transfusions are at increased risk of receiving multiple and/or large volume transfusions. Our study results suggest that adult donated PRBC units should be screened for lead contamination to avoid exposure in these patients.

References:

1) MMWR Morb Mortal Wkly Rep 2021;70:1509–1512.

2) Risk Anal. 2013 Mar;33(3):450-61.

3) JAMA Pediatr. 2017 Jul 1;171(7):616-618.

4) Pediatr Res. 2020 Mar;87(4):677-682

Figure 1.pdf

THURS - ORP- BS 1 - BR 1 - Oral Research Presentations 1 - 06

Experiences of trauma after delivery in critically ill obstetric patients: a case-control qualitative pilot study

Presenting Author: Yael Sarig

Presenting Author's Institution: Columbia University - New York, New York

Co-Authors: Ralph Alberto - Columbia University
Walter M. Taylor, MD - Columbia University
Craig Thomas - Columbia University

Abstract :

Background

Critically ill obstetric patients are at risk for traumatic birth experiences. They may be chronically ill or experiencing unexpected complications of pregnancy and delivery, requiring admission to a critical care obstetric (CCOB) unit. We examined quantitative and qualitative patterns of childbirth-related trauma in CCOB and control patients, hypothesizing greater PTSD-related symptom burden in CCOB patients and attenuation of trauma salience over time.

Methods

We enrolled 47 patients postpartum (17 controls and 30 CCOB) between Oct-Jan 2025. They completed 2 validated surveys: the City Birth Trauma Scale–Short Form (City BiTS; 1 yes/no question and 4 questions scored on a Likert scale from 0-4, for a total score of 0-13, with a higher score indicating more extensive PTSD symptoms) and the modified PCL-5 questionnaire, validated for childbirth-related PTSD (5-point Likert scale, total severity score with range 20-100). Patients reporting distress provided qualitative descriptions. Follow-up at 6-weeks used the same surveys (n=16). Responses were thematically coded using NVivo[1], a data analysis software used in qualitative research. Survey scores are reported as median [IQR]. Analyses were descriptive due to sample size and pilot study design.

Results

At enrollment (n=47), City BiTS scores were similar in CCOB and controls (1 [0.25-3] vs 2 [0-3; P=0.928) (Table 1). At 6-week follow-up (n=17), scores were slightly higher among CCOB patients, though not statistically significantly (0.5 [0-1] vs 0 [0-0.25]; P=0.376), with both cohorts demonstrating overall score declines over time. At 6-weeks, PCL-5 scores were similar between groups (CCOB 21.5 [20-24.25] vs

controls 25.5 [21.5-26]; P=0.456). At enrollment, 72.3% of patients (n=34) reported ongoing birth-related trauma compared to 18.8% (n=3) at follow-up (all 3 were CCOB patients). Exemplar patients' quotes are presented in Table 1.

Discussion

In this pilot study, our findings suggest that childbirth-related trauma differs in content and persistence among critically ill patients. Controls primarily described distress related to exhaustion, emotional overwhelm, and unmet expectations during labor, particularly with unplanned cesarean deliveries. In contrast, CCOB patients described trauma centered on specific medical events, including severe pain, hemorrhage, perceived risk of death, fear for infant safety, and frustrations with their care team. When trauma persisted at follow-up, it occurred only in the CCOB group and remained linked to identifiable medical events such as hemorrhage, undesired cesarean delivery, and perceived failures in pain control or communication from the clinical team. Larger cohorts to further characterize the themes and patterns of distress will allow to identify opportunities for prevention and interventions to mitigate childbirth-related PTSD in this already at-risk population.

References:

1. https://lumivero.com/resources/what-is-qualitative-research/

Qualitative CCOB Table.pdf

THURS - ORP - BS 1 - BR 1 - Oral Research Presentations 2 - 01

New gadgets at Labor floor: A preliminary comparison of ROTEM Sigma, ROTEM Delta and Clauss Fibrinogen for the Obstetric Patients

Presenting Author: Aymen A. Alian, MD, MSc, MBBCh

Presenting Author's Institution: Yale University, Anesthesia Department - New Haven, Connecticut

Co-Authors: Marah A. Alian, DO - Yale University, Anesthesia Department
Kristen L. Fardelmann, MD - Yale University School of Medicine
Angelique A. garay, DNAP, CRNA, ACNP-BC - Yale New Haven Hospital
He A. Hugo, MS - Yale University, Anesthesia Department
Hung-Mo Lin - Yale University

Abstract :

Background:
Postpartum hemorrhage (PPH) remains the leading cause of maternal mortality and severe maternal morbidity worldwide[1]. During PPH, fibrinogen levels decline earlier than other coagulation factors[2]. Point-of-care viscoelastic assays, such as rotational thromboelastometry (ROTEM), provide faster coagulation assessment than standard laboratory tests (SLTs) (approximately 10 minutes vs. 45 minutes). This study compared coagulation results obtained from the automated ROTEM® Sigma and the ROTEM® Delta with SLTs during PPH. We hypothesized that ROTEM® Sigma would deliver rapid, reliable results with less variability than ROTEM® Delta. The primary aim was to compare the performance of FIBTEM parameters between ROTEM® Delta and ROTEM® Sigma in obstetric patients. The secondary aim was to evaluate their ability to predict critical fibrinogen thresholds that guide treatment initiation, supporting the development of a PPH management algorithm using ROTEM® Sigma.

Methods:
After IRB approval, blood samples for standard laboratory tests (SLTs) and ROTEM samples were obtained from pregnant women presenting for labor at Yale New Haven Hospital from 2022– 2024. Data are presented as mean ± standard deviation. Correlations between fibrinogen concentrations and FIBTEM amplitudes at 5 minutes (A5), 10 minutes (A10), and 20 minutes (A20) were calculated.

Results:
A total of 667 fibrinogen samples were analyzed, including 322 ROTEM® Sigma and 318 ROTEM® Delta measurements. Simultaneous Sigma and Delta samples were available from 73 patients. Descriptive statistics of Fibrinogen and FIBTEM values of pregnant women are shown in (figure 1-A), FIBTEM Sigma amplitudes demonstrated strong linear correlations with fibrinogen levels (A5 r=0.89, A10 r=0.89, A20 r=0.88). In contrast, the association between Delta FIBTEM A10 and fibrinogen was non-linear, with a Spearman correlation of 0.74 (figure 1-B). Among paired samples, concordance correlation between Sigma and Delta A10 values was 0.80. The mean difference between Delta and Sigma A10 was 1.59 ± 2.46, with Delta values higher, likely due to platelet contamination resulting from fewer platelet inhibitors

used in Delta (one vs. two in Sigma). Predictive performance for fibrinogen thresholds using FIBTEM parameters is summarized in (figure 1-C).

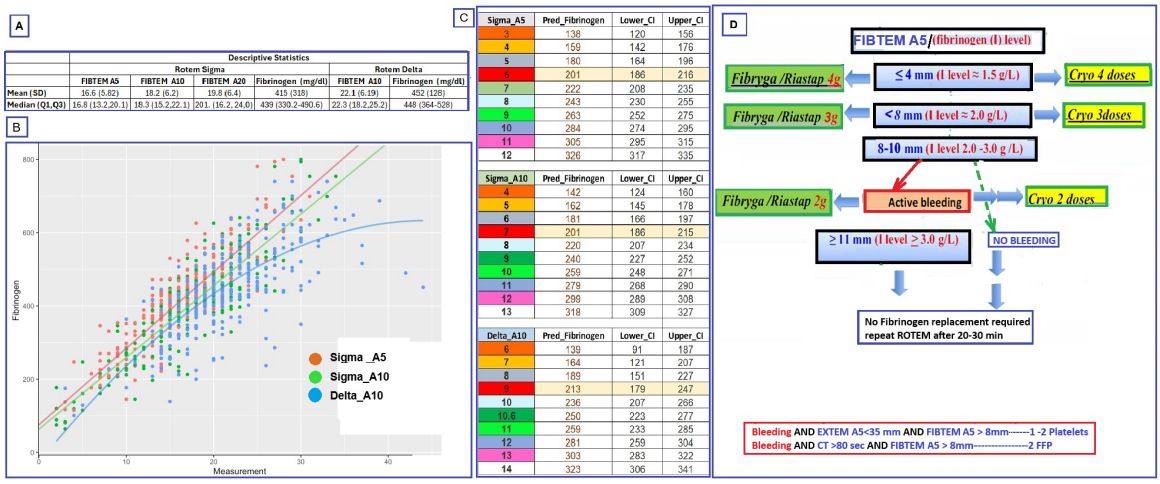
Conclusions:

Cartridge-based ROTEM® Sigma provides rapid and more reliable fibrinogen assessment with reduced variability compared to ROTEM® Delta. Sigma FIBTEM parameters, particularly A5, correlated more strongly with conventional coagulation tests. Predicting fibrinogen levels using ROTEM® Sigma may facilitate earlier initiation of goal-directed transfusion protocols in bleeding obstetric patients (figure 1-D), minimizing delays associated with SLTs.

References:

1. Lancet Glob Health 2014; 2: e323–33

2. Int J Obstet Anesth. 2019;37:106–117



THURS - ORP - BS 1 - BR 1 - Oral Research Presentations 2 - 02

Early Thromboelastographic Phenotypes in Severe Postpartum Hemorrhage: A Multicenter Observational Cohort Study

Presenting Author: Grace Lim, MD MSc MBA

Presenting Author's Institution: University of Utah - Salt Lake City, Utah

Co-Authors: Aymen A. Alian, MD, MSc, MBBCh - Yale University, Anesthesia Department
Jessica R. Ansari, MD, MS - Division of Obstetric Anesthesiology and Maternal Health, Department of Anesthesia, Perioperative, and Pain Medicine Stanford University School of Medicine
Philip E. Hess, MD - Beth Israel Deaconess Medical Center / Harvard Medical School
Daniel Katz, MD - Icahn School of Medicine at Mount Sinai
John J. Kowalczyk, MD - Brigham and Women's Hospital /Harvard Medical School

Abstract :

Background

Severe postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity[1], yet it is unclear whether coagulation profiles differ by etiology of PPH among patients with severe PPH. Thromboelastography (TEG) 6s is a viscoelastic hemostatic assay that can demonstrate low fibrinogen during PPH $\geq$1000mL[2]. Therefore, we sought to explore whether differences exist in early TEG 6s profiles across seven severe PPH etiologies. We hypothesize that different PPH etiologies will have distinct TEG 6s profiles that are apparent even early in hemorrhage, prior to blood transfusion.

Methods

We conducted a multicenter prospective observational cohort study across six US academic obstetric centers. Patients with severe PPH, defined as receipt of ≥2 units of packed red blood cells (PRBCs) or use of cell salvage, were included. Citrated whole blood samples obtained during active PPH and prior to transfusion were analyzed using TEG 6s. Viscoelastic parameters included clot initiation (CK-R), propagation (CK-K, CK-Angle), and fibrinogen-dependent clot strength (CFF-MA, CFF-FLEV). PPH etiologies were categorized as uterine atony, placental abruption, retained placenta or products of conception, hematologic/coagulopathy, uterine rupture, uterine hysterotomy extension injury or genital tract laceration, and placenta accreta spectrum or abnormal placentation, based on clinician adjudication of the primary etiology. Violin plots were generated to visualize the distribution of thromboelastography parameters stratified by primary postpartum hemorrhage etiology, with medians and interquartile ranges overlaid. Comparisons of thromboelastography parameters across the five most prevalent postpartum hemorrhage etiologies were performed using the Kruskal-Wallis rank-sum test.

Results

Ninety-three patients met inclusion criteria. The most common PPH etiologies were uterine atony (33.3%), surgical injury or genital tract laceration (22.6%), and abnormal placentation (20.4%). Data for

individual TEG parameters stratified by PPH etiology are presented in the **Figure**. Among the five most common PPH etiologies, early TEG parameters did not differ significantly by etiology (all $P > 0.17$). However, fibrinogen-dependent measures (CFF-MA, CFF-FLEV) exhibited wider dispersion and lower median values in cases of retained products of conception (RPOC), coagulopathy, and uterine rupture compared with clot initiation parameters, patterns that were less apparent in the more common etiologies of PPH.

Conclusions

Early TEG profiles in severe PPH were broadly similar across common etiologies, with greater variability observed in fibrinogen-related measures in cases of RPOC, coagulopathy, and uterine rupture. Future prospective trials are needed to determine whether precision, etiology-informed fibrinogen assessment and replacement improves hemostatic management in severe PPH.

References:

1. Cresswell JA. Lancet Glob Health. 2025;13:e626
2. Roberts TCD. Int J Obstet Anesth. 2021;47:103192

figure-v1.pdf

THURS - ORP - BS 1 - BR 1 - Oral Research Presentations 2 - 03

Association of general anesthesia with postpartum hemorrhage following cesarean delivery among patients who did not attempt labor: a single-center retrospective study

Presenting Author: Isabella Hardej, BS

Presenting Author's Institution: Baylor College of Medicine - Temple, Texas

Co-Authors: Taylor Hartshorne, BS - Baylor College of Medicine
Michael Hofkamp, MD - Baylor Scott & White Medical Center-Temple
Hope Scherger, BS - Baylor College of Medicine
Diana Villazana-Kretzer, DO - Baylor Scott & White Medical Center-Temple

Abstract :

Objective

Conversion to general anesthesia (GA) may be required when pain during cesarean delivery (CD) occurs.[1] GA prior to CD incision has been associated with increased postpartum hemorrhage (PPH) risk in pre-labor patients.[2] We hypothesized that any duration of GA for CD would be associated with PPH among patients who did not attempt labor. Our secondary aim was to identify characteristics associated with increased PPH risk other than GA.

Study Design

We used a retrospective observational study design. Patients who had a CD from July 1, 2024 to June 30, 2025 at our hospital, did not attempt labor, and had a documented quantitative blood loss (QBL) were included. We defined PPH as a QBL $\geq$1000 mL.[3] We performed a bivariate analysis between the PPH and no PPH cohorts. We then performed a multivariate logistic regression with variables of interest to determine which characteristics were independently associated with PPH.

Results

1015 patients had a CD during the study period. We collected data for approximately 95% of patients who met inclusion criteria. In the current dataset, 567 patients were included in the final analysis. There were 31 (5%) patients in the PPH cohort (median QBL 1276 mL) and 536 (95%) patients in the no PPH cohort (median QBL 420 mL). Cohorts differed in in vitro fertilization (IVF) (p=0.01), history of PPH requiring transfusion (p=0.05), preeclampsia (p=0.05), initial anesthetic technique (p< 0.001), and GA of any duration (p=< 0.001). Complete cohort data are presented in *Table 1*.

A multivariate logistic regression determined that multiple gestation (aOR 3.58 95% CI 1.07-12.04; p=0.04), IVF used to conceive current pregnancy (aOR 9.66; 95% CI 1.93-48.36; p=0.006), preeclampsia (aOR 2.42; 95% CI 1.04-5.62; p=0.04), anemia (aOR 2.92; 95% CI 1.33-6.40; p=0.008), and general

anesthesia as the final anesthetic technique (aOR 6.48; 95% CI 1.86 to 22.60; p=0.003) were independently associated with an increased odds of PPH. Age (aOR 1.10; 0.95-1.28; p=0.18), history of transfusion for PPH (aOR 6.62; 95% CI 0.98-44.76; p=0.05), and thrombocytopenia (aOR 3.95; 95% CI 0.57-27.54; p=0.17) were not independently associated with PPH. The C-statistic was 0.74 for the model.

Discussion

After controlling multiple variables, we determined that patients who received any duration of GA for CD were approximately 6.5 times more likely to have PPH. In a case-controlled series, there was an increased risk of PPH in patients who received GA prior to incision for pre-labor CD (aOR 22.3; 95% CI 4.9-99.9; p< 0.001).[2] Due to the difficulty of obtaining accurate data on cumulative oxytocin administration retrospectively, we did not include patients who attempted labor. Our c-statistic value of 0.74 indicates good predictability of our model. While GA was associated with an increased risk of PPH in our patients, it should not be withheld when indicated.

References:

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2. Anesth Analg 2017;125:523-532
3. Obstet Gynecol 2014;124:150–3

Table 1. Association of GA with PPH in prelabor CD.pdf

THURS - ORP - BS 1 - BR 1 - Oral Research Presentations 2 - 04

Impact of Postpartum Hemorrhage on Early Recovery After Cesarean Delivery

Presenting Author: Jeroen De Haes, MD, EDAIC, EDIC

Presenting Author's Institution: Mount Sinai Hospital, University of Toronto - Toronto, Ontario

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Abstract :

Background:
Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality and is associated with significant psychological sequelae, including depression and post-traumatic stress disorder.[1] Despite efforts to standardize PPH outcomes, patient-reported outcomes, breastfeeding, and overall wellbeing were excluded highlighting a critical gap in understanding recovery after PPH.[2] The Obstetric Quality of Recovery-10 (Obs-QoR-10) is a validated tool for assessing postpartum recovery, yet its use in patients with PPH has not been studied. Given the physical and psychological burden of PPH, recovery may be more challenging in this population.

Objective:
To compare postpartum recovery, measured by Obs-QoR-10, in patients with and without PPH following caesarean delivery, hypothesizing a clinically meaningful 10-point difference between groups.

Methods:
This prospective matched case–control study included adult patients undergoing caesarean delivery under neuraxial anesthesia. Patients with PPH were matched 1:1 to controls without PPH by age, parity, labor status, caesarean urgency, gestational age, and delivery date. PPH was defined as blood loss ≥1000 mL, blood transfusion, ICU-level care, or major hemorrhage intervention. Control patients required quantitative blood loss ≤500 mL. Obs-QoR-10 was administered 24–72 hours postpartum.

Results:
Sixty-eight patients were included in the matched analysis (34 PPH, 34 controls), with no significant differences in baseline demographic or obstetric characteristics. Patients experiencing PPH had significantly lower postpartum recovery scores compared with controls, as measured by the Obs-QoR-10 (median 68 [IQR 51–79] vs 82.5 [74–88], p=0.003). Median quantitative blood loss was substantially higher in the PPH group (1,449 mL vs 320 mL, p< 0.001), with greater intravenous fluid administration (p=0.001), and increased use of additional uterotonics (p=0.012) and tranexamic acid (p< 0.001). Length of hospital stay and breastfeeding rates did not differ significantly between groups.

Conclusions:
Postpartum hemorrhage following cesarean delivery is associated with significantly impaired early postpartum recovery. These findings highlight the importance of incorporating patient-reported outcome measures into PPH assessment and underscore the need for targeted strategies to optimize postpartum care and recovery. Given that recovery was assessed within 24–72 hours postpartum, further research is needed to evaluate longer-term recovery trajectories and patients' lived experiences after PPH, and to identify targeted strategies to optimize postpartum wellbeing and care.

References:

1. Lancet. Glob Health 2014;323-33

2. BJOG 2019;83-93

Impact of Postpartum Hemorrhage on Early Recovery After Cesarean Delivery.pdf

Optimal Programmed Intermittent Epidural Bolus Volume of Ropivacaine and Dexmedetomidine in Dural Puncture Epidural Technique for Labor Analgesia: A Biased-Coin Up-and-Down Sequential Allocation Study

Presenting Author: Yongxin Liang

Presenting Author's Institution: Women and Children's Hospital, Qingdao University - Qingdao, Shandong

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Abstract :

Background:
The dural puncture epidural (DPE) technique combined with the programmed intermittent epidural bolus (PIEB) technique is a promising regimen for labor analgesia, offering rapid onset of analgesia and superior analgesic efficacy. Dexmedetomidine has emerged as a favorable adjuvant within this regimen; compared to traditional opioid adjuvants, it accelerates the onset of analgesia while reducing associated adverse effects. Although previous research has shown the optimal concentration of dexmedetomidine for the DPE technique to be 0.3 μg/mL, the corresponding optimal PIEB bolus volume remains undetermined. This study aims to determine the optimal PIEB bolus volume (EV_{90}, effective volume for 90% of parturients) for 0.1% ropivacaine and 0.3 μg/mL dexmedetomidine in the DPE technique with a fixed 60-minute PIEB interval for labor analgesia.

Methods:
This biased-coin up-and-down sequential study enrolled 40 nulliparous women requesting labor analgesia. After dural puncture with a 25-gauge Whitacre needle, a 10 mL loading volume of 0.1% ropivacaine with 0.3 μg/mL dexmedetomidine was administered. The PIEB regimen was initiated 1 hour later, delivering boluses at fixed 60-minute intervals. The initial bolus volume was 8 mL. For each subsequent parturient, the volume (range: 8–13 mL) was adjusted based on the preceding parturient's response: ineffective analgesia prompted a 1 mL increase, whereas effective analgesia led to either a 1 mL decrease (probability, 1/9) or no change (probability, 8/9). The primary outcome was effective analgesia, defined as no requirement for rescue boluses (patient-controlled epidural analgesia or provider boluses) within 6 hours of initiation or prior to full cervical dilation, whichever occurred first. Secondary outcomes included pain scores, motor and sensory blockade, sedation scores, and adverse events.

Results:
The EV_{90} was estimated at 10.3 mL (95% CI: 9.7–10.8) by the truncated Dixon-Mood method and 10.9 mL

(95% CI: 9.8–11.8) by isotonic regression. Motor blockade was observed in only one parturient. Three parturients experienced transient hypotension not requiring vasopressor treatment. No excessive sedation or other significant adverse effects occurred.

Conclusions:

The optimal PIEB EV_{90} for 0.1% ropivacaine with 0.3 μg/mL dexmedetomidine in labor analgesia using DPE with a fixed 60-minute interval is approximately 10.6 mL. This volume effectively relieves labor pain and is safe for both the mother and the fetus.

THURS - ORP - BS 1 - BR 1 - Oral Research Presentations 2 - 06

Risk of General Anesthesia for Cesarean Delivery by Race: Results from Multicenter Perioperative Outcomes Group (MPOG) Registry

Presenting Author: Alexander Butwick, MS, MBBS

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Abstract :

Introduction:
Known disparities exist in the use of general anesthesia (GA) for cesarean delivery (CD), with higher rates being reported among minoritized patients[1]. However, large contemporary population-based studies with clinical detail to contextualize the use of GA are limited. Therefore, we sought to investigate whether racial disparities in GA use persist overall and within clinically relevant subgroups—emergency CD and cases with pre-existing epidural catheters.

Methods:
Using the MPOG database, we conducted a multicenter retrospective observational study of CDs performed between Jan 2018 and Dec 2023. The primary outcome was mode of anesthesia (GA vs neuraxial anesthesia). The primary exposure was the patient's self-identified race, classified as Non-Hispanic (NH) White, NH Black, NH Asian, Hispanic, Other, and unknown. We also performed subgroup-restricted models to examine GA risk among those who underwent emergency CD and those with a pre-existing labor epidural catheter. Mixed-effects logistic regression models were used to estimate adjusted risk ratios (aRRs), accounting for patient-level factors (age, BMI, ASA physical status, obstetric comorbidities), case-level factors (emergency status, procedural timing), and hospital-level factors, with institution included as a random effect.

Results:
Among 248,936 CDs from 63 US institutions, the overall GA rate was 6.2%. The overall GA rates and the unadjusted and adjusted risks of GA by race/ethnicity are presented in Table1. Overall rates of GA were highest and lowest among NH Black patients (8.5%) and NH Asian patients (3.7%) respectively. After multivariable adjustment, NH Black patients had a higher risk of GA compared with NH White patients (aRR 1.11, 95% CI 1.06–1.15), while NH Asian patients had a lower risk (aRR 0.84, 95% CI 0.81–0.87). No significant differences were observed for Hispanic or Unknown race patients. In subgroup analyses, racial differences in GA use persisted among emergency cesarean deliveries, with NH Black patients and Other race patients being at 1.15 and 1.34-fold increased risk of GA compared to NH White patients, respectively. Conversely, among patients with pre-existing labor epidural catheters, GA risk was slightly reduced among NH Black compared to NH White patients in the pre-existing epidural group and NH

Asian patients consistently had a lower GA risk.

Conclusion:
In this large contemporary cohort study using MPOG data, NH Black patients remained at increased overall risk of GA for CD. Rates of GA for emergency CD were high across all groups, with Black and Other race patients being at increased risk. However, this disparity was less pronounced among patients with pre-existing labor epidural catheters.These findings highlight the need to better understand perioperative decision-making and institutional practices that contribute to persistent disparities in GA use for emergency CD.

References:

1. J Clin Anesth 2020;65:109821

figure.pdf

THURS - CR - BS 1 - BR 1 – Challenging Acuity - 01

ECMO is in the Birth Plan*:* Peripartum Management of Severe Pulmonary Hypertension Requiring Preterm Cesarean Delivery

Presenting Author: Ian Funk, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

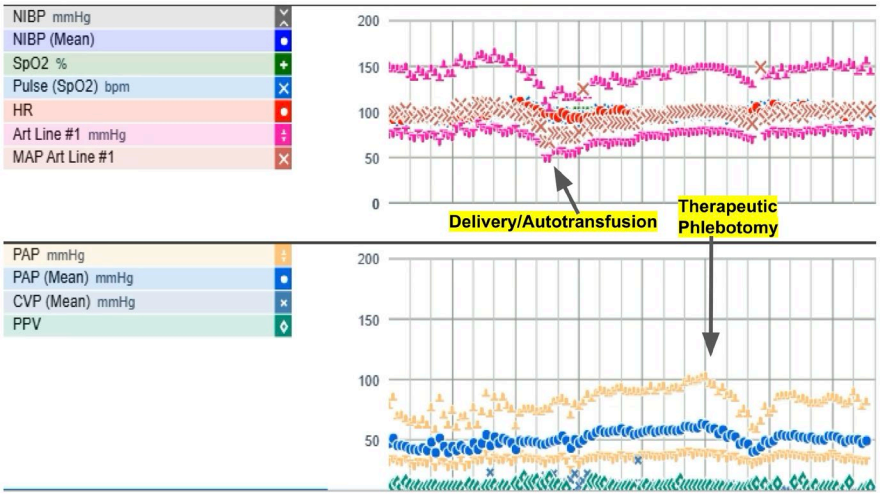
Co-Authors: Afif Kraitem, MD - Vanderbilt University
Laura L. Sorabella, MD - Vanderbilt University Department of Anesthesiology

Introduction:
Pulmonary hypertension (PH) is a significant risk factor for adverse maternal and fetal outcomes during pregnancy. Mortality from PH during pregnancy results from inability of the RV and pulmonary circulation to accommodate gestational increases in cardiac output, plasma volume, and autotransfusion post-delivery (1-3). Despite advances in pulmonary vasodilators, mechanical circulatory support, and multidisciplinary care, contemporary mortality rates are 12-16%, most deaths occurring postpartum secondary to RV failure in severe PH subgroups (2,3). PH remains a WHO Class IV condition for which pregnancy is contraindicated (1).

Case One:
A 27-year-old female, G5P004, with newly diagnosed severe PH (WHO Groups 1 and 4) presented at 28w EGA for optimization prior to primary cesarean delivery for breech presentation. Her history was notable for protein S deficiency, pulmonary emboli, and morbid obesity (BMI 50). Right heart catheterization revealed markedly elevated pulmonary artery (PA) pressures (118/39 mmHg). Intravenous epoprostenol therapy was initiated but discontinued due to drug intolerance-related hypoxic respiratory failure. Despite attempted escalation of therapy she developed worsening RV dysfunction with evidence of end-organ compromise, including uteroplacental insufficiency with declining amniotic fluid index. Our team proceeded with preterm cesarean delivery under neuraxial anesthesia in a cardiac operating room. Following a low dose CSE (3.75mg hyperbaric bupivacaine, 15mcg fentanyl, 0.15mg morphine), femoral arterial and venous sheaths were placed for potential extracorporeal membrane oxygenation (ECMO) support. Management of intravascular volume, fluid shifts, and post-delivery autotransfusion was guided by PA catheter (PAC) data and continuous transthoracic echocardiography (TTE). Inotropic support with dobutamine (DBA) and epinephrine (EPI) was initiated at delivery in the setting of worsening RV function and rising PA pressures. Diuresis was initiated with furosemide 80mg, and an additional 800mL of autologous blood was collected via the 5 Fr femoral venous introducer without hemodilution to reduce preload (Figure 1). Postoperatively, the patient was transferred to the cardiovascular intensive care unit on high-flow nasal cannula, DBA, EPI, and vasopressin. She was initiated on inhaled nitric oxide and furosemide infusion to maintain euvolemia and reduce RV afterload. Both the patient and neonate were ultimately discharged with plans for continued medical management and consideration of future pulmonary endarterectomy.

Discussion:
Delivery for patients with PAH is high risk. Several management strategies may make it safer. Placing access for peripheral VA-ECMO ensures its availability in an emergency. PAC and continuous TTE guided inotropic vasopressor management. Therapeutic phlebotomy may help offload the RV in the immediate postpartum period, and existing femoral access can be used to facilitate this.

References:
1 PMID 26401246 2 PMID 28178055 3 PMID 37637356



THURS - CR - BS 1 - BR 1 – Challenging Acuity - 02

Placenta Accreta Syndrome with Iliac Artery Invasion

Presenting Author: Brooke Freese, MD

Presenting Author's Institution: University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine - Lexington, Kentucky

Co-Authors: James Damron, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine, Division of Obstetric Anesthesia
Jon Holzberger, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine, Division of Obstetric Anesthesia

Introduction:
Placenta accreta spectrum (PAS) involves abnormal trophoblastic invasion of the myometrium and beyond (1). While accreta, increta, and percreta differ by depth, vascular invasion into major pelvic vessels—such as the iliac arteries—is extremely rare and linked to catastrophic hemorrhage, complex surgery, and high maternal morbidity. We present a 25-year-old with PAS and left internal iliac invasion managed with cesarean section, embolization, and delayed hysterectomy.

Case One:
A 25-year-old G3P2 with a history of two prior cesarean deliveries was admitted at 33 weeks gestation with MRI findings of complete placenta previa and multifocal percreta. Imaging showed trophoblastic encasement of the left internal iliac vessels and nodular protrusion at the bladder interface without transmural invasion. A multidisciplinary team—maternal-fetal medicine, anesthesia, gynecologic oncology, vascular surgery, urology, and interventional radiology—planned a classic cesarean at 33w5d, leaving the placenta in situ, followed by bilateral internal iliac embolization and delayed hysterectomy six weeks later. In preparation for massive hemorrhage, the case was performed in a hybrid OR with vascular surgery where additional access was obtained including an arterial line, bilateral femoral arterial access via vascular surgery and a triple lumen CVL after the induction of general anesthesia. No intraoperative complications occurred; no vasopressors or blood products were needed. Six weeks later, total abdominal hysterectomy was completed without postoperative complications.

Discussion:
Placenta accreta is recognized as one of the two primary causes of peripartum hemorrhage and is the leading reason for peripartum hysterectomy (3). This case underscores the critical importance of meticulous surgical and anesthetic planning in reducing both morbidity and mortality. General anesthesia is typically favored due to the potential for extended operative times and the significant risk of massive hemorrhage (3). Regional anesthesia carries the risk of neuraxial hematoma, especially in the setting of coagulopathy from excessive bleeding (4). Surgical intervention is optimally scheduled between 34 weeks and 36 weeks of gestation, as delaying the procedure beyond 36 weeks further elevates the risk of hemorrhage (4). Patients with placenta percreta are excellent candidates for delayed interval

hysterectomy—a strategy aimed at minimizing blood loss and tissue trauma. This approach is ideal given their heightened risk for severe hemorrhage, especially when the placenta encroaches upon major pelvic vasculature (2).

References:

1. PMID:16157109 2. PMID:24266548 3. PMID:27375391 4. PMID:20052816

THURS - CR - BS 1 - BR 1 – Challenging Acuity - 03

Surprise! A Sneaky Invasion of the Bladder by Uterus Causing Massive Hemorrhage

Presenting Author: Anwesa Basa, BS

Presenting Author's Institution: The Ohio State University College of Medicine - Columbus, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center
Lucas Steele, MD - The Ohio State University

Introduction:
In recent years, the incidence of placenta accreta spectrum (PAS) has paralleled rising cesarean delivery rates (0.3% of births). The primary risk factor is placenta previa in a patient with a prior cesarean scar. In roughly 5% of cases, PAS can progress to percreta, with placental tissue invading adjacent organs. These cases are very complex with extremely high morbidity. Here, we present a case of unexpected placenta percreta with bladder invasion resulting in a massive large volume intraoperative hemorrhage that was managed successfully.

Case One:
A 34-year-old G8P6 at 34w2d gestation presented for a planned cesarean hysterectomy. Notably, she had undergone six prior Cesarean deliveries and had a known placenta previa with this pregnancy. Preoperative imaging suggested possible PAS, necessitating a multidisciplinary approach to surgical planning by anesthesiology, gyn-oncology, and MFM. Per standard of care, she was scheduled for cesarean hysterectomy in the main operating room with an arterial line, bilateral large bore IVs, and an available rapid transfuser. A combined spinal epidural was attempted but was unsuccessful, necessitating induction of general anesthesia prior to incision. Delivery of a healthy preterm infant was uneventful, but during dissection for the hysterectomy she began to hemorrhage. Previously undiagnosed placenta percreta was discovered, with direct invasion into the dome of the bladder. Urology and gyn-oncology were called and she underwent partial cystectomy with complex primary repair. Her course was notable for a total blood loss of 17 liters, requiring massive transfusion of over 40 units of blood products and use of 4 vasopressors. She was admitted to the ICU and successfully de-escalated. She was discharged 10 days later, ambulating and voiding spontaneously.

Discussion:
This case highlights the level of care, planning, and flexibility required to manage placenta accreta spectrum. Initial planning including CSE, but after surgical level was unable to be achieved, general anesthesia was induced. In addition, the extent of disease in PAS may be difficult to determine preoperatively; thorough evaluation and a high clinical suspicion for percreta should guide subsequent surgical preparation. The invasion into the bladder requiring cystotomy and emergent repair further complicated the massive hemorrhage. There is currently no consensus regarding the optimal anesthetic management of PAS. If neuraxial is chosen, a CSE is recommended, with the ability to convert to general anesthesia at any point. In all cases involving PAS, maternal survival depends on prompt recognition of

hemorrhage and massive transfusion activation. Large bore IV access is critical, and any coagulopathies must be rapidly corrected. With careful management, these patients can have positive outcomes despite heavy blood loss.

References:

1. Hawaii Med J. 2002 Apr;61(4):66-9. 2. Anesthesiology. 2025 Dec 16. doi: 10.1097 3. Journal of Perinatal Medicine, vol. 51, no. 4, 2023, pp. 439-454.

THURS - CR - BS 1 - BR 1 – Challenging Acuity - 04

When Seconds Matter: Emergent ECMO Cannulation for Cardiac Arrest in the Setting of Life-Threatening Amniotic Fluid Embolism

Presenting Author: Chelsea Holbrook, MD

Presenting Author's Institution: George Washington University - Arlington, Virginia

Co-Authors: Swapna Chaudhuri, MD, PhD - George Washington University Hospital
Laura Roland, MD - The George Washington University

Introduction:
Amniotic fluid embolism (AFE) is an obstetric emergency arising from sudden entry of amniotic fluid or fetal cells into the maternal circulation, resulting in a severe systemic inflammatory response. Patients present with sudden cardiovascular collapse, severe pulmonary distress, multi-organ failure and disseminated intravascular coagulopathy (DIC). Though AFE is rare, morbidity and mortality remain high. Maternal mortality is ~20%, with 61% of women and 50% of infants developing neurologic complications. Treatment includes cardiopulmonary resuscitation and aggressive supportive care. Besides prompt exclusionary diagnosis, readily available advanced cardiopulmonary support, via extracorporeal membrane oxygenation (ECMO), can be the difference between life and death in this catastrophic disease process. We present a case of intraoperative cardiac arrest, where the use of emergent veno-arterial (VA) ECMO played a key role in successful resuscitation of a patient with suspected AFE, DIC, and intraoperative stroke.

Case One:
A 32-year-old G3P1 at 39 weeks presented for an elective repeat cesarean section. Her history was significant for Protein S deficiency and a prior stroke. Following an unremarkable spinal anesthetic, fetal bradycardia was noted and the surgeon converted to a stat section. About 1 minute after delivery, the patient became unresponsive with a fixed rightward gaze, followed by cyanosis. Despite emergent intubation, she developed hypoxemia, cardiopulmonary collapse and DIC, resulting in several rounds of ACLS and massive transfusion. Transesophageal echocardiography showed right ventricular failure and AFE was suspected at this time. She was emergently brought to the ICU for VA ECMO, and was then transferred to interventional radiology for embolization and vascular injury repair. Once stabilized, CT head revealed a left frontal ischemic infarct with hemorrhagic transformation for which conservative management was recommended. She was eventually transitioned to veno-venous ECMO, and fully decannulated 8 days later. Following a long recovery, and with the efforts of a large multidisciplinary team, she was discharged home with her children.

Discussion:
Prompt and aggressive resuscitation strategies are key to successful management of AFE. Use of VA ECMO is now proving to be a life-saving resource for patients with cardiopulmonary distress from many different underlying etiologies, including patients with high post-partum hemorrhage risk. In patients with

suspected AFE, the utilization of VA ECMO has been shown to confer up to a 70% survival rate; however, the literature is still sparse regarding use of ECMO in obstetric anesthesia. In our case, timely capability to utilize VA ECMO in a critical, severely coagulopathic patient proved to be a life-saving measure and a successful management strategy for a catastrophic case of AFE.

References:

ASAIO J 2024; 70:e6–e8 ClinicalKey 2025

THURS - CR - BS 1 - BR 1 – Challenging Acuity - 05

Ante In Extremis: Acute Management of Prepartum Amniotic Fluid Embolism

Presenting Author: Connor McElwee, MD

Presenting Author's Institution: Ochsner Medical Center - New Orleans, Louisiana

Co-Authors: Riddhi Patodia, DO - Ochsner Medical Center

Introduction:
Amniotic Fluid Embolism (AFE) is a life-threatening anaphylactoid reaction to placental components entering maternal circulation, often leading to rapid cardiovascular collapse.

Case One:
A 32-year-old G3P2 at 39 weeks presented for scheduled induction of labor, electing for a trial of labor after cesarean section as she had previously undergone cesarean in Africa with inadequate analgesia. Pertinent medical history included anemia, GBS positive status, and polyhydramnios (AFI 27). An epidural was placed without complication, and an adequate dermatomal level of analgesia was achieved. Following induction of labor, decelerations were noted on fetal heart tracing, which prompted the obstetric team to pause the patient's Pitocin and attempt maternal repositioning. Without improvement with terbutaline, the patient was transported to the OR for emergent cesarean. During transportation the patient began to exhibit seizure-like activity, and once on ECG monitoring was found to have pulseless electrical activity, prompting Code Blue initiation and CPR. The patient was intubated, and three minutes later a hypotonic infant was delivered via perimortem cesarean. Six minutes following Code Blue activation, return of spontaneous circulation was achieved. Arterial and central access were obtained, and massive transfusion protocol was initiated, with blood products totaling 6 units pRBCs, 2 units FFP, 1 unit platelets, and 2 units cryoprecipitate. In addition to two rounds of 1 mg epinephrine, 0.4 mg atropine, 8 mg ondansetron, and 30 mg ketorolac were administered in adherence to AFE protocol. After two days of ventilatory and vasopressor support, the patient was ultimately extubated, weaned from pressors, and later discharged. The neonate was similarly weaned from ventilatory support and discharged in stable condition.

Discussion:
This case illustrates the importance of timely identification and management of AFE, a rare obstetric emergency with roughly 20% maternal death rate. In order to optimize both maternal and fetal outcomes, the obstetric anesthesiologist's efforts should address hemodynamic instability, respiratory distress, and fulminant coagulopathy. Additionally, this case highlights that AFE may occur not only during delivery or postpartum, but also in the prepartum period. The obstetric anesthesiologist should therefore have a high suspicion for AFE as a possible cause of cardiovascular collapse in the interval immediately preceding delivery.

References:

Suissa, N., Czuzoj-Shulman, N., & Abenhaim, H. A. (2024). Amniotic fluid embolism: 20-year incidence and case-fatality trends in the United States. European Journal of Obstetrics and Gynecology and Reproductive Biology, 294, 92–96. doi:10.1016/j.ejogrb.2023.12.034

THURS - CR - BS 1 - BR 1 – Challenging Acuity - 06

Life-Threatening Peripartum Cardiomyopathy (PPCM) in a Previously Healthy Parturient - Interplay Between Genetic Susceptibility and Pregnancy-Related Stress

Presenting Author: Lauren McHenry, MD

Presenting Author's Institution: University of California Davis Medical Center - Sacramento, California

Co-Authors: Amritpal S. Randhawa, BS - University of California, Davis School of Medicine
Prabdit Sidhu, MD, MPH - University of California Davis Medical Center

Introduction:
Peripartum cardiomyopathy (PPCM) is a rare, life-threatening cause of heart failure presenting in late peripartum or postpartum. Defined by left ventricular ejection fraction (LVEF) < 45% without an identifiable cause, PPCM affects approximately 1 in 2000 births worldwide and is a leading cause of maternal mortality.1 The pathophysiology of PPCM remains unclear, but it is likely multifactorial, triggered by oxidative stress, inflammation, vascular damage, and late-gestational hormonal shifts.1 Emerging evidence further suggests that an underlying genetic susceptibility for dilated cardiomyopathy (DCM) may overlap with pregnancy-related physiologic stress to precipitate disease. Although LVEF recovers in over 50% of patients, morbidity remains high with some patients requiring an automatic internal cardiac defibrillator for malignant dysrhythmias, left ventricular assist device support, or cardiac transplantation. Moreover, PPCM poses unique peripartum anesthetic challenges, including hemodynamic instability, compromised uteroplacental perfusion, and potential need for mechanical circulatory support.

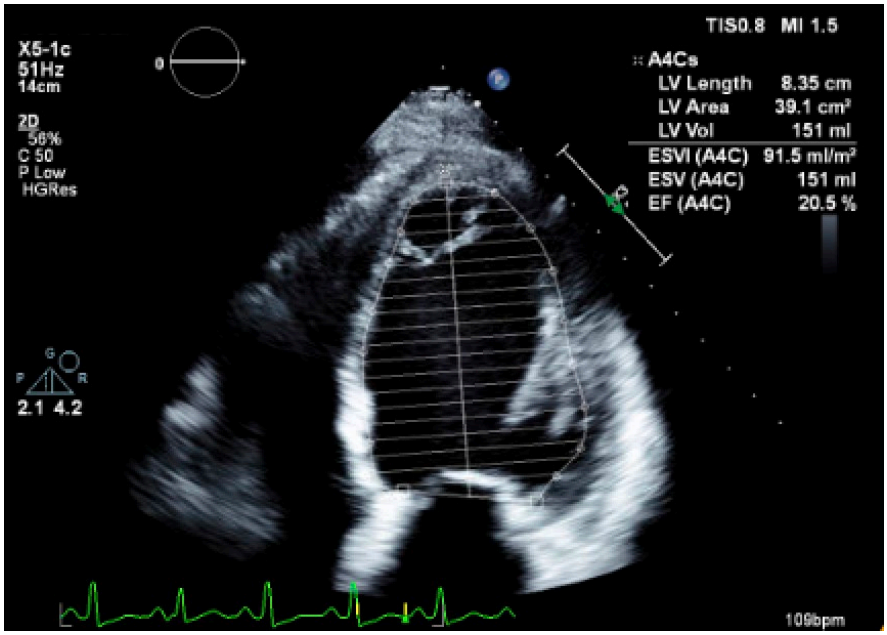
Case One:
A 19-year-old previously healthy G1P0 at 38w4d presented after a 2-week viral prodrome followed by acute progressive dyspnea and chest pain. Transthoracic echocardiogram demonstrated LVEF of 20% and dilated ventricles, concerning for PPCM. She underwent cesarean section under carefully titrated epidural neuraxial anesthesia, with invasive arterial monitoring, central venous access, and pre-cannulation for VA extracorporeal membrane oxygenation. She was discharged on postoperative day 5 with a LifeVest wearable defibrillator, and her course has since been marked by persistent severe LV function, recurrent heart failure exacerbations and LV thrombus. Genetic testing later identified a pathogenic variant in the desmoplakin (DSP) gene, which is associated with arrhythmogenic and DCM.

Discussion:
Up to 15% of patients with PPCM carry heterozygous loss-of-function mutations in genes implicated in nonischemic DCM, such as TTN, FLNC, and DSP, suggesting a shared disease continuum in which similar genetic susceptibility is unmasked by different environmental or physiologic stressors.2,3 However, it is unclear mechanistically how this genetic risk interacts with pregnancy-related physiologic and hormonal changes. Further studies aimed at a comprehensive genomic analysis may identify additional mutations linking PPCM and DCM, clarifying their shared mechanistic origin. This case

highlights the interplay between genetic susceptibility and pregnancy-related cardiovascular stress in the development of PPCM and underscores the complexity of anesthetic management in parturients with severe systolic dysfunction. Successful outcomes rely on invasive monitoring, preparedness for mechanical support, and multidisciplinary coordination.

References:

1. N Engl J Med 2024;390(2):154-164 2. Circulation 2021;143:1852-1862 3. N Engl J Med 2016;374:233-241



THURS - CR - BS 1 - BR 1 – Challenging Acuity - 07

Anesthetic Considerations for Cesarean Delivery and Type A Aortic Dissection Repair in a patient with Marfan Syndrome

Presenting Author: Kelley A. Smith, MD

Presenting Author's Institution: University of Virginia - Charlottesville, Virginia

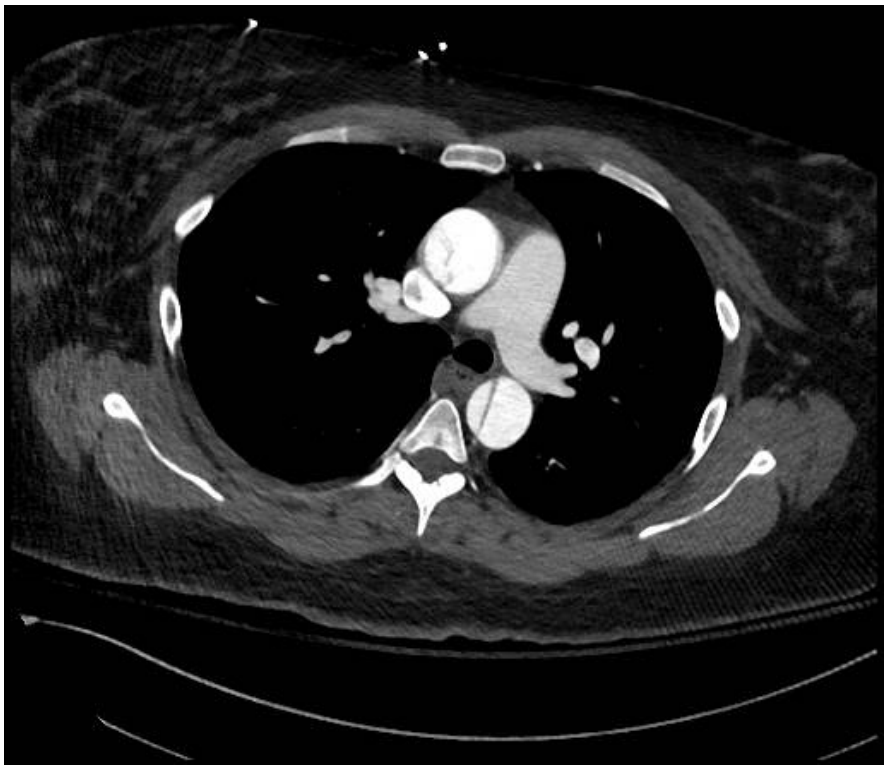
Co-Authors: Catherine E. Lyons, BS, BA - University of Virginia School of Medicine
Karen Singh, MD - UVA Health

Introduction:
Acute type A aortic dissection in pregnancy presents a life-threatening, time-sensitive challenge requiring nuanced anesthetic planning for hemodynamic stability and fetal viability.

Case One:
We describe the anesthetic management of a 23-year-old primigravida at 35 weeks' gestation with Marfan syndrome and known aortic root and ascending aortic dilation who presented with acute type A aortic dissection, extending from tubular ascending aorta to descending abdominal aorta (Figure 1). On presentation, the patient was maintained on high-dose esmolol and nicardipine infusions, with intermittent labetalol boluses to achieve a target systolic blood pressure below 110 mmHg, emphasizing strict impulse control to minimize propagation of the dissection while supporting uteroplacental perfusion. Given the need for immediate surgical intervention, a combined cesarean delivery (CD) and ascending aortic dissection repair was undertaken. CD was completed prior to aortic surgery to account for the risks associated with fetal exposure to cardiopulmonary bypass (CPB) as well as the late gestational age. Hemodynamic management prioritized heart rate control and avoidance of acute afterload increases. General anesthesia with rapid sequence induction was selected over neuraxial techniques to facilitate the use of TEE as well as to allow for rapid progression to CPB if needed. Prior to induction, arterial and central venous access, cerebral oximetry and BIS monitoring was established. The patient was induced with ketamine (2 mg/kg), lidocaine, and rocuronium with avoidance of high-dose opioids. Esmolol and nicardipine infusions were discontinued peri-induction and the patient required low dose epinephrine and norepinephrine infusions after induction. A TEE probe was placed immediately after induction and the exam confirmed the presence of aortic dissection and absence of pericardial effusion. The absence of tamponade physiology in this case allowed for a relatively hemodynamically stable intraoperative course during the CD. After delivery, oxytocin administration resulted in transient hypotension requiring vasopressor escalation. She underwent full systemic anticoagulation for CPB and hypothermic circulatory arrest for aortic repair. The post-bypass course was complicated by a substantial coagulopathy necessitating whole blood transfusion, prothrombin complex concentrate, and recombinant factor 7a, guided by POC coagulation testing. Postoperatively, the patient remained in the ICU for 12 days and was discharged home in stable condition. The neonate was delivered with Apgar scores of 2 and 5 at 1 and 5 minutes and required a 37-day ICU stay due to prematurity.

Discussion:
This case highlights key considerations for the obstetric and cardiothoracic anesthesiologist managing concurrent high-risk cardiovascular and obstetric pathology: careful hemodynamic and echocardiographic monitoring, as well as anticipation of hemorrhagic and coagulation challenges.

References:
1. Ann Cardiothorac Surg 2023;12:526



THURS - CR - BS 1 - BR 1 – Challenging Acuity - 08

Pulseless Pregnancy: Navigating Cesarean Delivery with an LVAD

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Introduction:
The incidence of pregnancy in patients with left-ventricular assist devices (LVADs) is rare with 10 cases reported resulting in 8 live births (1). No guidelines exist for the anesthetic management of these patients.

Case One:
A 35-year-old G4P7 female with BMI 50 and history of peripartum cardiomyopathy requiring durable HeartMate 3 LVAD presented for management at 14 weeks gestation. At presentation, transthoracic echocardiogram (TTE) demonstrated a severely dilated left ventricle (LV) with end diastolic diameter 75mm and reduced ejection fraction of 15% with diffuse hypokinesis; mildly dilated right ventricle (RV) with reduced systolic function (TAPSE 12mm). Functional status was initially preserved, as she was able to perform all activities of daily living unassisted. During the second trimester, she was hospitalized four times for symptomatic, acute decompensated heart failure requiring intravenous diuretics and progressive increases in LVAD speed. RV function was also noted to be declining. At 32w3d gestation, the decision was made to proceed with delivery for maternal indications via primary cesarean for breech presentation. The primary anesthetic concern was the anticipated need for RV hemodynamic support. In the operating room epoprostenol was administered via high-flow nasal cannula for RV afterload reduction. Radial and pulmonary artery catheters were placed. Pulmonary artery pulsatility index at that time was 1.1, confirming RV dysfunction. Dural puncture epidural was then performed, which was slowly dosed with 10mL of 2% lidocaine-1:100,000 epinephrine, 100mcg fentanyl, and 20mg dexmedetomidine following test dose of 3mL 1.5% lidocaine-1:100,000 epinephrine. Following epidural activation, mean arterial pressure decreased requiring epinephrine for RV inotropic support and vasopressin for decreased systemic vascular resistance. Femoral sheaths were placed to enable rapid conversion to venoarterial extracorporeal membrane oxygenation (ECMO), but were not utilized. A vigorous baby was delivered with Apgars 7 and 8. An initial bolus of oxytocin 3U was given followed by maintenance infusion of 3U/hr for management of uterine atony. This resulted in systemic hypotension prompting initiation of norepinephrine. Uterine tone was adequate without second-line uterotonics, and surgical bleeding was well controlled. Epidural morphine 2mg was administered for postoperative analgesia. She was transferred to the intensive care unit where all vasoactive medications were gradually weaned by postoperative day (POD) 3. On POD5, in the setting of early anticoagulation the patient developed rectus sheath hematomas requiring embolization. She was discharged from the hospital on POD11.

Discussion:
Our case demonstrates successful management under neuraxial anesthesia for cesarean delivery of a patient with biventricular failure and an LVAD utilizing pulmonary and radial arterial catheters for monitoring and multiple vasoactive medications.

References:
1. Oren et al. 2024 ASAIO Journal

THURS - CR - BS 1 - BR 1 – Challenging Acuity – 09

Lipid Emulsion Use During Maternal Cardiac Arrest with Suspected Amniotic Fluid Embolism

Presenting Author: Alex J. Hydock, MD

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Co-Authors: Eric A. Krause, MD - KUMC
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Introduction:
Amniotic fluid embolism (AFE) is a rare, catastrophic obstetric emergency characterized by abrupt hypoxia, cardiovascular collapse, and coagulopathy. Lipid emulsion is an established rescue therapy for local anesthetic systemic toxicity (LAST) and has been described in case reports as adjunctive therapy during refractory cardiac arrest associated with AFE.

Case One:
A 19-year-old G1P0 at 38 weeks gestation underwent induction of labor with uncomplicated epidural placement. Shortly after intrauterine pressure catheter placement, she developed nausea, vomiting, unresponsiveness, seizure-like activity, and fetal bradycardia, prompting emergent cesarean delivery. Immediately following delivery, the patient became bradycardic and hypoxic, progressing to cardiac arrest. Four rounds of cardiopulmonary resuscitation were performed, including four defibrillations and standard advanced cardiac life support measures. Given seizure-like activity and refractory cardiovascular collapse, LAST could not be excluded, and 20% lipid emulsion was administered empirically (1.5 mL/kg bolus followed by 0.25 mL/kg/min infusion). Following the lipid emulsion bolus, spontaneous circulation returned within minutes. Point-of-care ultrasound demonstrated grossly normal biventricular function. The patient was stabilized and lipid emulsion was discontinued. Approximately one hour after discontinuation, the patient deteriorated with recurrent cardiac arrest, severe postpartum hemorrhage, and coagulopathy requiring massive transfusion and emergent bedside hysterectomy. Thromboelastography obtained 1 hour following initial loss of consciousness demonstrated abnormal maximum amplitude (49), LY30 (65%), and decreased fibrinogen (198). Given refractory hypoxia and hypercapnia with arterial blood gas values of pH 7.06, $PaCO_2$ 102 mmHg, and PaO_2 39 mmHg, the patient was cannulated for veno-venous extracorporeal membrane oxygenation. Transesophageal echocardiography demonstrated moderate right ventricular dysfunction and severe tricuspid regurgitation. Four days later, the patient was successfully decannulated and ultimately discharged home with full neurologic recovery. Based on the acute cardiopulmonary collapse, hemorrhage, coagulopathy, and exclusion of alternative etiologies, AFE was favored as the leading diagnosis.

Discussion:
This case highlights the diagnostic uncertainty during obstetric cardiac arrest and overlap between AFE and LAST. While lipid emulsion was administered empirically for LAST, its temporal association with

return of spontaneous circulation raises consideration for adjunctive use during refractory AFE-associated cardiac arrest. Further investigation is needed to clarify the potential role of lipid emulsion in AFE.

References:

1. Lynch, W. et al. (2017)A&A Case Reports 8: 64-66

THURS - CR - BS 1 - BR 1 – Challenging Acuity - 10

Management of Cocaine-Induced Type A Aortic Dissection at 30 Weeks Gestation

Presenting Author: Lucas Steele, MD

Presenting Author's Institution: The Ohio State University - Columbus, Ohio

Co-Authors: Peyton Beachy, MD - Ohio State University Wexner Medical Center
Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center

Introduction:
Type A aortic dissection during pregnancy is an extremely rare occurrence, estimated to occur in less than 0.4% of all aortic dissections. Risk factors for aortic dissection include connective tissue disorders, smoking, trauma, hypertension, and stimulant (cocaine) use. The sympathetic surge observed with cocaine use amplifies the hyperdynamic physiologic changes of pregnancy, resulting in further increases in heart rate, cardiac output, and circulating blood volume. Additionally, both conditions have been shown to directly affect the composition and strength of the aortic intima, thereby increasing the likelihood of dissection when combined.

Case One:
A 36-year-old G6P3 at 30 weeks' gestation was transferred from an outside hospital with chest pain after being found to have echocardiographic/CT aneurysm findings of a type A aortic dissection. Her past medical history was significant for cocaine use, with last use 3 days before presentation. She was immediately evaluated by OBGYN and cardiac surgery and underwent emergent cesarean delivery with general anesthesia. Intraoperative TEE demonstrated a large dissection flap originating in the aortic root and extending into the aortic arch. Following delivery, she underwent prophylactic bilateral uterine artery embolization with interventional radiology given post-operative hemorrhage concerns. She was admitted to the CVICU for impulse control managed with esmolol, nitroprusside, nicardipine, and carvedilol. On post-operative day 3, she underwent successful aortic root and hemi-arch repair with aortic valve replacement surgery. She was weaned quickly from vasoactive medications and was eventually discharged home in stable condition. She was doing well at her 6-week post-operative appointment with plans to follow up in one year.

Discussion:
In a pregnant patient with a known type A aortic dissection, balancing aortic repair with safe delivery of the fetus requires multi-specialty consideration, as mortality increases 1-2% per hour with delayed repair. Immediate operative intervention was initially planned; however, given her hemodynamic stability, her dissection appeared to be subacute given the delay in diagnosis, and the risk of life-threatening hemorrhage during emergent Cesarean delivery due to the systemic anticoagulation required for cardiac bypass outweighed the benefits of immediate repair. She underwent successful Cesarean with a cardiac setup and TEE and after multidisciplinary discussion, underwent IR-guided uterine artery embolization.. This case ultimately demonstrates that multidisciplinary care is imperative for positive outcomes in these

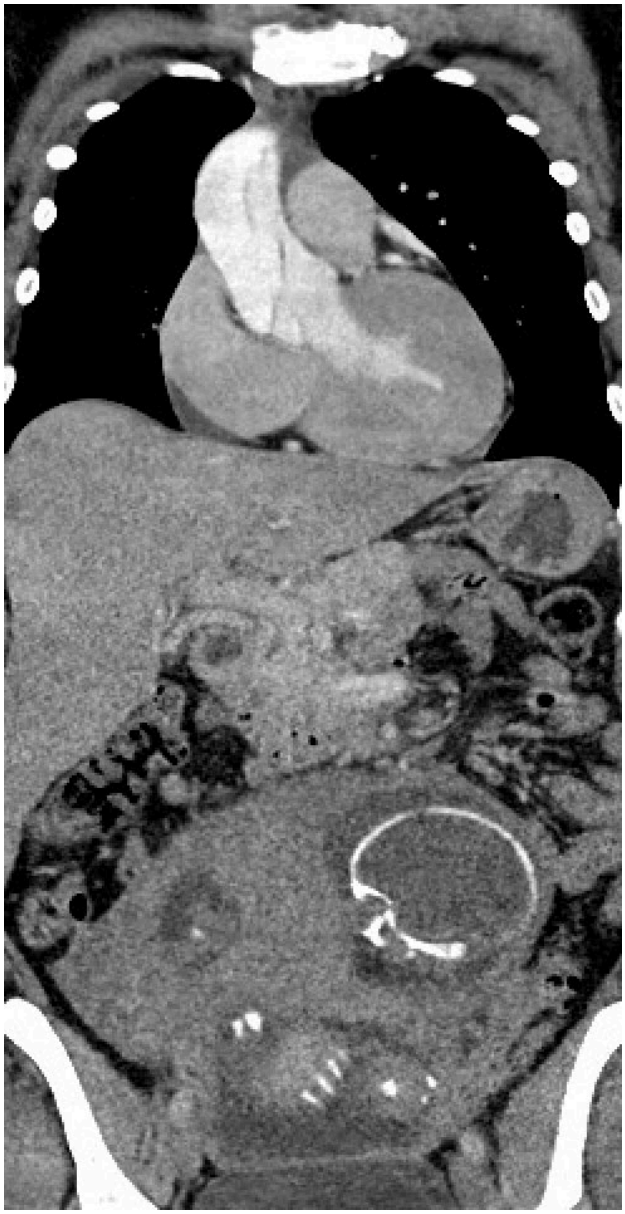
complex cardiac-obstetric patients. It also reinforces that pregnant patients presenting with chest pain, particularly if they use recreational cocaine, should be screened for aortic dissection to minimize the potential risk of delayed diagnosis.

References:

1. Annals of Thoracic Surgery 103(4):1199–1206.

2. Am J Case Rep 2023; 24:e940628.

3. Case Rep Womens Health. 2020 Oct 2;28:e00261



THURS - CR - BS 1 - BR 2A – Potpourri – 01

It Takes a Village: A Multidisciplinary Approach to a Complex Case of Placenta Accreta Spectrum

Presenting Author: Tyler King, MD

Presenting Author's Institution: Atrium Heath Wake Forest Baptist - Greensboro, North Carolina

Co-Authors: Liliane Ernst, MD - Atrium Health Wake Forest

Introduction:
Placenta Accreta Spectrum (PAS) is defined by ACOG as pathologic adherence of the placenta. The estimated incidence of PAS has increased to 1 in 272 deliveries. There are several risk factors known for PAS with the highest being multiple prior Cesarean deliveries. PAS is associated with an 18-fold increase in maternal morbidity and 7% of worldwide maternal mortality.

Case One:
The patient was G5P2 with two previous cesarean deliveries, with a PMH significant for cHTN, Factor V Leiden with previous DVT, and right MCA stroke. She was scheduled for possible cesarean hysterectomy due to concern for PAS due to focal loss of uteroplacental interface among other ultrasound signs. She presented at 31w4d with an occlusive LLE DVT that extended from her external iliac to her popliteal vein. Vascular surgery was consulted, and thrombectomy was considered too high risk at this gestational age in the context of PAS. IR was consulted to discuss IVC filter placement; however, there was concern that given her advanced gravid status the filter would have to be placed suprarenal which carries an increased risk of renal vein/ IVC thrombosis and that her IVC would be too large for IVC placement. Cardiothoracic surgery (CTS) was consulted for contingency planning for the scenario of massive PE since her clot burden would affect ECMO cannulation. To balance the risks of bleeding complications in the context of anticoagulation (ACT) and PAS with the risk of thromboembolism associated with the significant clot burden, a multidisciplinary meeting was arranged between many different subspecialties to determine her ACT plan. To reduce the risk of thromboembolism in the time period when ACT was held it was decided to place an IVC filter the day before her surgery with plan to remove it in the postoperative period as soon as therapeutic ACT could be restarted in order to minimize risk of thrombosis associated with the filter. The day prior to surgery, the patient underwent successful placement of an infrarenal filter. The anesthetic plan centered around preparation for significant hemorrhage and thromboembolism while still offering a positive delivery experience for the patient. Venous access was achieved with two large bore IVs. A radial arterial line was placed for hemodynamic monitoring. CTS was on standby for ECMO. A CSE was placed, and surgical anesthesia was achieved; however, during the hysterectomy portion of the case, the patient requested conversion to general anesthesia. The operative course was complicated by right ovarian vein thrombosis requiring salpingectomy. QBL of 2L resulted in receiving 2 pRBCs.

Discussion:

This case was complex due to two opposing issues: the bleeding risk of PAS and the need for ACT due to significant DVT. Multidisciplinary planning was essential in minimizing the risk of both hemorrhage and thromboembolism. Without every member of the care team, this patient would not have been able to have the outcome that was achieved.

References:

Obstetric Care Consensus No. 7

Accreta.pdf

Transversus Abdominis Plane Catheters for Opioid-Free Analgesia Following Cesarean Delivery in a Patient with Mast Cell Activation Syndrome

Presenting Author: Brian Vickers, MD

Presenting Author's Institution: Albany Medical Center - Albany, New York

Co-Authors: Narda Bondah, BS - Albany Medical College

Introduction:
MCAS is an underrecognized condition with a higher propensity for multiorgan involvement and unpredictability compared to its IgE-mediated counterpart. It is vital to prevent mediator release by avoiding exposure to certain triggers, such as stress, temperature changes, and certain drugs, because this can lead to severe allergy-like symptoms or even anaphylaxis. Unfortunately, many of the drugs implicated in MCAS are commonly utilized in the perioperative environment, such as opioids, muscle relaxants, and NSAIDs [2]. This case report details the opioid-free management of a patient presenting for elective cesarean delivery with a complex medical history including MCAS and spontaneous CSF leak.

Case One:
A 28-year-old G1P0 female at 37w1d presented with SROM and requested to proceed with elective cesarean section. Her medical history was remarkable for EDS, MCAS, POTS, anxiety, spontaneous CSF leaks, and reported anaphylaxis to all opioids. She declined IOL due to concern that she would be unable to have labor analgesia as she had previously been advised an epidural would have a greater chance of causing recurrent CSF leak. Also, she reported a history of anaphylactic shock while recovering from general anesthesia, requiring epinephrine and ICU admission for a reaction which was attributed to opioids. Preoperatively, she received famotidine, sodium bicitrate, acetaminophen, and her home dose of steroids. In addition to standard ASA monitors, a ClearSight monitor was utilized for continuous blood pressure monitoring. A spinal was placed with 1.8mL of 0.75% bupivacaine and a T4 level was achieved. Verbal reassurance, acupressure, and partner presence were initially helpful at managing her anxiety. However, shortly after placenta removal she developed a panic attack and severe nausea. Her home lorazepam and ondansetron were administered with marginal effect. Dexmedetomidine was administered to reduce both anxiety and postoperative pain. After skin closure, bilateral TAP catheters were placed. She received scheduled acetaminophen and ketorolac – a drug which she had previously tolerated. Her pain levels were satisfactory, remaining 0-3/10 through her admission. TAP catheters were removed on POD2.

Discussion:
While our standard of care for pain control after cesarean delivery is intrathecal morphine, we successfully achieved adequate pain control without any opioids by utilizing existing multimodal techniques [1]. Establishing the efficacy of opioid-free regional anesthetic techniques for patients desiring

or requiring opioid-free anesthesia for cesarean section is an important first step in complimenting established practices.

References:

1. International Journal of Obstetric Anesthesia. 2012 Apr 1;21(2):176–80. 2. J Biomed Res. 2022 May 28;36(6):435-439.

THURS - CR - BS 1 - BR 2A – Potpourri – 03

Beyond the Expected: Anesthetic Management of an Elderly Parturient with Triplet Gestation

Presenting Author: Kelechi B. Anyaehie, MD, MPH

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Co-Authors: Susan Stanley, MD - UTSW

Introduction:
The increasing utilization of assisted reproductive technology has led to a rising prevalence of pregnancies in patients of advanced maternal age (AMA). Providing optimal anesthetic management for this demographic necessitates a comprehensive understanding of age-related physiological changes, the impact of pre-existing comorbidities, and the heightened risk of obstetric complications. We present a case of an elderly parturient with triplet gestation, via in vitro fertilization (IVF) in Africa, presenting for cesarean delivery complicated by delayed onset of severe preeclampsia.

Case One:
A 62 year old G4P0A3 initially presented to labor and delivery from clinic at 30w2d for elevated blood pressures of 140s/80s. She was admitted to antepartum for 2 weeks for coordination of care and maternal fetal surveillance in the setting of gestational vs chronic hypertension. Her high-risk pregnancy was complicated by complete placenta previa, IVF gestation, dichorionic/triamniotic triplet gestation, fetal anomalies (triplet B and C with spina bifida), cervical cerclage, postmenopausal status, history of open myomectomy, anemia, glaucoma, new onset severe lower extremity and abdominal wall edema/ venous stasis and class II obesity. At 32w2d the patient underwent a primary classical cesarean delivery with cerclage removal. Intraoperatively, an additional large bore IV was obtained and a low-dose combined spinal epidural was placed requiring 2 attempts, due to significantly calcified spinal ligaments. Additional boluses of phenylephrine, along with an infusion, were given to treat symptomatic spinal induced hypotension. EBL was 2L due to classical hysterotomy, significant lysis of adhesions, and triplet gestation. Her epidural was maintained for 24 hours for post op analgesia. On postoperative day (POD) 5, patient developed severe range blood pressures requiring IV antihypertensives and a loading dose of magnesium for delayed pre-eclampsia. A continuous magnesium infusion was deferred given suspected CKD stage II. She was transitioned to nifedipine with improvement of blood pressure and was discharged home on POD 7. Triplet A was admitted and remained in the NICU and triplet B and C were transferred to the adjacent children's hospital for meningomyelocele repair.

Discussion:
Studies show maternal morbidity and mortality increase substantially with age greater than 50. Elderly parturients are at greater risk of chronic hypertension, pre-eclampsia, gestational diabetes, cesarean delivery and hemorrhage. All of which have anesthetic implications. Literature on the anesthetic management and specific outcome data for pregnant patients over the age of 60 is limited. This case

emphasizes the need for individualized risk assessment, perioperative planning and preparation for potential maternal and fetal complications.

References:

1. Orbach-Zinger S, et al. J Matern Fetal Neonatal Med. 2015;28(1) 2. Saccone G, et al. Int J Gynaecol Obstet. 2022;159(1):43-55 3. Anaesthesia. 1999;54(9):887-891

THURS - CR - BS 1 - BR 2A – Potpourri – 04

Amniotic Fluid Embolism: Early detection and aggressive treatment leading to a good outcome

Presenting Author: Shobana Bharadwaj, MBBS

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Co-Authors: Savannah Cofer, MD - University of Maryland Medical Center
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Introduction:
Amniotic fluid embolism (AFE) is a rare but catastrophic complication during pregnancy where amniotic fluid or debris enter maternal circulation causing hemodynamic instability, hypoxia, and coagulopathy. The exact mechanism is not fully understood however, it is believed to be a maternal anaphylactoid reaction to the fetal material which contains procoagulant factors. Data also suggests that maternal immune response to the fetal material via the complement system plays a role. Early detection and management are crucial during AFE for improving outcomes.

Case One:
We present a 40 year old G11P4064 who presented for induction of labor at term at 39w6d with pregnancy complicated by advanced maternal age and grand multiparity. She received an uncomplicated epidural for labor analgesia. Shortly following artificial rupture of membranes she experienced altered mental status and an acute drop in blood pressure treated with boluses of phenylephrine and ephedrine. Fetal bradycardia ensued despite blood pressure management at which point she underwent a STAT cesarean section. Her mental status was stable and BP improved with treatment. Anesthesia was maintained via 3% chloroprocaine bolus in her existing labor epidural with oxygen delivered via nonrebreather. Hemodynamics were supported with a phenylephrine infusion and an arterial line was placed in the operating room. Following delivery, uterine atony was treated with standardized oxytocin boluses and infusion, as well as methylergonovine, carboprost, and calcium. Despite this, there was ongoing coagulopathy at which point a massive transfusion was initiated as labs demonstrated DIC and AFE was suspected as the diagnosis. ROTEM was used intraoperatively for guided transfusion. She was subsequently intubated due to her abdomen remaining open in the setting of bleeding and was transported to the ICU. Postoperatively, echocardiogram was normal. Following this, she required uterine artery embolization. With further resuscitation her labs normalized and abdomen was closed the following day. Ultimately, she was extubated on POD2 and discharged home without deficits.

Discussion:
The key to improved survival in AFE is early detection and supportive management including aggressive management of coagulopathy and hemodynamic support. This case demonstrates that AFE presentation is a spectrum and the importance of early detection and intervention. In this case, the prompt response to

her acute hypotension likely prevented complete cardiopulmonary collapse. All of which resulted in positive outcomes for both mother and baby.

References:

1. PMID: 27275041 2. PMID: 28188959 3. PMID: 20436307

THURS - CR - BS 1 - BR 2A – Potpourri – 05

Navigating the Hemodynamic Stress Test: Successful Pregnancy in a Paced Fontan Patient with Situs Inversus

Presenting Author: Erin Ross, DO

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Co-Authors: Aaron Huang, MS3 - Albany Medical College

Introduction:
The Fontan procedure separates the pulmonary circulation and systemic circulation ultimately allowing the single ventricle to act as the left heart and the Fontan circuit to act as the right heart, relying on passive flow to the lungs[2]. This requires a delicate lifetime balance of pulmonary vascular resistance(PVR) and systemic vascular resistance(SVR) to maintain cardiac output. For these patients, it is pertinent that SVR remain high and PVR remain low. Patients can have a rare, combined abnormality of Fontan circulation with dextrocardia which can make not only the repair more tenuous but can cause difficulties with continued monitoring with echo due to anatomic position[3]. In general, the physiologic strain of pregnancy on patients with Fontan physiology is a balancing act, requiring meticulous planning and execution of care. The profound hemodynamic shifts that are encountered in pregnancy are often poorly tolerated. Regardless, the number of women giving birth with Fontan circulation is expected to increase due to improved long-term outcomes with this procedure[1].

Case One:
A 24 year-old G4P0030 presented at 36 weeks gestation. She was born with dextrocardia with complex single ventricle (likely right). Her surgical history was significant for a staged palliation, culminating in an extracardiac Fontan procedure and pacemaker placement. Prior to pregnancy, her baseline oxygen saturation was 85-88% on room air, improving to >90% in pregnancy. Echo pertinent for single ventricle, transposed great vessels, right aortic arch, unobstructed flow through Fontan circuit. Management included epidural analgesia to minimize sympathetic surge and tachycardia of labor while avoiding a sudden drop in SVR or increase in PVR. A healthy infant was vaginally delivered, without hemorrhage. Following delivery, the patient was monitored to manage autotransfusion.

Discussion:
This case highlights the successful perinatal management of a patient with a triad of cardiac complexities: Fontan physiology, dextrocardia, and pacemaker dependency. Pregnancy-induced volume expansion without a sub-pulmonary pump requires a delicate balance between maintaining high enough venous pressure to drive pulmonary flow and avoiding heart failure[2].The success of this case rested on the following tenants: the prenatal interdisciplinary preparation, navigating the physiologic stress test that is pregnancy, and the precise execution of neuraxial anesthesia to maintain hemodynamic stability during delivery. As the first generation of Fontan survivors reaches reproductive age, clinicians are increasingly encountering the challenge of managing pregnancy in this high-risk population, although literature

remains limited[1]. This case provides a framework for navigating the intricate interplay between Fontan palliated anatomy and the physiological stress of pregnancy.

References:
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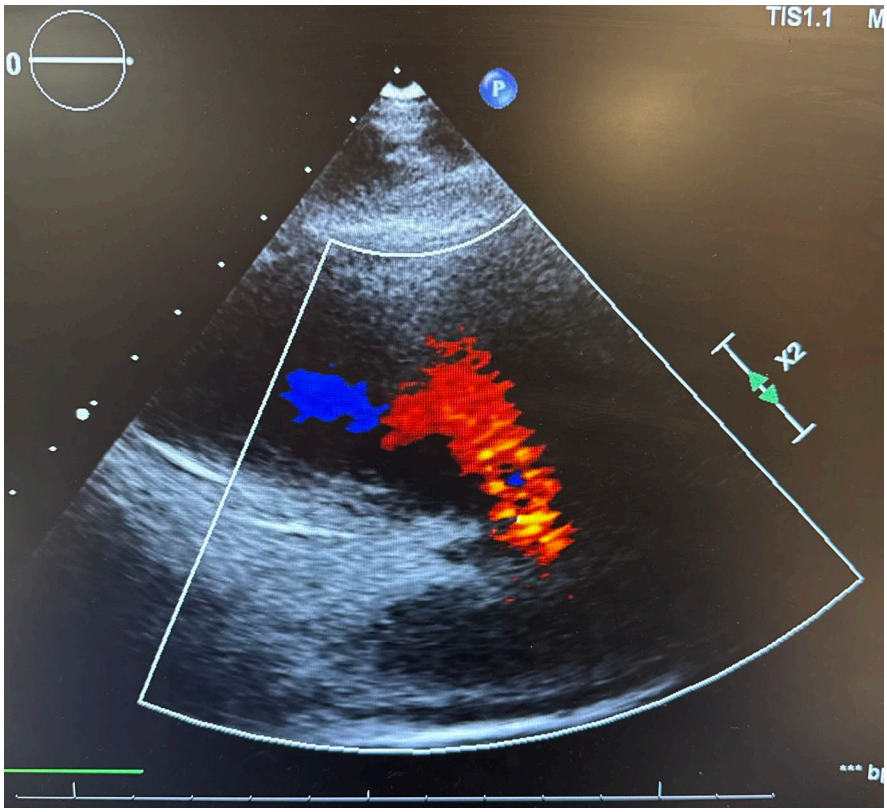

THURS - CR - BS 1 - BR 2A – Potpourri – 06

General Anesthesia for Cesarean Delivery in a Parturient with Pre-eclampsia and New-Onset Complete Heart Block

Presenting Author: Shobana Bharadwaj, MBBS

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Co-Authors: Allison Lankford, MD - University of Maryland School of Medicine
Christopher R. Parrino, MD, MD - University of Maryland Medical Center

Introduction:
Complete heart block (CHB) during pregnancy is rare, with an incidence of 1 in 100,000 pregnancies[1]. While neuraxial anesthesia may be preferred to minimize hemodynamic shifts, it risks sympathectomy-induced bradycardia. General anesthesia with backup pacing may be appropriate in select cases requiring cesarean delivery[2]. We present a case of a primigravida with new-onset CHB and pre-eclampsia undergoing cesarean delivery with general anesthesia and standby transvenous pacing.

Case One:
A 24-year-old G1P0 at 36w2d presented with hypertension and bradycardia (HR 39-42 bpm). ECG confirmed third-degree heart block with a junctional escape rhythm (Figure). She was hemodynamically stable, but reported mild dizziness. Laboratory evaluation confirmed pre-eclampsia. Infectious and autoimmune workups were negative, and she had normal biventricular and valvular function. A multidisciplinary team recommended cesarean delivery at 36w5d for breech presentation and maternal indications. In the operating room, an arterial line was placed and general anesthesia was induced. A transvenous pacing lead was introduced partially into the superior vena cava in case of hemodynamic instability but was not advanced further. Hemodynamics were maintained with norepinephrine. A healthy neonate was delivered, and umbilical cord gases were normal. The CHB persisted at 43-55 bpm. Analgesia was achieved with acetaminophen, methadone, and bilateral transversus abdominis plane blocks. The patient recovered well and was discharged home on postoperative day 3. She remained in CHB with a plan for follow-up in 4 weeks with cardiology.

Discussion:
Although gradual epidural dosing is commonly employed to avoid abrupt sympathectomy, general anesthesia with pre-positioned pacing can be performed safely in parturients with CHB when neuraxial techniques pose risk or rapid conversion to surgical anesthesia is anticipated. This case underscores the importance of individualized planning and multidisciplinary coordination in parturients with significant cardiac disease. Parturients presenting with stable CHB may not require pacing unless the arrhythmia fails to resolve in the postpartum period[3].

References:

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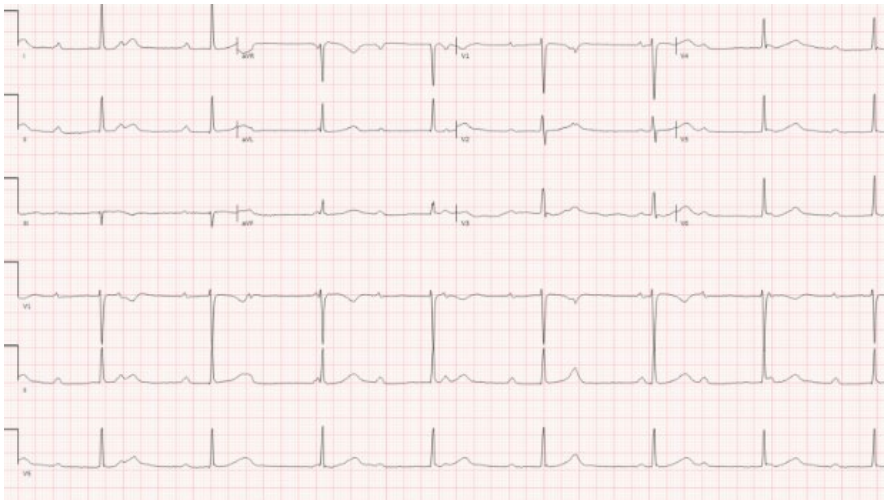

THURS - CR - BS 1 - BR 2A – Potpourri – 07

Multidisciplinary Management of a Parturient with Recent SCAD-Induced STEMI for Combined Cesarean Delivery and Myomectomy

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Introduction:
Spontaneous coronary artery dissection (SCAD) is a rare but leading cause of pregnancy- associated myocardial infarction. Anesthetic management focuses on maintaining coronary perfusion pressure while avoiding surges in catecholamines and shear stress that could propagate dissection. We describe the successful use of a low-dose combined spinal-epidural (CSE) and invasive monitoring for a patient with a recent SCAD-induced STEMI undergoing Cesarean delivery and myomectomy.

Case One:
A 32-year-old G2P0A1 at 37w2d presented for primary Cesarean delivery and myomectomy (largest fibroid 11cm). Her history was significant for a STEMI five months prior (11/2024) secondary to SCAD of the proximal and distal LAD, treated with balloon angioplasty without stenting. Her pregnancy was managed with metoprolol succinate and aspirin; preoperative echocardiography showed an EF of 61–65% with no wall motion abnormalities. Due to the risk of recurrent dissection and the complexity of a combined procedure, the case was performed in a hybrid OR with Cardiology on standby. A radial arterial line was placed for close hemodynamic monitoring. To minimize hemodynamic swings, a low-dose CSE was performed (0.5 mL of 0.75% bupivacaine with 15 mcg fentanyl). The epidural was then slowly titrated with 2% lidocaine with epinephrine to achieve a surgical level while avoiding abrupt sympathectomy. Intraoperative MAPs were maintained >70 mmHg using a phenylephrine infusion and judicious fluid boluses to ensure adequate coronary perfusion. Estimated blood loss was 1 L; cell saver and TAP blocks were utilized for blood conservation and opioid-sparing analgesia. The patient was monitored in the CICU postoperatively and discharged on post-op day 5 without cardiac or obstetric complications.

Discussion:
This case highlights the importance of a "slow-on" neuraxial technique in SCAD patients. While spinal anesthesia offers a dense block, the resulting rapid sympathectomy can lead to hypotension and compensatory tachycardia, both of which increase myocardial oxygen demand and risk coronary hypoperfusion. By utilizing a low-dose spinal component supplemented by a slow epidural load, we achieved surgical anesthesia while maintaining hemodynamic stability (MAP >70 mmHg). The use of a hybrid OR and multidisciplinary collaboration ensured a high safety margin for this high-risk parturient.

References:

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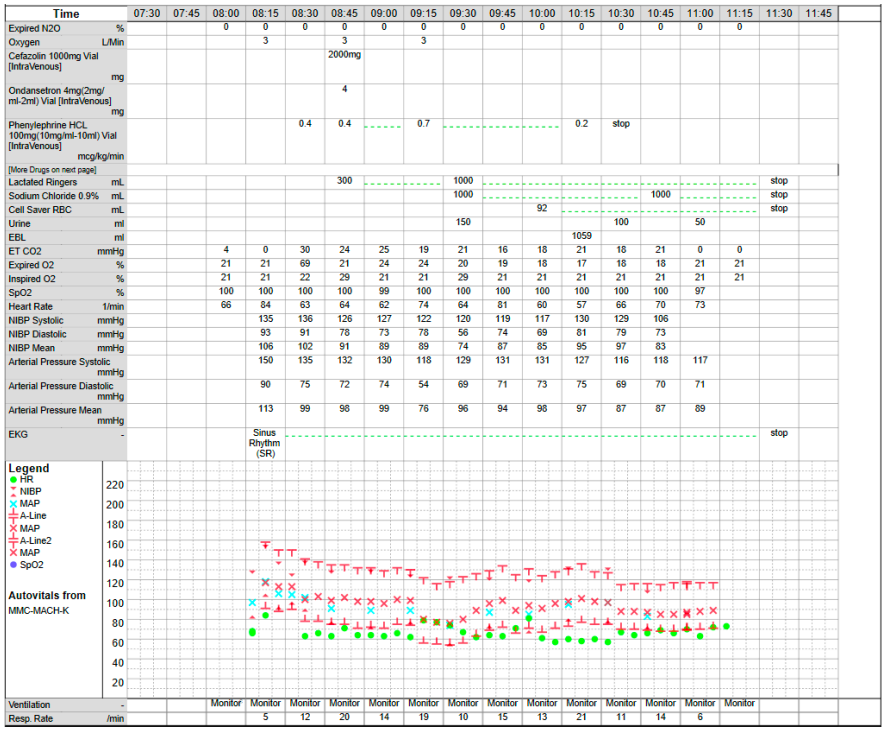

THURS - CR - BS 1 - BR 2A – Potpourri – 08

A Case Report of Takotsubo Cardiomyopathy in Pregnancy: When Form Reflects Dysfunction

Presenting Author: Trenton J. Dawson, MD

Presenting Author's Institution: University of Chicago - Chicago, Illinois

Introduction:
Takotsubo cardiomyopathy (TCM) is a transient, stress-induced left ventricular dysfunction triggered by emotional or physiological stress. Pregnancy and delivery are well-recognized physiological stressors that can unmask or precipitate TCM, and catecholamine surges during labor, delivery, or anesthetic induction can cause or exacerbate myocardial injury.

Case One:
A 33-year-old G5P3013 at 38w0d gestation presented with acute onset of chest pain and dyspnea. She had a prior history of postpartum TCM. Her initial evaluation was positive for anxiety and diaphoresis with normal vital signs. Laboratory evaluation revealed a troponin of 390 ng/L (n< 147 ng/L) and pro-BNP of 221 pg/mL (n< 125pg/mL). Her EKG findings included T-wave inversions in leads V2–V4 without arrhythmia or ST-segment changes. Point-of-care ultrasound (POCUS) demonstrated apical ballooning with basal hyperkinesis, prompting cardiology consultation and formal transthoracic echocardiography (TTE). TTE confirmed the diagnosis with a left ventricular ejection fraction of 45–47% and apical hypokinesis. After multidisciplinary cardio-obstetric evaluation, she underwent repeat cesarean delivery on hospital day 3 after her troponin normalized. Surgical anesthesia was initiated via a combined spinal epidural procedure with 0.6mg intrathecal bupivacaine and 200mg epidural lidocaine dosed slowly over 15 minutes. Intraoperative POCUS confirmed stable apical ballooning and basal hyperkinesis. A healthy neonate was delivered. The patient had a quantitative blood loss of 975 mL secondary to uterine atony, which resolved with oxytocin infusion at 300u/min and uterine massage. She received 1.5L of crystalloid. No arrhythmias or ischemic changes occurred. She was discharged home on postpartum day 4 with remote blood pressure monitoring and outpatient cardiology follow-up. At 8 weeks postpartum, repeat TTE showed EF 51–61% with normalization of wall motion.

Discussion:
In this patient, immediate POCUS steered initial management and ultimately prompted the diagnosis of recurrent TCM. Hemodynamic goals are similar to the management of coronary artery disease: preventing sympathetic activation and tachycardia to maintaining coronary perfusion and avoid myocardial ischemia. A slow, graded neuraxial anesthetic minimized abrupt afterload reduction. Interval POCUS assessments enabled dynamic assessment of ventricular function and selection of vasopressors and fluid responsiveness which ultimately prevented decompensation. Postpartum recovery for patients with TCM is typically favorable with expected normalization of cardiac function within 8 weeks. However, recurrence rates are approximately 10%. Until specific guidelines can be established, we recommend the

use of interval POCUS assessments to provide dynamic assessment of ventricular function, optimize coronary perfusion, maintain placental perfusion.

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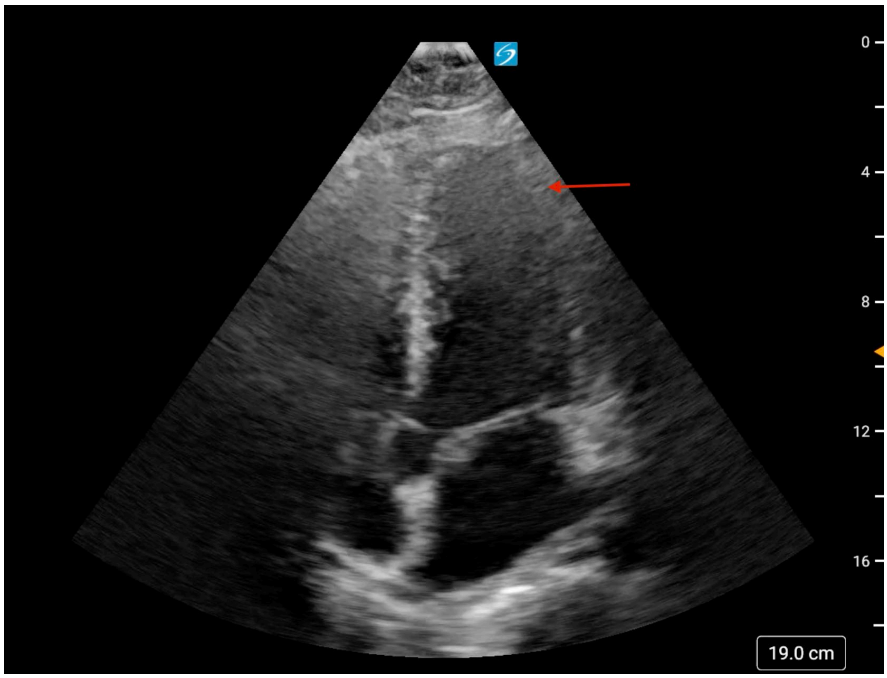

THURS - CR - BS 1 - BR 2A – Potpourri – 09

Navigating the Mitochondrial Maze: A Case Report of Emergent Cesarean Delivery Following Labor Induction in a Patient with Leigh Syndrome

Presenting Author: Nancy H. Greenspon, MD

Presenting Author's Institution: McGaw Medical Center of Northwestern University - Chicago, Illinois

Co-Authors: Nicole H. Higgins, MD, MSc - Northwestern University Feinberg School of Medicine
Jacob M. Nieb, MD - Northwestern University Feinberg School of Medicine

Introduction:
Adult-onset Leigh syndrome is a rare and poorly understood variant of the typically fatal infantile mitochondrial disorder.1 Peripartum management of patients with mitochondrial dysfunction is complicated by the threat of metabolic stress-induced decompensation and undefined drug safety profiles.2,3 We present the management of a patient with Leigh syndrome requiring emergent intrapartum Cesarean delivery. To our knowledge, this is the first and only report in the literature to describe obstetric anesthetic management of this rare condition.

Case One:
A 29-year-old G2P0 with Leigh syndrome presented for planned induction at 39 weeks gestation. Prior to induction, she received an antenatal obstetric anesthesiology consultation to formulate a comprehensive management strategy. Physical exam at the time of presentation was notable for an unfavorable airway and lower extremity weakness requiring wheelchair assistance. An arterial line was placed for continuous hemodynamic monitoring and serial metabolic assessments given the risk of mitochondrial crisis during labor. A dural puncture epidural was placed and labor analgesia was maintained with an individualized infusion of 0.1% ropivacaine with 2 mcg/mL fentanyl, chosen over the institutional standard bupivacaine-based solution due to theoretical concerns for enhanced cardiotoxicity in mitochondrial dysfunction.4 After 15 hours of labor, fetal bradycardia necessitated emergent Cesarean delivery. Surgical anesthesia was achieved by epidural administration of 2% lidocaine with 100 mcg epinephrine and 2 mEq bicarbonate titrated to a T4 level. Delivery was complicated by uterine atony treated with methylergonovine and carboprost. Epidural morphine was administered for postoperative analgesia. She remained hemodynamically stable without respiratory depression or metabolic acidosis and was discharged on postpartum day 5.

Discussion:
While reports on the peripartum management of mitochondrial myopathies exist, their generalizability is limited by significant genetic and phenotypic heterogeneity among these disorders.3,5 The paucity of Leigh syndrome-specific guidelines necessitated the translation of basic science principles, specifically regarding labor-induced metabolic stress and pharmacologic mitochondrial suppression, into a tailored anesthetic plan. Our approach prioritized early neuraxial analgesia to attenuate the systemic stress response to pain and deliberately avoided agents known to inhibit the mitochondrial electron transport

chain or disrupt oxidative phosphorylation.2,5 Facilitated by antenatal consultation, this evidence-based strategy allowed us to navigate an emergent Cesarean delivery without metabolic sequelae, underscoring the critical value of applying physiological research to bedside decision-making in rare mitochondrial disorders.

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1. Neurologist. 2011;17:222-7. 2. Can J Anaesth. 1996;43:403-7. 3. Korean J Anesthesiol. 2014;67:283-6. 4. Anesthesiology. 2000;92:523-8 5. J Inborn Errors Metab Screen. 2017;5.

THURS - CR - BS 1 - BR 2A – Potpourri – 10

Management of a Parturient with a History of Thoracic Sympathetic Ganglion Ablation

Presenting Author: Alaya Bodepudi, MD

Presenting Author's Institution: McGaw Medical Center of Northwestern University - Chicago, Illinois

Co-Authors: Rechna Korula, MD - McGaw Medical Center of Northwestern University

Introduction:
Thoracic sympathectomy as a treatment for hyperhidrosis was developed between 1920-1940 and popularized in the 1980s in Europe and Asia[2]. The levels ablated can vary but commonly occur in the sympathetic trunk between the 2nd and 5th ribs, typically spanning the T2-T5 ganglia[1]. Permanent bradycardia has been described after the procedure but there is insufficient data available to appreciate the incidence of this complication[2]. The Society of Thoracic Surgeons 2011 Expert Consensus on the use of thoracic sympathectomy for hyperhidrosis recommends that competitive athletes who undergo the procedure get counseled on a theoretical reduction in exercise capacity[1]. Little data is available regarding hemodynamic interruptions after thoracic sympathectomies. No studies or case reports are available describing labor epidurals in this population.

Case One:
A 28-year-old G1P0 was admitted to the labor and delivery floor for an elective induction. Her medical history was significant for bilateral thoracic sympathetic ganglion ablation performed seven years prior in South Korea for treatment of hyperhidrosis. The procedure records were unavailable and the patient was unable to provide specific details. She was otherwise healthy with good functional status and requested an epidural for labor analgesia. She was placed on standard monitors prior to and following placement. A dural puncture epidural was performed to prevent hypotension in response to a spinal anesthetic. Test dose was also omitted to prevent hemodynamic shifts with unintentional intravenous or intrathecal medication administration. The epidural was dosed to effect with bupivacaine boluses and the patient was placed on a standard programmed intermittent epidural bolus setting. Labor progressed as normal but she ultimately underwent cesarean delivery due to arrest of dilation. She tolerated the epidural placement, dosing, and cesarean section without incident.

Discussion:
We approached our patient's analgesic management conservatively with the assumption that she would have little to no sympathetic compensation to hemodynamic shifts. She tolerated the epidural well, but it is unclear how she would have responded to other neuraxial procedures such as a spinal anesthetic. This case provokes interesting discussion about the safety of neuraxial procedures in patients who have

undergone prior thoracic sympathectomy surgeries. As the procedure becomes more common globally and in the United States, further research is warranted to understand the implications of performing neuraxial procedures in these patients and its potential risks.

References:

1. Cerfolio RJ, De Campos JR, Bryant AS, et al. The Society of Thoracic Surgeons Expert Consensus for the Surgical Treatment of Hyperhidrosis. Ann Thorac Surg 2011 2. Vannucci F, Araújo JA. Thoracic sympathectomy for hyperhidrosis: from surgical indications to clinical results. J Thorac Dis. 2017

Management of a Previable Patient with Severe Aortic Valve Endocarditis with Aortic Valve Insufficiency, Requiring VV-ECMO for Bronchospastic Respiratory Failure

Presenting Author: Ian Funk, MD

Presenting Author's Institution: Vanderbilt University - Nashville, Tennessee

Co-Authors: Elise W. Boos, MD, MSc - Vanderbilt University Medical Center
Ian Funk, MD - Vanderbilt University Medical Center

Introduction:
Infective endocarditis (IE) in pregnancy is a rare but highly morbid condition. Maternal mortality from this condition has declined over time, as diagnostic and treatment options have improved, but still remains at 10-15%. (1) Careful consideration of structural involvement, valvular lesions and their impact on pregnancy physiology, and estimated gestational age (EGA) at diagnosis is essential. Termination of pregnancy (TOP) is an important option to offer to patients at a previable EGA with cardiac disease that could be markedly worsened by pregnancy physiology.

Case One:
A 28-year-old female at 19w EGA with past medical history of bicuspid aortic valve (AV), polysubstance use disorder, and anxiety; initially presented to the emergency department with dyspnea, chest pain, and fentanyl withdrawal. Initial laboratory workup revealed S. mitis bacteremia, and transthoracic echocardiography (TTE) showed multiple vegetations concerning for AV IE with severe AV insufficiency (AI). Given her significant symptomatic burden and potential for severe cardiovascular instability with advancing pregnancy, a multidisciplinary discussion followed. Management options, including cardiac surgery during pregnancy, were reviewed, and the patient elected for TOP via dilation and evacuation. Following placement of a pre-induction arterial line, anesthesia was induced with 70mg ketamine, 2mg midazolam, 50mg propofol. Dobutamine and norepinephrine were initiated shortly after induction for hypotension. A transesophageal echocardiogram (TEE) probe was placed, showing a left ventricular ejection fraction (LVEF) of 45-50% on dobutamine, normal right ventricular function, and severe AI with multiple mobile vegetations and an aortic root abscess (fig 1). A left pleural effusion was also visualized. The case was complicated by multiple episodes of severe bronchospasm, requiring postoperative ventilation and ICU admission. She was extubated post-operative day (POD) 1. Two weeks later, the patient underwent a Bio-Bentall. Postoperatively, she remained in acute-on-chronic respiratory failure with failed recruitment measures and was ultimately cannulated peripherally for veno-venous extracorporeal membranous oxygenation (VV-ECMO) on POD 1. She was extubated on POD 4 and decannulated on POD 8. Her LVEF slowly improved and she was ultimately discharged to a skilled nursing facility.

Discussion:

This case highlights the complexity of managing a previable pregnant patient with life-threatening cardiac pathology. While AI is commonly considered a valvular lesion that is well tolerated in pregnancy, acute severe AI can be catastrophic. Aortic root abscesses in pregnancy are rarely described in the literature, and they introduce a risk for rupture as cardiac output and aortic diameter both increase later in pregnancy and in the immediate postpartum period. (2)

References:

1 PMID: 24997091 2 PMID: 35004029

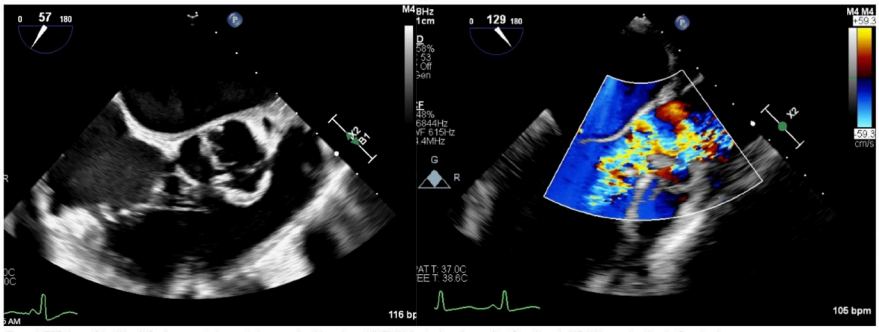

Figure 1. TEE views of the AV, calcifications, vegetations and abscesses in midesophageal (ME) AV short-axis and regurgitant flow shown in ME AV long-axis with color flow doppler

A Case of Peripartum Decompensated Nonischemic Cardiomyopathy with Real-Time Hemodynamic Demonstration of Postpartum Autotransfusion and Early Right Heart Failure Management

Presenting Author: Caroline C. Miller

Presenting Author's Institution: Medical University of South Carolina - Charleston, South Carolina

Co-Authors: Chase McClendon, MD - Medical University of South Carolina
Mollianna Walker, MD - Medical University of South Carolina

Introduction:
Peripartum cardiomyopathies present significant challenges in anesthesia and obstetrics. Pregnancy is often described as a “stress test” on the heart due to vasodilatory effects, increased circulatory volume, and augmented cardiac output, all of which can precipitate heart failure in patients with compromised cardiac function (1). Hemodynamic changes at delivery, particularly sudden autotransfusion from uterine involution and relief of aortocaval compression, can stress impaired ventricles (2). Direct, real-time observation of these physiologic changes in high risk patients is rarely documented.

Case One:
We describe a 27-year-old woman, gravida 1, para 0, with known nonischemic cardiomyopathy (NICM) and reduced ejection fraction (26%) who developed decompensated heart failure during pregnancy at 26 weeks 3 days, complicated by severe preeclampsia. She underwent urgent cesarean delivery under general anesthesia with invasive monitoring with arterial line, central venous catheter, and pulmonary artery catheter (Swan-Ganz catheter). Immediately following delivery, invasive hemodynamic tracings demonstrated acute increases in central venous and pulmonary artery pressures consistent with postpartum autotransfusion. Early recognition of right heart failure allowed prompt intervention with vasopressin and epinephrine, averting further clinical decompensation. The patient was further optimized with diuresis in the cardiac intensive care unit postoperatively, weaned off of vasopressors on postoperative day 1, and discharged home in improved condition five days later.

Discussion:
This case highlights the profound hemodynamic impact of postpartum autotransfusion in a patient with severe nonischemic cardiomyopathy and preeclampsia. Invasive hemodynamic monitoring provided a rare opportunity to directly observe acute increases in central venous and pulmonary artery pressures immediately following delivery, reflecting the sudden preload challenge imposed by uterine involution (2). In patients with limited myocardial reserve, these physiologic shifts may overwhelm compensatory mechanisms and precipitate right ventricular failure (3). Early recognition allowed timely escalation of vasoactive support, preventing further deterioration. Delivery can be safely managed in patients with severe NICM through vigilant management and well-coordinated collaboration amongst obstetric,

anesthesia, cardiac, and critical care teams (4). This case underscores the importance of anticipating sudden preload shifts, early recognition of right ventricular failure, and prompt vasoactive therapy in the peripartum period.

References:

1. Circulation 2014;130:1003-1008. 2. Ann Blood 2025;10. 3. J Am Coll Cardiol 2018;71:2419-2430. 4. Anesthesiology 2021;135:164-183.

THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 03

Peripartum Cardiomyopathy: A Rare Cause of Acute Heart Failure in Pregnancy

Presenting Author: Alexis Toy, DO

Presenting Author's Institution: Allegheny Health Network - Monroeville, Pennsylvania

Introduction:
Peripartum cardiomyopathy is a specific type of cardiomyopathy that onsets in the last month of pregnancy or within the first 5 months postpartum and occurs in those without preexisting heart disease. It accounts for approximately 8-10% of pregnancy related deaths overall. It is a rare disorder, and thus research and literature is limited. The etiology is not well understood but likely related to myocarditis secondary to an autoimmune/inflammatory response and oxidative stress. Risk factors for development include African American ethnicity, age >35 years old, multifetal gestation, and gestational hypertension/pre-eclampsia.

Case One:
A 24 y/o G1P0 Caucasian female was admitted at 33w4d for PPROM. Significant past medical history includes bicuspid aortic valve, gestational hypertension, obesity (BMI 40), and anxiety/depression. Of note, patient was reportedly experiencing more shortness of breath within the past few weeks leading up to her rupture of membranes and presentation to the hospital. Within a few hours of admission, she was noted to have acute onset of shortness of breath, chest pressure, tachycardia with HR into the 140s, and increasing oxygen requirements. CTA of chest was negative for pulmonary embolism but showed concerns of pulmonary edema. Pro-BNP elevated at 2000. Decision was made to proceed with urgent C-section under general anesthesia. A pre-induction arterial line was placed, and then the patient was induced with etomidate, lidocaine, fentanyl, and succinylcholine. Push-dose epinephrine needed post-induction; however, the case then proceeded without complication. The decision was made to leave the patient intubated and transfer to ICU for further workup. TTE was done that showed EF 10-14% with global hypokinesis. Throughout her ICU course, she was treated for suspected peripartum cardiomyopathy with vasopressors and diuresis and was eventually extubated on post-op day 11. She was started on goal directed medical therapy and discharged home 2 days later with a life vest.

Discussion:
This patient was known to have a bicuspid aortic valve, and pre-pregnancy echocardiograms showed EF 50-54% and mild-moderate aortic regurgitation. Repeat TTE while 11 weeks pregnant revealed the same. Given the acute nature and severity of her LV dysfunction, peripartum cardiomyopathy remains a possible etiology, however PPCM should always be a diagnosis of exclusion. Other possibilities include exacerbation of valvular heart disease cardiomyopathy during pregnancy, viral cardiomyopathy, and familial cardiomyopathy. This case allows us to discuss the diagnosis and management of cardiomyopathy in pregnancy.

References:

1. Obstetric anesthesia and uncommon disorders, 2nd ed, 2011 2. Kaplan's cardiac anesthesia: For cardiac and noncardiac surgery, 7th ed, 2016 3. Anesthesiology Continuing Education, Issue 21A, Item 13

THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 04

Anesthetic Management of Labor Analgesia in a Pregnant Woman with Heart Failure with Reduced Ejection Fraction, Thromboembolism and Morbid Obesity.

Presenting Author: Ashka V. Surve, MBBS, MD

Presenting Author's Institution: University of Texas Medical Branch Galveston - Galveston, Texas

Co-Authors: Cameron O. Holguin, MD - University of Texas Medical Branch Galveston
Salem J. Khalil, BSA - University of Texas Medical Branch (UTMB)

Introduction:
Pregnancy itself is a condition of hemodynamic stress and hypercoagulability, associated obesity can further complicate the journey. Decreased systemic vascular resistance, increased cardiac output, elevated estrogen, progesterone, fibrinogen and several coagulation factors, with associated morbid obesity can predispose patients to the risk of venous thromboembolism and cardiopulmonary dysfunction [1]. We present a case of labor pain management in a pregnant woman with morbid obesity, deep vein thrombosis, pulmonary embolism and heart failure with reduced ejection fraction.

Case One:
A 36-year-old 5th gravida with morbid obesity (BMI 49.58kg/m²) presented at 37 weeks' gestation for induction of labor with a complex medical history of active thromboembolism, on therapeutic Enoxaparin, and newly diagnosed severe heart failure with reduced ejection fraction 25–30% on Metoprolol and Furosemide. Earlier at 17 weeks, she presented with acute left leg pain and dyspnoea and was found to have extensive deep venous thrombosis and right pulmonary artery embolism. Cardiac evaluation revealed severe dilated left ventricle, global hypokinesis, prolonged QT interval, and elevated Brain Natriuretic Peptide (564pg/ml), without prior cardiac or family history or known coagulation disorder. Anesthesia consultation addressed the challenges of severe systolic dysfunction, active anticoagulation, morbid obesity, and pregnancy-related physiologic changes. Anesthetic planning emphasized early neuraxial analgesia using titrated dose of 0.2% Ropivacaine starting at 8ml/hr with careful coordination of anticoagulation timing, strict hemodynamic monitoring, maintenance of preload, avoidance of tachycardia, hypotension, and QT prolonging medications, and readiness for invasive monitoring if needed. Continuous telemetry was employed. The patient underwent induction of labor with adequate neuraxial analgesia and achieved an uncomplicated spontaneous vaginal delivery. Postpartum care focused on timely resumption of anticoagulation and optimization of heart failure therapy.

Discussion:
Patients with heart failure with reduced ejection fraction are very sensitive to hemodynamic changes. Judicious mount of fluid co-load and titrated dose of local anesthetics should be used during central neuraxial block for labor analgesia as well as cesarean delivery [2]. General anesthesia if needed, preparedness to manage difficult airway, adequate preoxygenation, careful selection of induction agents to minimize hemodynamic stress during airway manipulation and adequate pain control should be

achieved intra and postoperatively using opioid, epidural or regional blocks [3]. Invasive blood pressure monitoring should be prompt if undergoing operative delivery or suspecting hemodynamic instability. Postoperative monitoring is equally important to detect early signs of cardiorespiratory decompensation and prompt management.

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THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 05

Prolonged Hospital Course complicated by Pulmonary Hypertension, Congestive Heart Failure, and Tracheostomy during Pregnancy

Presenting Author: Sydney C. Labat, MD

Presenting Author's Institution: Ochsner Clinic Foundation - New Orleans, Louisiana

Co-Authors: Colleen Martell, MD - Ochsner Clinic Foundation

Introduction:
Pregnant women with Pulmonary Hypertension (PH) often face both maternal and neonatal complications. Risks are related to the inability of the strained right heart to compensate for the physiologic changes of pregnancy and during delivery; such as an increase in plasma volume and cardiac output, decrease in SVR, and the effects of autotransfusion.

Case One:
Patient is a 33yo female at 25 + 2 wga with a PMHx of prior CD x3, obesity, OSA, medication noncompliance, PH, CHF with an EF of 40-50%, chronically present tracheostomy placed 1 year prior due to acute respiratory failure in the setting of acute decompensated heart failure. She initially presented the ED with the complaint of abdominal trauma, and SOB that she attributes to clogged trach. She reported missing diuretic medications, was lost to ENT follow up since trach placement, and had no prenatal care. Upon admission, cardiology completed a PH work-up including a RHC showing severe PAH with pressures of 120/52. The initial diagnosis was severe group 1 PH, prompting the initiation of IV epoprostenol with the plan to continue inpatient treatment until delivery at 32 wga. After epoprostenol initiation, she demonstrated worsening pulm edema and it was discontinued, determining PH was not type 1 but multifactorial. She improved with continued diuresis, ENT was consulted for evaluation of airway stenosis. ENT plans included trach exchange during GA for delivery. Multidisciplinary teams were alerted for the CD, 50 days after admission. Of note, she refused preoperative RHC and CVC placement. At the time of surgery, the patient underwent controlled induction of general anesthesia followed by trach exchange with ENT. Trach exchange demonstrated significant airway stenosis followed by a desaturation event. After exchange, sats improved. TEE probe was inserted, vasoactive and ionotropic infusions were initiated to support the presumed strained right heart. TEE report demonstrated dilated RV, low normal RV function, D shaped LV in systole, indicative of pressure overload and PASP ~50 (significantly lower than previously thought). Delivery and BTL proceeded; echo remained grossly unchanged with delivery and autotransfusion. Vasoactive support was weaned as appropriate. Upon completion of the case, the patient was transported to the ICU where she remained mechanically ventilated. The remainder of her post-partum course was uncomplicated.

Discussion:
PH with subsequent congestive heart failure can prove to be difficult to maneuver during pregnancy, labor and delivery. Special consideration for the change in blood volume that occurs during pregnancy and the

effects of autotransfusion after delivery should be given. Plans for approaching a case such as this can include TEE utilization, ionotropic support, central venous access, and multidisciplinary discussions.

References:

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THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 06

BMI 104 with Shortness of Breath and Active Lower Extremity Thrombus Cesarean Section

Presenting Author: Ashley Del Bianco, DNAP, CRNA

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Holly B. Ende, MD - Vanderbilt University Medical Center
Ian Funk, MD - Vanderbilt University Medical Center

Introduction:
36yo G5P0222 with pregnancy complicated by super morbid obesity (body mass index [BMI] 110), chronic hypertension, obstructive sleep apnea, gastroesophageal reflux disease, sciatica, and prior aborted gastric sleeve conversion to roux-en-Y bypass due to extensive adhesions presented with dyspnea and bilateral lower extremity swelling. She was found to have a right lower extremity deep vein thrombosis, and therapeutic enoxaparin 160mg BID was initiated, with trending anti-Xa levels. Following diuresis, dyspnea improved, and BMI was reduced to 104 by the time of planned cesarean delivery at 33w3d accompanied by tubal ligation and anterior hernia repair.

Case One:
On the day of surgery, after appropriate enoxaparin hold time of 24 hours and normal anti-Xa (< 0.1 IU/mL), the patient received 150 mcg intrathecal morphine preoperatively. In the OR, general anesthesia was induced with ramp positioning, propofol, succinylcholine, and McGrath video laryngoscopy. The patient's airway was secured without difficulty with an 8.0 endotracheal tube to facilitate postoperative ventilation if needed. A post-induction arterial line and two large bore peripheral IVs were started via ultrasound guidance. Positioning occurred on a standard operating room table with bed extenders. Following delivery of the infant (APGARS 4 at 1min, 6 at 5min) and closure of hysterotomy, the ventral hernia was repaired with mesh by general surgery. The patient was reversed with sugammadex 200mg and extubated in the operating room. Total OR time was 8 hours and 51 minutes. She recovered in the PACU without event and experienced excellent postoperative pain control without the need for rescue analgesics in the first 17 hours.

Discussion:
Due to this patient's elevated BMI, ventral hernia, and active lower extremity thrombus, her case required extensive multidisciplinary coordination. Important anesthetic considerations included: 1.Confirmation of appropriate OR equipment – A standard operating room table was confirmed to support 1200 lbs while in the horizontal position. The table was not allowed to be tilted in any direction (halves table weight capacity). 2.General versus neuraxial as primary anesthetic – The decision was made to proceed with general anesthesia given that the patient was unable to lie flat and ventral hernia repair was facilitated by muscle relaxation. 3.Total intravenous anesthesia vs. volatile for maintenance – The decision was made to utilize volatile anesthesia until delivery of the infant and subsequently convert to TIVA to reduce uterine

atony risk while also minimizing adipose tissue propofol stores. 4.Recovery location – While we considered direct admission to the ICU, we ultimately decided on a trial of extubation in the OR, which the patient successfully completed. Due to the extensive planning efforts invested into this patient's care, the cesarean section and postoperative recovery were successful, and the patient was discharged home on POD 9.

References:

Ref: PMID 33409048

THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 7

When Neuraxial Is the Only Safe Airway: Managing a Non-Intubatable Parturient with Myasthenia Gravis and Anticoagulation

Presenting Author: Gabrielle M. Migliozzi, MD

Presenting Author's Institution: Boston University Medical Center - Boston, Massachusetts

Co-Authors: Nicole Spence, MD, FASRA - Boston University Medical Center

Introduction:
Myasthenia gravis is an autoimmune neuromuscular disorder characterized by impaired neuromuscular transmission due to autoantibodies against postsynaptic acetylcholine receptors. Clinical manifestations range from ptosis and extremity weakness to dysphagia and respiratory compromise. Symptoms may be exacerbated by pregnancy, physiologic stress, and anesthetic agents, particularly non-depolarizing neuromuscular blockers. Neuraxial anesthesia with amide local anesthetics is generally preferred in parturients, with close respiratory monitoring. We present a case of preterm cesarean delivery in a gravida with myasthenia gravis, severe subglottic stenosis, and antiphospholipid syndrome on anticoagulation, highlighting competing airway, neurologic, and anticoagulation risks.

Case One:
A 40-year-old G8P1332 at 32 weeks gestation was admitted for pre-eclampsia without severe features with a history of two prior cesarean deliveries. Her primary cesarean in 2020 required general anesthesia for acute respiratory distress syndrome secondary to COVID-19 and was complicated by prolonged intubation and subsequent subglottic stenosis. Additional comorbidities included myasthenia gravis, chronic hypertension, antiphospholipid syndrome on anticoagulation, insulin-dependent gestational diabetes, and asthma. A multidisciplinary team including maternal-fetal medicine, obstetric anesthesia, otolaryngology, neurology, and neonatology coordinated management of comorbidities, airway risk, and anesthetic planning. Office laryngoscopy revealed anterior scarring with a 4-mm posterior lumen, confirming the patient was not orally intubatable and would require emergent tracheostomy if neuraxial anesthesia was unavailable. A scheduled cesarean at 34 weeks was planned in the main operating room under neuraxial anesthesia with otolaryngology present. Anticoagulation was adjusted from heparin 10,000 units BID to 5,000 units TID to facilitate timely neuraxial placement. Due to worsening hypertension, cesarean delivery occurred at 32 weeks 3 days. A combined spinal-epidural was placed at L2–L3 using 12 mg hyperbaric bupivacaine with 10 mcg fentanyl intrathecally, with a negative test dose. The procedure was uneventful and the patient recovered under close monitoring without complications.

Discussion:
This case emphasizes the importance of individualized anesthetic strategies and obstetric anesthesiologist–led communication in optimizing maternal and fetal outcomes in a high-risk parturient with myasthenia gravis, severe subglottic stenosis, pre-eclampsia, advanced maternal age, and anticoagulation.Neuraxial anesthesia was prioritized to avoid general anesthesia, with careful airway

evaluation and planning for emergent tracheostomy if needed. Interdisciplinary coordination guided timing of delivery, anticoagulation management, and intraoperative care.

References:

1.Obstetric and neonatal outcomes in patients with maternal myasthenia gravis: a nationwide cohort study. Neurology. 2025;105(8):e214139

THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 08

High risk delivery in a patient with significant hemoptysis: a neuraxial strategy supported by inhaled tranexamic acid

Presenting Author: Kenneth Nguyen, DO

Presenting Author's Institution: Stanford Department of Anesthesiology, Perioperative and Pain Medicine-Division of Obstetric Anesthesiology - San Gabriel, California

Co-Authors: Jessica R. Ansari, MD, MS - Division of Obstetric Anesthesiology and Maternal Health, Department of Anesthesia, Perioperative, and Pain Medicine Stanford University School of Medicine

Introduction:
Hemoptysis in pregnancy is rare and presents unique anesthetic challenges.1 Inhaled tranexamic acid (TXA) has emerged as a potential noninvasive therapy for hemoptysis.2

Case One:
A 32yo G1 at 38+5 weeks gestation presented to the emergency department with hemoptysis of 0.5 to 1 cup of blood and oxygen saturation in the mid-80s. She received inhaled TXA and supplemental oxygen in the ED and was admitted. Following treatment with inhaled TXA every 8 hours, the gross hemoptysis resolved, but her cough remained productive of clotted blood. CT angiography was negative for pulmonary embolism but showed right-sided pulmonary debris. ENT performed flexible laryngoscopy which revealed prominent subglottic and interarytenoid vessels without a specific bleeding source. Interventional pulmonology recommended bronchoscopy during cesarean under GA and requested an 8.5 mm endotracheal tube (ETT) while also acknowledging low diagnostic yield. Given the prominent subglottic and interarytenoid vessels, we were concerned that airway instrumentation and intubation with a large ETT could provoke airway hemorrhage during cesarean delivery. After a multidisciplinary discussion with obstetric anesthesia, MFM, interventional pulmonary, ENT, we planned for cesarean delivery under neuraxial anesthesia with interventional pulmonology available for emergent bronchoscopy in the event of uncontrolled hemoptysis and delaying planned bronchoscopy until 2-3 days into the postpartum period Prior to surgery, the patient continued to experience intermittent desaturation into the high 80s with coughing and was uncomfortable lying flat. To optimize oxygenation and avoid abrupt respiratory decompensation, we used humidified high-flow nasal cannula to optimize oxygenation and a reduced-dose combined spinal-epidural (CSE). After pretreatment with intranasal oxymetazoline in case epistaxis was a cause of her hemoptysis and dexmedetomidine for anxiolysis, an initial CSE with 9mg of intrathecal (IT) bupivacaine, 15mcg IT fentanyl, and 100mcg IT morphine produced a block that rose only to T10 bilaterally without improvement despite administration of epidural lidocaine. The catheter was deemed non-functional and a repeat CSE was performed with 5.25mg IT bupivacaine resulting in a T4 block bilaterally. The cesarean delivery was complicated by uterine atony treated with oxytocin, calcium, and TXA but no hemoptysis. Bronchoscopy performed on postpartum day 3 revealed a prominent right lower lobe vascular malformation that was immediately embolized. Workup for hereditary hemorrhagic telangiectasia is underway.

Discussion:
This case highlights key anesthetic considerations for hemoptysis and airway vascular abnormalities in pregnancy. Inhaled TXA reduced active bleeding and helped avoid emergent airway instrumentation. When bronchoscopy can be safely delayed, deferring it to the postpartum period reduces the risk of airway trauma in pregnant patients with fragile airway vasculature.

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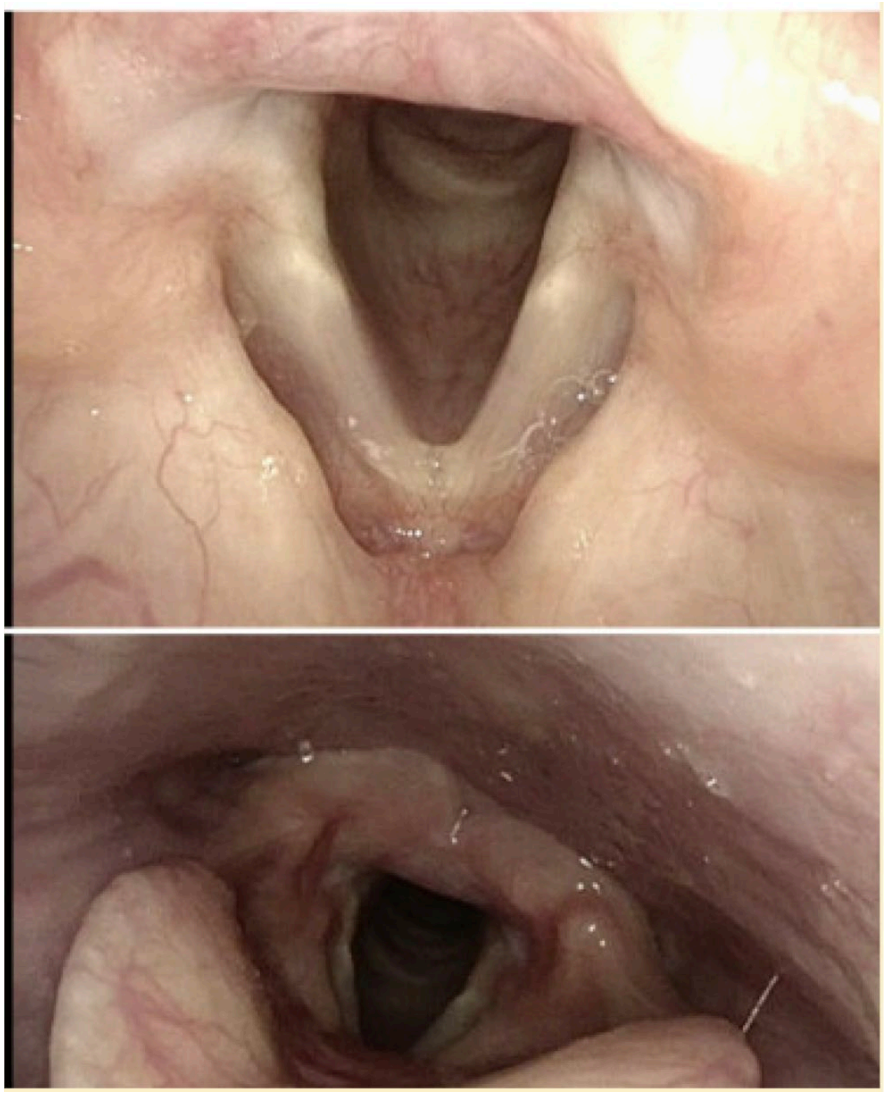
1. PMID: 36165638 2. PMID: 30321510



THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 09

A Breath of Fresh Air: Considerations for Parturients with Idiopathic Tracheal Stenosis

Presenting Author: Natalie Campbell, MD

Presenting Author's Institution: University of North Carolina - Durham, North Carolina

Introduction:
Idiopathic tracheal stenosis (ITS) is a rare airway disorder that occurs more often in females and can worsen during pregnancy. Although the exact cause is unknown, several studies have associated both an inflammatory and hormonal influence given high expression of estrogen and progesterone receptors (1). ITS can initially present during pregnancy and should be closely monitored, given airway edema can further exacerbate symptoms. ITS in the pregnant population requires several considerations for the anesthesia care team, especially if a parturient requires a GA cesarean.

Case One:
37 G2P1 F presented for repeat cesarean at 39w0d due to worsening symptoms associated with known subglottic stenosis. She has a history of congenital tracheal stenosis status-post tracheostomy and tracheal reconstruction. A peri-partum ENT office visit noted ~75% upper tracheal stenosis associated with mild inspiratory stridor and noisy breathing. CSE was performed with bilateral T3 dermatomal rise to pinprick. About 9 minutes after placement, she endorsed SOB. She was noted to have equal 5/5 strength in upper extremities. Simple face mask was placed at 10L/min and she endorsed improvement. She was weaned to room air by the end of the surgery. She had an uncomplicated post-op course.

Case Two:
35 G2P1 F presented for an unscheduled primary cesarean at 37w0d due to malpresentation and PROM. She has a history of idiopathic subglottic stenosis that was first discovered during her 2023 pregnancy with worsening SOB. She had an extensive cardiac and thyroid workup that was negative. She ultimately required serial peri-partum microdirect laryngoscopy with dilation, CO2 laser excision of scar, and steroid injection with symptomatic and peak flow meter improvement. Her most recent procedure was done 11 days prior to her cesarean. She had both a spinal and then epidural performed with inadequate levels to proceed. Ultimately, she required GA with a 6.0 MLT placed under MAC3 VL (grade 2a view) without complication. She had an uncomplicated post-op course.

Discussion:
Surveillance of ITS is important during pregnancy and is commonly performed objectively with peak flow meter readings, and subjectively by symptoms. Further, symptoms can be quantified by voice-related quality of life measures and glottal functional index. In general, a flow of < 200 L/min indicates severe obstruction and consideration for peri-partum intervention (2). Given concern for airway edema, decreased FRC, and hormone-related worsening of ITS, neuraxial should be considered as the primary

anesthetic to avoid instrumentation of the airway. If GA is necessary, a multidisciplinary team is recommended as well as advanced airway equipment and appropriate post-operative planning.

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1. Aziz, J. (2023). Idiopathic tracheal stenosis and hormone receptors. 2. DeVrieze, B. (2024). Peak Flow Rate Measurement.

THURS - CR - BS 1 - BR 2A - Respiratory Challenges – 10

Shortness of Breath… Pleural Effusion… Anterior Mediastinal Mass… Stage IV Lymphoma

Presenting Author: Susanne S. Rupert, MD

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Introduction:
Anterior mediastinal masses can compress vital mediastinal organs. Cough and especially stridor with exertion can be signs of airway compression and tracheobronchomalacia. Tracheal collapse can occur with position changes especially under sedation and especially with paralysis. Vascular occlusion can cause syncope, cardiovascular collapse, and venous thrombosis which is a common presenting sign.

Case One:
G1P0 at 31w6d presented to the emergency room in the setting of acute onset shortness of breath. She reported an intermittent, dry, non-productive cough without dyspnea for around a month that she hadn't reported to her OB provider. In the week prior, she became increasingly dyspneic and one day prior noticed new swelling on the left side of her neck. Suddenly, she became so dyspneic she was unable to speak in full sentences. POCUS thoracentesis drained 1L fluid reducing symptoms from her large pleural effusion. Chest CT revealed a large 14 cm anterior mediastinal mass. The patient's neck swelling was caused by left internal jugular vein occlusion. Biopsy under CT guidance revealed Hodgkin's lymphoma. She received two cycles of chemotherapy with AVD Adriamycin (Doxorubicin), Vinblastine, Dacarbazine with a reduction in mass size to 12cm x 7.5cm. Steroids for fetal lung maturity can precipitate tumor lysis syndrome and thus were avoided initially in our patient.

Discussion:
Literature on fetal cardiotoxic effects of chemotherapy is relatively sparse. Chemotherapy regimens differ depending on gestational age. Adriamycin and cyclophosphamide have cardiotoxic effects which can cause both immediate and delayed/sub-clinical or progressive cardiac dysfunction. While most fetuses tolerate the administration of these agents in later pregnancy without complications, there are cases of temporally-persuasive likely fetal cardiotoxicity from chemotherapy that results in fetal cardiovascular dysfunction and potentially intra-uterine fetal demise, around 2-6%. This parturient's care requires ongoing multidisciplinary planning throughout chemotherapy, pregnancy, and delivery as patient or fetal condition may worsen acutely. Avoidance of positions that are symptomatic for the patient are paramount. Cardiac compression can affect filling and function. Helpful imaging evaluation can involve POCUS, ECHO, MRI, and CT. Rigid bronchoscopy, airway stents, cardiopulmonary bypass, or ECMO may be necessary and life saving in rare cases. The patient is planned for an induction of labor at 38w0d under epidural anesthesia, with large lower extremity access, arterial catheter, and ECMO availability on

standby.

References:

1. Case Rep Anesthesiol. 2025 Oct 23;2025:2053701 2. Forensic Sci Med Pathol. 2024, 20(1):226-232

Shortness of Breath... Pleural Effusion... Anterior Mediastinal Mass... Stage IV Lymphoma.pdf

THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 01

Isolated Hypofibrinogenemia in an Obstetric Patient

Presenting Author: Xavier Cortez, MD

Presenting Author's Institution: UCSF - San Francisco, California

Co-Authors: Ben C. Li, MD - UCSF
Sara Zhou, MD - UCSF

Introduction:
Fibrinogen is essential for clot formation, placental integrity, and postpartum hemostasis. Isolated low fibrinogen levels raise concern for congenital fibrinogen disorders (CFD). While fibrinogen replacement is widely recommended in response to acquired hypofibrinogenemia and active bleeding, anesthetic management including for neuraxial anesthesia in CFD is limited.1

Case One:
A 29-year-old G1P0 at 38+1 weeks with no history of bleeding or anticoagulant use presented in painful labor with an episode of vaginal spotting. Fetal heart tracing was reassuring. Due to severe labor pain, a lumbar dural puncture epidural was placed prior to lab results. Subsequent labs revealed fibrinogen of 56 mg/dL, with repeat < 50 mg/dL. Hemoglobin, platelet count, PT and PTT were normal. Family history was notable for a sister with low fibrinogen and placental abruption. Multidisciplinary consultation raised concern for CFD rather than consumptive coagulopathy. Fibrinogen concentrate was administered in divided doses, initially targeting >200 mg/dL prior to labor augmentation. Thromboelastography (TEG) demonstrated preserved clot strength, prompting adjustment of the fibrinogen goal to >100 mg/dL. Labor progressed to 9 cm with recurrent late decelerations. Cesarean delivery was performed after additional fibrinogen replacement. Quantitative blood loss was 745 mL. Tranexamic acid was administered after cord clamping, and no blood products were required. Postoperative fibrinogen levels were maintained >150 mg/dL for three days per hematology consultation. Postoperative prophylactic anticoagulation was started. No postpartum hemorrhage or neuraxial complications occurred.

Discussion:
New obstetric and hematology recommendations for CDH advise fibrinogen levels ≥100-150 mg/dL during pregnancy and delivery. They extend these targets to neuraxial procedures, but direct obstetric anesthesia outcome data and consensus guidelines are lacking.2 This case illustrates the potential role of viscoelastic hemostatic testing in contextualizing isolated hypofibrinogenemia. Despite reduced plasma fibrinogen levels, preserved global clot strength on TEG influenced fibrinogen replacement targets and anesthetic planning. Prior studies suggest that viscoelastic tests help identify obstetric patients at increased risk for adverse outcomes and lead to reduced transfusion requirements when used to guide management.3,4 These findings support that functional coagulation assessment may provide clinically meaningful information beyond static fibrinogen levels. This case underscores the need for multidisciplinary management and guidelines to better define fibrinogen and viscoelastic targets that

optimize neuraxial safety and maternal outcomes in patients with suspected fibrinogen disorders.

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1. Arch Clin Cases, vol. 9, no. 3, 2022, pp. 100–03. 2. J Thromb Haemost, vol. 22, no. 5, 2024, pp. 1516–21. 3. Clin Exp Pharmacol Physiol, vol. 43, no. 2, 2016, pp. 149–56. 4. Anaesthesia, vol. 74, no. 8, 2019, pp. 984–91.

Spinal Anesthesia for Cesarean Section Delivery in a Primigravida with Type 3 Von Willebrand Disease

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Introduction:
Type 3 Von Willebrand Disease (VWD) is the most rare and severe form of VWD, characterized by undetectable or absent Von Willebrand factor (VWF) and extremely low Factor VIII (FVIII) levels. It affects 1-5 per 1,000,000 people and is inherited in an autosomal recessive or codominant manner(1). Treatment is with factor replacement therapy(2).

Case One:
A 21-year-old G1P0 at 37 weeks' gestation with Type 3 VWD presented for pre-delivery consultation. Closely managed by hematology, she received Antihemophilic Factor-VWF (Wilate) infusions three times a week to normalize VWF and FVIII levels. She desired to labor with neuraxial placement if possible or proceed with Cesarean under general anesthesia if neuraxial was deemed unsafe. After an extensive multidisciplinary discussion involving the patient, hematology, MFM, and obstetric anesthesia, the decision was made to proceed with a primary cesarean delivery under spinal anesthesia. The patient presented for a cesarean delivery at 37w5d. She received an infusion of Antihemophilic Factor-VWF. After the infusion, laboratory tests were checked to confirm normal values, including VWF antigen (144%), FVIII activity (152%), and TEG values. Two large bore PIVs were placed; blood products were crossmatched and available prior to starting the case. An atraumatic spinal block was performed utilizing ultrasound. An appropriate surgical level was achieved, and a healthy infant was delivered. Prophylactic oxytocin was administered followed by intramuscular methylergonovine. Quantitative blood loss was 711 mL. The patient recovered uneventfully and was discharged on post-operative day 5 with a 7-day TXA course. One month following delivery, the patient was re-admitted for heavy vaginal bleeding. A CT scan demonstrated a fluid collection anterior to the uterus consistent with dehiscence. This was managed conservatively with transfusion, and she was discharged after 4 days with resolution of bleeding.

Discussion:
Women with VWD of any type are sometimes denied neuraxial anesthesia. Due to the rarity of Type 3 VWD, current data is limited. Previous guidelines in the United Kingdom recommended against neuraxial in patients with Type 2 and 3 VWD even with restoration of normal factor levels due to concern for

inability to achieve normal hemostasis(3). One case report demonstrated uncomplicated spinal anesthesia for two cesarean section deliveries in a woman with Type 3 VWD(4). Hematology literature suggests that replacement of factor levels to >50% normalizes the risk of a neuraxial hematoma to that of the general population, which is approximately 1 in 168,000 in obstetric patients(5). This case demonstrates another successful, uncomplicated use of spinal anesthesia in a patient with Type 3 VWD. This case highlights the importance of a multidisciplinary approach for advanced care coordinating in this patient population.

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THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 03

When Pregnancy's Prothrombotic State Is Not Enough: Refractory Acquired Hemophilia A

Presenting Author: Jacob Selph, MD

Presenting Author's Institution: University of Arkansas for Medical Sciences - Little Rock, Arkansas

Co-Authors: Ashley E. Elser, MD - University of Arkansas for Medical Sciences

Introduction:
Pregnancy-associated hemophilia A (AHA) is a rare acquired bleeding disorder caused by antibodies to Factor VIII. It typically presents postpartum, but can rarely arise during pregnancy. Significant bleeding may occur, especially when factor levels drop below 50%. In this population, neuraxial hematomas are almost exclusively associated with factor levels < 1% (1). We present a challenging case of AHA refractory to medical therapy, resulting in prolonged postpartum bleeding requiring two additional D&Cs.

Case One:
A 23-year-old G3P2 presented at 17 weeks with DOE, anemia (HgB 6.8) and prolonged PTT. Mixing studies showed presence of an inhibitor. Further investigation revealed FVIII < 1% and high FVIII antibodies c/w AHA 2/2 pregnancy. Her two prior SVDs were uncomplicated. Treatment with IVIG/steroids resulted in minimal improvement. Discharged with oral TXA and steroid taper. She followed up once outpatient during which factor activity remained < 1% and antibody titers remained high (200+BUs). At 36 weeks, she presented with cholestasis and underwent IOL. FVIII levels remained < 1% with high titers, excluding neuraxial anesthesia. She had an uncomplicated SVD while receiving recombinant FVIIa during the second stage and continued for 24 hours postpartum, then transitioned to TXA. On PPD2, she left AMA with "normal" bleeding. On PPD 7, she returned with severe anemia (HgB 4), requiring resuscitation and D&C with JADA placement. Two weeks later, she was readmitted with recurrent bleeding and endometritis, requiring another D&C with JADA. Labs during both admissions showed persistently high titers and near absent factor VIII activity.

Discussion:
AHA must be considered in pregnant patients presenting with prolonged PTT and bleeding events. These patients present challenges for the duration of the pregnancy through delivery and the extended postpartum period. Management requires coordination with hematology, OB, anesthesia and the blood bank at tertiary centers. First-line therapy includes steroids and IVIG. Refractory cases may require immunosuppression (i.e rituximab). Recommended factor levels >50% for neuraxial anesthesia. During delivery, if antibodies remain high, bypass hemostatic therapy with recombinant factor VII or prothrombin complex is recommended to prevent life-threatening bleeding. Given limited options for prevention of hemorrhage in severe cases, prophylactic uterine artery embolization has been reported (2). Extended postpartum stay may be warranted with low threshold for mechanical decompression of the uterus.

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1. Togioka BM, Burwick RM, Kujovich JL. Delivery and neuraxial technique outcomes in patients with hemophilia and in hemophilia carriers: a systematic review. J Anesth. 2021 Apr;35(2):288-302. Epub 2021 Mar 8. PMID: 33682038. 2. Nishi, A et al. “Successful management of acquired hemophilia A onset during pregnancy: A case report.” The journal of obstetrics and gynaecology research vol. 47,11 (2021): 4060-4066.

THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 04

Navigating Neuraxial Risk in Bernard–Soulier Syndrome: An Evidence-Informed Obstetric Approach

Presenting Author: Daniel Ratushnyak, MD

Presenting Author's Institution: University of Pittsburgh Department of Anesthesiology and Perioperative Medicine - Pittsburgh, Pennsylvania

Introduction:
Coagulopathy in pregnancy increases maternal and fetal morbidity and mortality[1]. Affected patients are at higher risk for postpartum hemorrhage, intrauterine bleeding, and transfusion[2]. Coagulopathy limits neuraxial techniques, complicates labor analgesia and operative planning, and requires multidisciplinary coordination. Rare inherited platelet disorders, such as Bernard–Soulier variants, present unique peripartum challenges due to limited evidence guiding anesthetic management.

Case One:
A 31-year-old primigravida with suspected Bernard–Soulier–variant platelet disorder presented at 39 weeks for delivery planning. A platelet abnormality had been identified prior to previous lumbar surgery. Second-trimester evaluation demonstrated reduced ristocetin-induced platelet aggregation and decreased CD42a/CD42b expression on flow cytometry, consistent with a Bernard–Soulier–like phenotype. She reported heavy menstrual bleeding, and IVF-related testing was negative for common Bernard–Soulier mutations. Multidisciplinary planning included maternal–fetal medicine, obstetrics, anesthesiology, and hematology planning prophylactic platelet transfusion and tranexamic acid. Neuraxial anesthesia was contraindicated; labor analgesia consisted of nitrous oxide and remifentanil patient-controlled analgesia. Arrest of descent required cesarean delivery under general anesthesia with modified rapid sequence induction and total intravenous anesthesia. Intraoperative hemorrhage (~1500 mL) from uterine atony and arterial extension was managed with uterotonics, tranexamic acid, and mechanical tamponade. Postoperatively, she received two units of red blood cells and was discharged on postoperative day four without complications.

Discussion:
Published experience with Bernard–Soulier syndrome in pregnancy is limited, but available reports highlight the challenges of neuraxial anesthesia in the setting of persistent platelet-function defects. Inherited platelet disorders complicate obstetric anesthesia because bleeding risk may not correlate with platelet count. Hematologic testing therefore informs avoidance of neuraxial techniques, selection of alternative analgesia, and preparation for general anesthesia. A 2025 case report described successful peripartum management with targeted platelet transfusion and tranexamic acid; however, neuraxial anesthesia was avoided due to ongoing hematoma risk[3]. Although ROTEM-guided assessment and platelet optimization have been described, neuraxial anesthesia remains high-risk even with apparently adequate platelet counts. Significant hemorrhage may still occur, underscoring the need for

anesthesiologists to remain vigilant and anticipate dynamic perioperative conditions and the variable phenotype of Bernard–Soulier variants. This case demonstrates how diagnostic insight can guide anesthetic planning and optimize outcomes in high-risk parturients.

References:

1. Obstet Gynecol 2009;113:998–1013 2. Obstet Gynecol 2017;130:e168–e186 3. J Dent Med Sci 2025;24:28–30

THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 05

Obstetric Anesthesia Without Neuraxial: Management of Rare Platelet Disorders

Presenting Author: Nicole Russell, MD

Presenting Author's Institution: UT Southwestern Medical Center - Dallas, Texas

Co-Authors: Trent D. Bryson, MD - University of Texas Southwestern
Emily Styslinger, MD, MPH - UT Southwestern Medical Center

Introduction:
Glanzmann thrombasthenia (GT) and Bernard–Soulier syndrome (BSS) are rare inherited platelet disorders with significant obstetric bleeding risk. Neuraxial anesthesia is contraindicated. GT is caused by absent/defective platelet aggregation due to αIIbβ3 (GPIIb/IIIa) receptor dysfunction leading to a normal platelet count but poor function.[1] BSS is characterized by macrothrombocytopenia with defective GPIb-IX-V complex that is associated with platelet adhesion to von Willebrand Factor. Hemorrhage management often requires the transfusion of functional platelets.[2]

Case One:
Case 1 (GT): A 36-year-old G1P0 at 35w0d with GT (platelet count 166x109/L) and anti-GPIIb/IIIa antibodies underwent induction of labor for severe preeclampsia. Her history included epistaxis and transfusion-requiring menorrhagia treated with tranexamic acid (TXA). At 22–23 weeks' gestation, she received weekly IVIG to reduce risk of fetal/neonatal thrombocytopenia due to maternal anti-platelet antibodies. Throughout pregnancy she experienced bleeding from her gums and diffuse ecchymosis. During labor, butorphanol and nitrous were used for pain control as neuraxial analgesia is contraindicated. Her fibrinogen was monitored every 6 hours with a target of >200 mg/dL and remained >400 mg/dL. Immediately following vaginal delivery and cord clamping, oxytocin, TXA (1g IV) and rFVIIa (90mcg/kg IV)3 were administered. rFVIIa was given every 2–3 hours for a total of three doses. TXA was continued postpartum. Her quantitative blood loss (QBL) was 481 mL. The patient did not experience any significant bleeding postpartum.

Case Two:
Case 2 (BSS): A 32-year-old G2P0A1 at 39w1d with BSS (platelet count 35x109/L) presented with spontaneous rupture of membranes. She was diagnosed with BSS in childhood after prolonged bleeding episodes and menorrhagia. With prior procedures, she required prophylactic platelet transfusions. An emergency cesarean section was performed under general anesthesia (neuraxial anesthesia contraindicated) for non-reassuring fetal heart tones. Immediately prior to incision prophylactic HLA-matched platelets were given. At cord clamping, TXA (1g IV), additional platelets, and methylergonovine (0.2mg IM) were administered for ongoing hemorrhage. QBL was 1147mL. She did not experience any significant postpartum bleeding and was continued on TXA postpartum.

Discussion:

Platelet disorders are rare. A multidisciplinary approach including hematology, maternal fetal medicine and OB anesthesia is necessary to establish a defined peripartum plan to prevent massive hemorrhage. Understanding the mechanism of the platelet disorder aids in tailoring treatment plans. Early pediatric hematology involvement is necessary as the neonate should be evaluated for thrombocytopenia and monitored for bleeding complications.

References:

1. Botero JP Haematologica 2020 2. Almomani MH In StatPearls 2025 3. Fiore M Blood 2022

THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 06

Neuraxial Anesthesia after Intradialytic Heparin: A Knowledge Gap in Pregnant Patients with ESRD

Presenting Author: Bethany Lutter, MD

Presenting Author's Institution: Northwestern Memorial Hospital - Chicago, Illinois

Co-Authors: Matthew G. Hire, MD - Northwestern University Feinberg School of Medicine
Alva Powell, MD - McGaw Medical Center of Northwestern University

Introduction:
Pregnant patients on hemodialysis present unique challenges for neuraxial anesthesia timing due to intradialytic heparin administration. While guidelines exist for neuraxial placement after subcutaneous heparin in obstetric patients, there is limited evidence addressing the safety of neuraxial techniques following hemodialysis with systemic heparinization. As rates of pregnancy in patients with ESRD rise, it is important to better characterize the degree of systemic anticoagulation achieved during dialysis. We present the case of a 30-year-old patient requiring dialysis who underwent an emergent cesarean delivery for compound presentation after previable preterm premature rupture of membranes (PPPROM).

Case One:
This G1P0 with ESRD was admitted at 23w1d for PPPROM requiring tocolysis and fetal monitoring. Her history included focal segmental glomerulosclerosis, two failed renal transplants, and subsequent transplant nephrectomy. The patient was seen in the obstetric anesthesiology clinic and the plan was to treat dialysis sessions as heparin infusions to determine candidacy for neuraxial anesthesia. At time of delivery, she was undergoing 5 inpatient dialysis sessions per week, while receiving prophylactic subcutaneous heparin 3 times a day. At 25w5d, she required an emergent cesarean delivery for compound presentation. She had received subcutaneous heparin 2 hours prior, so we elected to proceed with general anesthesia due to risk of neuraxial hematoma. The patient tolerated rapid sequence induction and the intraoperative course was uneventful. Estimated blood loss was 800mL and she was transfused 1 unit of red blood cells. She was discharged home 2 days later.

Discussion:
Current guidelines recommend waiting 4-6 hours after prophylactic heparin dosing before neuraxial placement, with confirmation of normal coagulation factors. However, these recommendations are based on subcutaneous administration with predictable pharmacokinetics. There are no universally accepted standards for heparin dosing in hemodialysis and protocols vary across institutions. Some guidelines recommend unfractionated heparin (UFH) as a bolus of 25-30 units/kg followed by an infusion rate of 500-2000 units/hr, stopped 1 hour prior to therapy completion. Other low dose protocols recommend 10 units/kg followed by an infusion rate of 10 units/kg/h or a 25 units/kg bolus with no infusion. The half life of UFH is 90 minutes, but may be increased up to 3 hours in renal failure. Given the unknown degree of systemic heparinization as well as lack of studies on the effects of anticoagulation in dialysis circuits, it is

unclear whether this is adequate time. This case highlights the need for further studies on the timing of neuraxial placement in pregnant patients following hemodialysis.

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THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 07

Use of Fondaparinux for DVT prophylaxis in High Risk Obstetric Patients with Heparin Allergy

Presenting Author: Miles Sullivan, MD

Presenting Author's Institution: Mount Sinai Morningside/West - New York, New York

Introduction:
New anticoagulant drugs have become increasingly available, but data on the safe use of these drugs during pregnancy is insufficient. This lack of research is significant when considering that venous thromboembolism (VTE) remains the leading cause of mortality in expecting mothers in the developed world (1). Pregnancy presents physiologic changes including an elevation in clotting factors that place the pregnant patient in a hypercoagulable state with increased risk for VTE (2). New anticoagulants, such as direct oral anticoagulants (DOACs) and factor Xa inhibitors, have become increasingly used for their efficacy and safety profiles and their convenience of use in non-pregnant patients (3). In contrast, unfractionated and low molecular weight heparins for DVT prophylaxis remain the treatment of choice in expecting mothers due to their well researched safety profiles during pregnancy, which alternative therapies lack (4). This lack of research on the safety of non-heparin treatment options in pregnancy makes pregnant patients with a history of heparin allergy particularly vulnerable.

Case One:
We present a case that addresses the ability to safely use these agents, specifically fondaparinux (factor Xa inhibitor), in the high risk obstetric patient. Patient was 28 week pregnant with a history of sickle cell disease with successful allogeneic stem cell transplant, DVT of right arm, and anaphylactic heparin allergy, who presented with pre-eclampsia and required emergency C section while taking fondaparinux for DVT prophylaxis. Prior to C section, patient was administered FEIBA NF for transient reversal of fondaparinux, and C section was safely completed during reversal window with estimated blood loss of 800cc. Fondaparinux was restarted on post-op day 1 without complications.

Discussion:
We conclude that fondaparinux can be safely used in the high risk obstetric patient with heparin allergy despite imminent delivery. This does require careful planning among multiple specialities, including obstetrics, anesthesiology, and hematology, access to fondaparinux reversal agent, and preparedness for general anesthesia vs. regional anesthesia in the event of emergency C section.

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GJ. Deep vein thrombosis: update on diagnosis and management. Med J Aust. 2019 Jun;210(11):516-524. doi:10.5694/mja2.50201 Vucić N, Cala K, Rancić I, Pticar R. Therapy and prevention of deep venous thrombosis and pulmonary embolism in gynecology and obstetrics. Acta Med Croatica. 2003;57(2):123-30. Croatian. PMID: 12879692

THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 08

Pulmonary Hypertension, Prostacyclin Analogs, and Platelet Function: A Case Series

Presenting Author: Daniel Webster, MD

Presenting Author's Institution: University of California - Irvine - Orange, California

Co-Authors: Sean Senozan, MD - University of California - Irvine

Introduction:
Pulmonary hypertension in pregnancy is accompanied by a markedly increased risk of morbidity and mortality. Prostacyclin analogs such as epoprostenol (EPO) have long been a mainstay treatment when this condition is severe. Prostacyclins are known to impact platelet function to some degree, however this is of unclear clinical significance in these patients (1). We present a series of 2 patients presenting with pulmonary hypertension during pregnancy requiring treatment with EPO. Laboratory evidence of concurrent changes in either platelet count or function raised the question of pharmacologic impact on this key coagulation component.

Case One:
Patient 1 was a 40 y/o G6P4014 presenting at 30w5d for a cardiac workup in the setting of shortness of breath. She was diagnosed with NYHA II heart failure and found to have pre-capillary pulmonary hypertension on right heart catheterization. She was initially treated with PO sildenafil then escalated to IV EPO. Arterial line and epidural were placed prior to induction of labor. She was delivered at 32w5d by cesarean section (CS). Her PLT remained between 200-260, though her PFA (epinephrine/col of 202 and ADP/collagen 120) was borderline abnormal, and ROTEM evaluation (Fibtem/Extem) was WNL.

Case Two:
Patient 2, a 28 y/o G2P0010 at 27w5d with a history of rheumatic heart disease complicated by HFpEF and pulmonary hypertension, presented for progressive peripheral edema. She was admitted to the MICU and EPO was initiated. Pre-delivery, Swan-Ganz catheter, A-line and epidural were placed, and iNO was utilized during delivery. She was delivered at 28w4d by CS for worsening maternal and fetal condition. Interestingly, from EPO initiation, her PLT level dropped rapidly to the nadir of 42 before recovering. ROTEM was performed on day 3 (PLT 102) with INTEM revealing a reduced alpha angle (64 deg), prolonged clotting time (212 s) and clot formation time (135 s), and EXTEM revealing a prolonged clot formation time (144 s). While the etiology was ultimately unclear, considerations at the time included prostacyclin administration vs ITP vs pre-E with SF.

Discussion:
EPO is commonly utilized to treat severe or symptomatic pulmonary hypertension during pregnancy. Long term EPO administration has been associated with a wide range of possible maternal side effects. Its contribution to thrombocytopenia and platelet dysfunction, while unclear, could have implications for

neuraxial intervention as well as the risk of post-partum hemorrhage in this patient population. Laboratory testing, including platelet function assays and viscoelastic testing may provide value in the evaluation of coagulopathy in these patients.

References:

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THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 09

Obstetric Anesthesiology at the Forefront: Management of Submassive Saddle Pulmonary Embolism for Safe Vaginal Delivery

Presenting Author: Mariana Acosta, MD

Presenting Author's Institution: Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami - Miami, Florida

Co-Authors: Ibrahim Ali, MD - Department of Anesthesiology, University of Miami, Jackson Memorial Hospital

Introduction:
The management of submassive saddle pulmonary embolism (PE) during pregnancy involves considerable risk and is not guided by well-established protocols. Obstetric anesthesiologists are required to synthesize expertise in cardiopulmonary physiology, anticoagulation, and neuraxial anesthesia to formulate comprehensive delivery strategies.

Case One:
A 30-year-old G2P1001 at 38 weeks' gestation with heterozygous prothrombin mutation and decreased protein S levels presented with acute dyspnea after discontinuation of prophylactic enoxaparin 48 hours earlier. She remained hemodynamically stable. CT angiography and echocardiography revealed a saddle pulmonary embolism with bilateral segmental and subsegmental involvement, right ventricular (RV) strain, and moderately reduced systolic function. Lower extremity ultrasound identified a right popliteal deep vein thrombosis (DVT). Therapeutic unfractionated heparin infusion was initiated. A multidisciplinary team considered several high-risk management options, including emergent cesarean delivery with open thrombectomy, VA-ECMO-supported cesarean, and perimortem cesarean delivery. After 72 hours of therapeutic anticoagulation, RV function normalized. Serial imaging revealed progression of the deep vein thrombosis to an occlusive thrombus, while the pulmonary embolism burden remained unchanged. Given the extent of thrombosis, a suprarenal inferior vena cava (IVC) filter was placed. Labor was induced at 40 weeks, and labor analgesia was initiated with a DPE technique. Subcutaneous heparin was administered intrapartum until delivery and anticoagulation management adhered to ASRA and SOAP guidelines. The patient underwent an uncomplicated vaginal delivery under neuraxial anesthesia. Six hours after delivery, a continuous heparin infusion was initiated and the patient remained on labor and delivery postpartum for surveillance. Twenty-four hours postpartum, anticoagulation was held for removal of the IVC filter. The patient experienced acute decompensation with echocardiographic evidence of right ventricular strain. Urgent mechanical thrombectomy was performed, resulting in complete recovery.

Discussion:
This case highlights the essential role of obstetric anesthesiology in the multidisciplinary management of submassive saddle pulmonary embolism during pregnancy. Careful risk stratification, coordinated anticoagulation, and individualized anesthetic planning enabled safe vaginal delivery while minimizing

maternal risk. The case also emphasizes the need for close postpartum surveillance, as thromboembolic risk remains high despite clinical stability. Early multidisciplinary involvement and ongoing reassessment are critical to optimizing maternal outcomes in complex pregnancy-associated thromboembolic disease.

References:

1. Reg Anesth Pain Med 2025; 0: 1-29 2. J Thromb Haemost 2017 Oct;15(10):1942-1950

PE_SOAP.pdf

THURS - CR - BS 1 - BR 2A - Coagulopathy - Congenital and Latrogenic – 10

Peripartum Management of a Parturient with a History of Truncus Arteriosus and Mechanical Aortic Valve on Warfarin

Presenting Author: Margaret Duval, MD

Presenting Author's Institution: New York Presbyterian- Weill Cornell Medicine - New York, New York

Co-Authors: Bracha Abraham, MD, MS - New York Presbyterian- Weill Cornell Medicine
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Introduction:
Mechanical heart valves (MHVs) confer a high risk of thromboembolism and require lifelong anticoagulation. Pregnancy further increases hypercoagulability, making meticulous anticoagulation essential to prevent valve thrombosis and stroke while balancing the risks of postpartum hemorrhage and neuraxial anesthesia. (1)

Case One:
We describe a 35-year-old G2P0010 with a repaired of truncus arteriosus, mechanical aortic valve replacement on warfarin, a bioprosthetic pulmonary valve replacement, single vessel coronary artery disease, and embolic stroke after one day off of warfarin for embryo transfer who presented for delivery planning. Prior to conception, she was managed by our adult congenital cardiology team, and transitioned from warfarin to enoxaparin then back after the first trimester. Early in pregnancy, she established care with maternal fetal medicine at our institution and a center near home. Multidisciplinary planning among maternal fetal medicine, cardiology, hematology, and obstetric anesthesia began in the second trimester with the goal of vaginal delivery and minimal time off therapeutic anticoagulation. Considerations included timing of induction, plan for transitioning, holding and restarting anticoagulation, intrapartum monitoring, and postpartum recovery. At 36 weeks' gestation, she was admitted and transitioned from warfarin to a therapeutic heparin infusion. Labor induction began on hospital day 7 with a cervical ripening balloon; non-neuraxial analgesia options were available. After balloon expulsion, therapeutic heparin was discontinued and labor augmented with oxytocin. Five hours later, normal platelet count and coagulation studies were confirmed, and a combined spinal-epidural was placed. While the epidural was in situ, the patient received low-dose subcutaneous heparin twice. She had an uncomplicated vaginal delivery. Two hours postpartum, the epidural was removed, and she was transferred to the cardiac care unit with labor and delivery nursing support, and with hemorrhage management equipment readily available. Therapeutic heparin was resumed 6 hours after delivery and continued until transition back to warfarin. Overall, the patient was off therapeutic anticoagulation for a total of 24 hours, achieved effective neuraxial labor analgesia, and experienced no adverse events.

Discussion:
Pregnancy in patients with MHVs is associated with substantial maternal morbidity, with up to 41% of patients experiencing severe morbidity. (2) This case highlights that safe vaginal delivery with neuraxial

anesthesia is feasible with careful, multidisciplinary planning and coordinated anticoagulation management.

References:

1. Daughety MM, et al. Management of Anticoagulation in Pregnant Women With Mechanical Heart Valves. Obstet Gynecol Surv. 2020 Mar;75(3):190-198. 2. Lester W, et al. British Society for Haematology guideline for anticoagulant management of pregnant individuals with mechanical heart valves. Br J Haematol. 2023 Aug;202(3):465-478.

THURS - CR - BS 1 - BR 2B – Potpourri - 01

Peripartum management of Hypodysfibrinogenemia: A Case Report

Presenting Author: Christine Ha, MD

Presenting Author's Institution: Columbia University - New York, New York

Co-Authors: James Conwell, DO - Columbia University

Introduction:
Hypodysfibrinogenemia is a rare condition defined by low levels and low function of fibrinogen1. Its exact incidence is unknown as it is often misdiagnosed as hypofibrinogenemia or undiagnosed in asymptomatic patients. It is unique in that patients may also have a thrombotic sequela of disease as opposed to purely a bleeding disorder2. Acquired fibrinogen disorders have been shown to increase risk of severe postpartum hemorrhage (PPH)3 and risk of hematoma with neuraxial procedures4, while the evidence for congenital fibrinogen disorders remains sparse.

Case One:
A 31 yo G1P0 at 37w0d, BMI 27 with known hypodysfibrinogenemia presented for induction of labor for fetal growth restriction. She had a diagnosis of anterior cerebral artery aneurysm with coiling in 2020 and laparoscopic sleeve gastrectomy in 2023, during which low fibrinogen (< 47 mg/dL) was identified. Bariatric surgery was uneventful with administration of 2 packed units of cryoprecipitate prophylactically. She had antepartum consultation with hematology, genetics and anesthesiology. Hematology recommended maintaining fibrinogen >150 mg/dL with fibrinogen concentrate until postpartum day 3 (PPD) and tranexamic acid from delivery to PPD 10. Given published data of increased PPH risk at fibrinogen < 200 mg/dL, and our institutional obstetric anesthesia protocol, we decided on that threshold. It took 28 hours from admission to reach the fibrinogen target levels with fibrinogen replacement (Table 1). She received a combined spinal epidural and started induction with oxytocin infusion. She delivered 7h later without PPH, and discharged on PPD3.

Discussion:
Fibrinogen repletion is the accepted treatment for hypodysfibrinogenemia for pregnant patients, however it requires thoughtful management as over administration may cause thrombotic events5. The expected increase from 10 units (2 pooled) of cryoprecipitate is approximately 100 mg/dL, and increase from fibrinogen concentrate is formulaic and reliable. However, in this case, the increase was much lower than expected. Given the discordance between expected and observed fibrinogen after appropriate repletion, ROTEM was also measured. While ROTEM is often used to guide transfusion in active bleeding, our institution frequently measures ROTEM in addition to other traditional coagulation labs, to guide management of patients with coagulation disorders. The FIBTEM A5 was 9 mm when fibrinogen was 135 mg/dL and FIBTEM A5 10 mm when fibrinogen was 190 mg/dL, which supported continuing fibrinogen repletion. Conclusion: This case emphasizes the importance of individualized fibrinogen repletion in a patient with hypodysfibrinogenemia in the setting of managing risks of both bleeding and clotting

sequelae. ROTEM was a useful measurement when fibrinogen values were inconsistent with expected increase after repletion.

References:

1. Haemophilia 2008; 14(6):1151-1158 2. J Thromb Haemost 2007;5(2):266-273 3. Res Pract Thromb Haemost 2021;5(4):e12491 4. J Thromb Haemost 2024;22(50:1516-1521

Hypodys Table 1.pdf

THURS - CR - BS 1 - BR 2B – Potpourri – 02

Gravid Hysterectomy Treatment for Bleeding Placenta Accreta with Concomitant Factor V Leiden-Associated Pulmonary Embolism

Presenting Author: Damon Wallace, MD

Presenting Author's Institution: University of Michigan - Ann Arbor, Michigan

Co-Authors: Irene Kitromelides, MD - University of Michigan Hospital
Lindsay S. Tremper, MD - University of Michigan

Introduction:
Physiologic changes of pregnancy result in an induced hypercoagulable state. In most situations, these patients do not require prophylactic anticoagulation. However, in patients with concomitant hypercoagulable disorders such as Factor V Leiden thrombophilia, prophylactic or even therapeutic anticoagulation may be warranted. Factor V Leiden is a common hypercoagulable state with a prevalence of 1-15% and accounts for roughly 40% of venous thromboembolisms (VTE) in pregnancy. In rare circumstances, patients may have an existing contraindication to the necessary anticoagulation regimen thereby increasing the complexity of case management.

Case One:
We present the case of a 40-year-old G7P5015 woman with heterozygous Factor V Leiden mutation and previous endometrial ablation who presented in her early second trimester. She had known FIGO grade II placenta accreta spectrum and placenta previa now complicated by recurrent bleeding. She was monitored for bleeding while attempting to reach a viable gestational age then undergo Cesarean hysterectomy at 34 weeks gestation or earlier in the setting of increased bleeding. DVT chemoprophylaxis was recommended given her hospitalization and history of Factor V Leiden mutation, but she declined due to concern for worsened bleeding. She developed worsening vaginal bleeding and chest pain that prompted a CT scan diagnosing unilateral lobar pulmonary embolism (PE) without right heart strain. Multiple interventions were discussed including thrombectomy followed by gravid hysterectomy, gravid hysterectomy with postoperative anticoagulation, or therapeutic anticoagulation followed by gravid hysterectomy. After multidisciplinary discussions, the patient elected to undergo gravid hysterectomy. This was performed uneventfully under general anesthesia with placement of an arterial line and central venous and pulmonary artery catheters. TEE was used to evaluate cardiac function throughout the procedure. Postoperative therapeutic anticoagulation was started with transition to apixaban therapy prior to discharge.

Discussion:
This case exemplifies the complex balance of coagulation profiles in hypercoagulable pregnant patients. Although this patient did not have evidence of hemodynamic instability associated with her PE, its development in a patient with multiple risk factors and contraindications to treatment with anticoagulation necessitate alternative approaches to prevent propagation and development of hemodynamic

compromise. Despite the complex personal and medical decision making, performing a gravid hysterectomy in this case permitted the prevention of hemodynamic deterioration and the initiation of therapeutic anticoagulation.

References:

1. Skeith, L. American Society of Hematology. 2017;1:160-167. 2. James, A. et al. ACOG Practice Bulletin No. 196. Obstetrics and Gynecology. 2018; 132(1):e1-17. 3. Mets, TD. Silverman, NS. ACOG Practice Bulletin No. 197. Obstetrics and Gynecology. 2018; 132(1):e18-34.

Image 1.pdf

THURS - CR - BS 1 - BR 2B – Potpourri - 03

Plasminogen Activator Inhibitor Deficiency in Pregnancy

Presenting Author: Michael Vogel, DO

Presenting Author's Institution: University of Kentucky - Lexington, Kentucky

Co-Authors: Neva Lemoine, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine, Division of Obstetric Anesthesia
Andrew Poore, MD - University of Kentucky

Introduction:
Plasminogen activator inhibitor-1 (PAI-1) is a protein that prevents the conversion of plasminogen into plasmin. Plasmin cleaves fibrin to break down and reduce further clot formation. PAI-1 deficiency is a rare autosomal recessive bleeding disorder that increases the risk of surgical bleeding, menorrhagia, and epistaxis (1). Peripartum tranexamic acid administration in conjunction with lab testing can be offered to patients with PAI-1 deficiency to optimize coagulation and reduce bleeding risk (2). Neuraxial placement in these patients may carry an increased risk of hematoma because of the existing bleeding diathesis. Although rare, neuraxial hematoma is a serious complication in pregnancy with current incidence rates estimated around 0.2 per 100,00 neuraxial placements (3).

Case One:
A 26-year-old G11P1091 patient at 38 weeks gestation presented for induction of labor. She was diagnosed with PAI-1 deficiency when she was a child after her sibling had excessive bleeding following tonsillectomy. She was not offered neuraxial anesthesia with her first pregnancy due to concern for bleeding. Hematology was consulted and recommended 25 mg/kg of TXA three times daily while inpatient and for 2 weeks postpartum. The patient was counseled on the risks and benefits of neuraxial anesthesia. She initially declined but later elected to proceed with epidural placement. A baseline thromboelastography (TEG) and complete blood count were performed upon admission with values being within normal limits. An epidural was placed without complication. She delivered approximately 6 hours later with an estimated blood loss of 180 mL and no evidence of postpartum hemorrhage thereafter. A TEG was performed prior to epidural removal to prevent a potential increased risk of epidural hematoma from catheter manipulation. The patient was closely followed until discharge without evidence of epidural hematoma or neurovascular injury.

Discussion:
Limited literature exists demonstrating the use of neuraxial anesthesia in patients with PAI-1 deficiency. Recommendations are often extrapolated from those created for other bleeding disorders. One study indicated an epidural was not offered to a patient with PAI-1 deficiency given the risk of bleeding (4). Another study looked at the use of viscoelastic testing with TEG in a patient for whom a single-shot spinal

was performed, but it did not discuss post-partum bleeding afterwards (2). This case demonstrates the precautions taken to provide successful neuraxial anesthesia for labor analgesia in a patient with PAI-1 deficiency in hopes that future clinicians may use a similar framework should they encounter patients who desire neuraxial anesthesia.

References:

1. PMID: 29847021 2. PMID: 31743119 3. Sviggum, Hans P. “Neurologic complications of pregnancy and neuraxial anesthesia.” Chestnut’s Obstetric Anesthesia, 7th ed., Elsevier, 2025:740–765. 4. PMID: 21037516

THURS - CR - BS 1 - BR 2B – Potpourri – 04

When The Best Laid Plans Go Awry: Peripartum Management of Type 2B von Willebrand Disease

Presenting Author: Adanna Ekekwe, BS

Presenting Author's Institution: University of Cincinnati College of Medicine - Cincinnati, Ohio

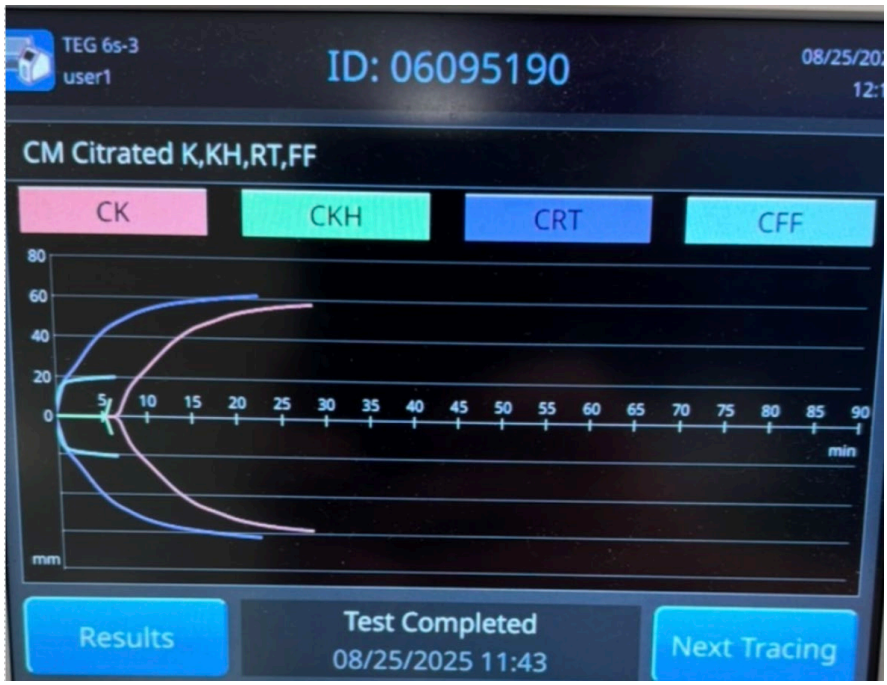
Introduction:
Type 2B von Willebrand disease (vWD) is an autosomal dominant inherited bleeding disorder caused by alteration in von Willebrand factor (vWF) that abnormally increases the binding affinity of vWF to GPIb on platelets (1). Although type 2B vWD is widely recognized, its clinical variability poses significant challenges to peripartum management where thrombocytopenia and postpartum hemorrhage (PPH) further complicate care (2).

Case One:
A 41-year-old G5P4 with history of type 2B vWD causing profound thrombocytopenia presented for antepartum optimization of her vWD. Each prior vaginal delivery resulted in progressively worse PPH requiring transfusion. After risk-benefit discussion, the patient preferred epidural placement, if possible. Antepartum hematology consult recommended the following:12h prior to induction - receive recombinant vWF (rvWF), and 6h prior to induction - one unit of platelets. Three hours prior to neuraxial, she should receive additional rvWF, tranexamic acid (TXA), and platelet transfusion during neuraxial placement. While epidural is in situ, recommendations were to repeat rvWF every 12h, TXA every 8h, and platelet goal of 80,000. Initial platelet count was 19,000, which increased only to 58,000 after 3 units of platelets. Due to poor response to transfusion and infection risk with additional platelet transfusion, we opted to not offer neuraxial anesthesia. The patient subsequently underwent a vaginal delivery with prophylactic JADA placement.

Discussion:
Type 2B vWD complicates neuraxial placement and hemorrhage management. Generally, neuraxial is deferred due to risk of epidural hematoma. With multidisciplinary care, our patient could have neuraxial if this criterion was met: platelet count of 80,000, ristocetin cofactor (rCO) 80-100%, Factor 8 level of 50%, and reassuring viscoelastic testing (VET). Based on hematology recommendations, she received rvWF, TXA, and platelets, 60 minutes prior to neuraxial. The plan included transfusing platelets during epidural placement due to immediate hemostatic activity based on VET data (3). Despite 3 units of platelets, her platelet count was never above 58,000, and she delivered without neuraxial anesthesia. Despite her thrombocytopenia, VET showed adequate hemostasis (Fig 1). Historically, these patients have not been thought to be neuraxial candidates; however, this case highlights that neuraxial can be offered when multidisciplinary and consensus criteria are met. The need for multidisciplinary management of these patients is imperative as they are at high risk for hemorrhage and benefit greatly from neuraxial anesthesia. A future direction for the care of patients with type 2B vWF is with VET. Due to growing

evidence that VET can more reliably predict bleeding risk (4). In the setting of platelet disorders, VET may help strengthen decision making on safety of neuraxial.

References:
1. Blood 2018;131:1292 2. Eur J Haematol 2019;103:73 3. Anesth Analg 2009;108:1430 4. Thromb Res 2025;254:109449



THURS - CR - BS 1 - BR 2B – Potpourri - 05

Intravenous Thrombolysis Following Epidural Placement and Removal

Presenting Author: Antanina Voit, MD

Presenting Author's Institution: The Ohio State University Wexner Medical Center - Columbus, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center
Yun Xia, MD - The Ohio State University Wexner Medical Center

Introduction:
Systemic thrombolytics are contraindicated within ten days of neuraxial procedures because of bleeding risk.(1) Although postpartum ischemic stroke is rare, its suspicion in a parturient may necessitate consideration of intravenous thrombolysis despite recent neuraxial intervention. We present a case of thrombolytic administration for suspected ischemic stroke following a dural puncture epidural and the associated outcome.

Case One:
25 year old G5P3 parturient with a history of headaches presented for induction of labor at 38 weeks and 3 days' gestation. Labor analgesia was provided via a dural puncture epidural. She had a vaginal delivery followed by removal of the epidural catheter. On postpartum day one, the patient developed a global headache with progressive left-sided weakness and sensory changes, including facial numbness and tinnitus. Neurologic examination demonstrated distal-predominant left-sided weakness (wrist and hand strength 4/5;hip flexion 2/5; ankle dorsiflexion 2/5, plantarflexion 1/5). Differential diagnosis included ischemic stroke, hemiplegic migraine, cerebral venous sinus thrombosis, reversible cerebral vasoconstriction syndrome, postpartum angiopathy and a post-dural puncture headache. With a National Institutes of Health Stroke Scale score of 5, intravenous tenecteplase was administered 16 hours after epidural catheter removal. Shortly after thrombolytic administration, the patient developed postpartum hemorrhage due to uterine atony, requiring multiple uterotonics, placement of a uterine tamponade device (Jada System), and blood transfusion. Head computed tomography (CT) angiography showed no large-vessel occlusion, magnetic resonance (MR) venography was negative for cerebral venous sinus thrombosis, and brain MR imaging demonstrated no acute infarction. The patient's neurologic symptoms resolved within several hours. A 24-hour post-thrombolysis head CT revealed no intracranial hemorrhage. She continued to experience a global headache with left-sided muffled hearing, which improved with ibuprofen and caffeine. She was discharged home on hospital day four with outpatient follow-up.

Discussion:
Systemic thrombolysis after neuraxial procedures is discouraged by current guidelines because of the risk of hematoma and permanent neurologic injury. However, guidance specific to postpartum patients with acute neurologic deficits is limited. In parturients with suspected acute ischemic stroke, the potential benefit of thrombolysis may outweigh the risks when alternative diagnoses have been excluded. This case highlights the importance of careful clinical decision-making while maintaining a broad differential

diagnosis in postpartum patients presenting with neurologic symptoms. Further data are needed to better inform risk stratification and management strategies for thrombolytic use in the setting of neuraxial anesthesia.

References:

1. Reg Anesth Pain Med 2025;0:1–19

THURS - CR - BS 1 - BR 2B – Potpourri – 06

A Multidisciplinary Approach to Cesarean Delivery in a Patient with Hypertrophic Cardiomyopathy and Amide Local Anesthetic Allergy

Presenting Author: Dillon Patel, MD

Presenting Author's Institution: The University of North Carolina at Chapel Hill - Durham, North Carolina

Introduction:
Hypertrophic obstructive cardiomyopathy (HOCM) is often well tolerated in pregnancy; however, arrhythmia and heart failure occur in up to 25% of patients, particularly those with NYHA Class ≥ II or poor functional status1,2. Co-morbid conditions of pregnancy or anesthetic complications, such as local anesthetic (LA) allergy, complicate management. Pre-pregnancy shared decision making, and a multidisciplinary approach to delivery are paramount.

Case One:
A 24-year-old G7P0060 at 27+2 weeks' gestation with mild intermittent asthma, heterozygous Factor V Leiden, proven amide LA allergy, and MYBPC3-associated HOCM with AICD placement presented with abdominal pain, worsening shortness of breath, and chest tightness. Placental abruption was ruled out. Transthoracic echocardiography demonstrated severe asymmetric septal hypertrophy, systolic anterior motion of the mitral valve, preserved LVEF (>55%), and markedly worsened dynamic LVOT gradient of 69 mmHg. She was admitted to the ICU for invasive monitoring, aggressive volume resuscitation, device interrogation, and optimization with beta-blockade and calcium channel blockade. She remained inpatient until scheduled cesarean delivery (CD) at 30 weeks' gestation. A pre-induction arterial line and epidural were placed. Femoral arterial and venous sheaths were placed by CT surgery, in the event of urgent ECMO conversion, followed by central venous and pulmonary artery catheter placement by anesthesia team, all using 3% 2-chloroprocaine (CP) skin localization. The epidural was slowly loaded with 3% CP to achieve a T4 bilateral block. CD proceeded uneventfully with stable hemodynamics using phenylephrine infusion and judicious volume administration. Uterine tone was achieved with oxytocin infusion and buccal misoprostol. Oxytocin bolus was avoided due to concern for hypotension. Her post-operative course was uncomplicated. She was discharged on postoperative day three.

Discussion:
Meticulous control of preload, afterload, and heart rate is required when managing a parturient with HOCM. No consensus exists regarding general versus neuraxial anesthesia. Epidural anesthesia with gradual dosing and preload optimization is increasingly favored to avoid abrupt sympathectomy; single-shot spinal should be avoided3. True IgE-mediated allergy to amide LA is exceedingly rare. Ester LA, such as CP, are a safe and effective alternative. CP's rapid onset and short duration require frequent re-dosing. The short half-life may be advantageous for CD in patients with fixed or dynamic outflow tract obstruction by permitting titration for tight hemodynamic control4,5. This case demonstrates that carefully

titrated epidural anesthesia with 3% CP can provide reliable surgical anesthesia and stable hemodynamics in patients with severe HOCM.

References:

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THURS - CR - BS 1 - BR 2B – Potpourri - 07

Anesthetic Considerations of Severe Mitral Stenosis in the Peripartum Period

Presenting Author: Emma L. Stoltz, MD

Presenting Author's Institution: University of Kansas Medical Center - Kansas City, Kansas

Co-Authors: Grace Shih, MD - Department of Anesthesiology, The University of Kansas
Joel T. Sydzyik - University of Kansas School of Medicine

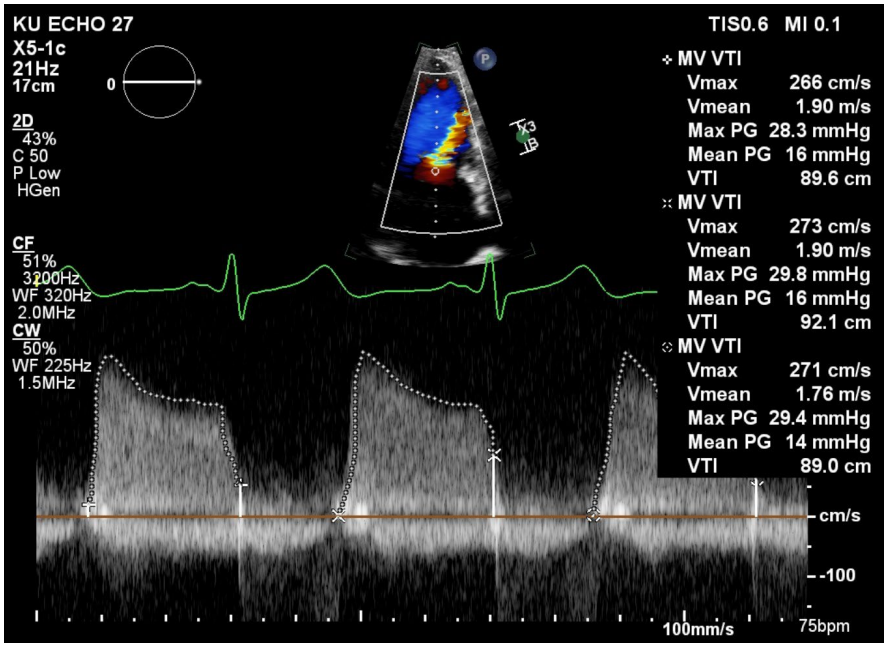
Introduction:
Mitral stenosis (MS) remains the most common valvular heart disease complicating pregnancy, leading to high rates of maternal mortality in patients with severe dysfunction and thus requiring thoughtful management by a multidisciplinary team1. As pregnancy progresses, increasing cardio-circulatory changes often lead to worsening symptoms of MS, and the severity of disease typically correlates with the risk of maternofetal complications1,2.

Case One:
A 32-year-old G2P1001 at 22w with a PMH of rheumatic heart disease status-post surgical repair in Brazil in 2013 presented with chest pain and SOB and was found to have critical mitral stenosis (MS) on echocardiogram with mean MV pressure gradient of 21 mmHg, calculated MV area of < 1cm2, and PASP of 100 mmHg (Fig 1). Her symptoms improved with medical management until 29w5d where she was admitted to the cardiac ICU due to decompensation. It was initially decided to pursue percutaneous balloon mitral valvuloplasty as a temporizing measure, but, upon further discussion, the operation was deferred due to lability of the procedure, anesthetic risks, and the likelihood of minimal benefit given the patient's less favorable Wilkins score. Since expectant management carried a high risk of maternal morbidity and mortality, it was decided to pursue scheduled c-section at 31w1d. Anesthesia was delivered via epidural catheter. The c-section was performed with VA ECMO available and femoral sheaths placed at the start of the procedure. She tolerated the operation well and had an uncomplicated postoperative course in the cardiac ICU. She was discharged from the hospital on postoperative day 4; with plans to undergo mitral valve replacement in 4-6 weeks.

Discussion:
While percutaneous balloon mitral valvuloplasty has emerged as the preferred intervention in these cases, it may not be best in all patients and benefits and risks must be weighed on an individualized basis1,2. In cases where balloon valvuloplasty is not ideal, expectant management, preterm delivery, and surgical valve replacement can be considered2. The ideal timing of delivery in patients with cardiovascular disease continues to be debated, but the goal is to achieve 39 weeks' gestation unless there is concern for maternofetal decompensation based on the severity of the lesion, clinical signs and symptoms, and the need for interventions that could only be safely performed in a nonpregnant state, etc3. Vaginal delivery is preferred in these patients, unless complicated by conditions like severe pulmonary hypertension and MS that make the Valsalva maneuver risky3.

References:

1. Abdelrahman, S. et al. (2019). Rev Recent Clin Trials 14(2): 136-140. 2. Lau, E. et al. (2019). Trends Cardiovasc Med 29(3): 155-161. 3. Meng, M et al. (2023). Circulation 147(11): e657-e673.



THURS - CR - BS 1 - BR 2B – Potpourri - 08

Ebstein Anomaly in the Parturient: Management Considerations

Presenting Author: Robert Guidangen, MD

Presenting Author's Institution: University of Nebraska Medical Center - Omaha, Nebraska

Co-Authors: Joshua Abels, MD - University of Nebraska Medical Center

Introduction:
Ebstein anomaly (EA) is a rare cardiac abnormality with an incidence of only 0.5%-1% among cases of congenital heart disease [1,2]. Further, the variety of symptoms, disease severity, and complications make uniform evaluation difficult. Women born with Ebstein anomaly frequently reach childbearing age, and contemporary literature demonstrate that pregnancy is likely to be well tolerated. However, among pregnant patients with Ebstein anomaly, nearly half may develop a cardiac arrhythmia while as much as 18% have been shown to develop heart failure [3]. We present specific considerations for anesthetic management in a patient with repaired EA complicated by severe right heart dysfunction and significant valvulopathy.

Case One:
A 23-year-old G1P0 with intrauterine pregnancy at 36 weeks and 6 days gestation presented for scheduled induction of labor indicated by worsening dyspnea and lower extremity edema in the setting of EA. The patient previously underwent bioprosthetic tricuspid valve replacement with atrial septal defect closure at 5 years old. However, she required transcatheter valve-in-valve implantation at 12 years old secondary to failure of initial replacement. Late in her antepartum course, echocardiography showed prosthetic tricuspid stenosis and severe right ventricular dilation with severe dysfunction. Upon admission to the labor and delivery floor, two large-bore peripheral intravenous catheters were inserted and judicious intravenous crystalloid management was implemented. A radial arterial line was placed shortly before placement of a labor epidural. Successful neuraxial anesthesia was initiated with a slowly titrated infusion of a bupivacaine and fentanyl solution while maintaining hemodynamic stability. Her labor course was uncomplicated with oxytocin augmentation, and she underwent spontaneous vaginal delivery of a healthy infant. The patient discharged home on postpartum day 2.

Discussion:
Management of patients with EA– repaired or unrepaired - in labor prioritizes maintenance of normal sinus rhythm and euvolemia while providing sufficient analgesia for vaginal delivery, which is the preferred method of delivery in almost all cases [2]. Additional hemodynamic goals emphasize avoidance of myocardial depression and increases in pulmonary vascular resistance. Further strategies include clear induction plans for emergent cesarean delivery and monitoring requirements while in the labor suite. EA can have variable presentation based on status of repair/replacement, co-occurring valvular disease, and altered cardiac function through the antepartum period [1,3]. This case highlights the influence of physiologic changes in pregnancy on disease progression and underscores the extensive

multidisciplinary planning needed to optimize successful delivery.

References:

1. Open Heart. 2023 Aug;10(2):e002406. 2. J Reprod Infertil. 2018 Apr-Jun;19(2):119-122 3. Am J Cardiol. 2025 Dec 1;256:45-48

THURS - CR - BS 1 - BR 2B – Potpourri - 09

Anesthetic Management of a Cesarean Section with Severe Mitral Stenosis and Pulmonary Hypertension

Presenting Author: Coleman Harber, MD

Presenting Author's Institution: University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine - Lexington, Kentucky

Co-Authors: Evan Birmingham, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine
James Damron, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine, Division of Obstetric Anesthesia

Introduction:
Mitral stenosis (MS) is the most common valvular disease affecting pregnant patients, with an incidence of 1-2% in developed countries. The most common cause of MS is rheumatic heart disease.1,2 A valve area less than 2 cm2 is diagnostic of mitral stenosis which impedes blood flow from the left atrium to the left ventricle. This restriction of forward flow across the stenotic valve leads to an increase in left atrial pressure, risking pulmonary hypertension and right heart failure. The physiologic changes of pregnancy may worsen these conditions, making anesthetic management of the MS patient particularly challenging.

Case One:
A 36-year-old G8P3134 with history of smoking, substance abuse, COPD, morbid obesity and four prior cesarean sections presented at 29 weeks gestation with severe symptomatic dyspnea, lower extremity edema and intermittent chest pressure. A transthoracic echo revealed rheumatic heart disease with mitral stenosis and pulmonary hypertension. She was started on furosemide 40 mg daily and metoprolol 25 mg daily and followed closely by maternal fetal medicine and cardiology as her pregnancy progressed. After multidisciplinary planning, she was scheduled for elective Cesarean section at 37 weeks gestation. An uncomplicated dural puncture epidural was performed in the operating room with standard ASA monitors applied. An arterial line along with 18g and 16g IVs were placed with ultrasound guidance. A 7 Fr triple lumen CVC was placed in the right internal jugular vein. The epidural catheter was dosed with small aliquots of 2-3 mL of 2% lidocaine with 1:200,000 epinephrine until a T6 level was obtained. SVR was maintained with phenylephrine and vasopressin infusions. Tranexamic acid and high dose oxytocin were utilized for post-partum hemorrhage prevention. After uncomplicated delivery, the patient was taken to the cardiac ICU for close monitoring.

Discussion:
The European Society of Cardiology guidelines recommend Cesarean delivery in patients with mitral stenosis who are NYHA class III/IV or who have pulmonary hypertension.3 There are no major RCTs specifically examining anesthetic management of mitral stenosis in Cesarean sections. A small observational study by Wu et al. demonstrated epidural as a successful technique.4 The AHA recommends carefully titrated neuraxial as the preferred technique as well in their guidelines for

anesthetic care of pregnant patients with cardiovascular disease with vasopressor utilized as needed to maintain aortic diastolic pressure at baseline.5 Multidisciplinary planning with focus on delivery timing as well as optimizing heart rate control and volume status preoperatively is crucial. Intraoperative focus on minimizing sudden hemodynamic changes, maintaining systemic vascular resistance, avoiding tachycardia and judicious fluid management are key to safe delivery of the mitral stenosis patient.

References:

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THURS - CR - BS 1 - BR 2B - Call for ECMO! - 01

ECMO for resuscitation of a patient with an amniotic fluid embolism

Presenting Author: Ani Chilingirian, MD

Presenting Author's Institution: UCSF Anesthesia - San Francisco, California

Co-Authors: Jennifer Woodbury, MD, MBA - UCSF
Peter Yeh, MD - UCSF Anesthesia

Introduction:
Amniotic fluid embolism (AFE) is a rare but catastrophic obstetric emergency with mortality rates up to 60% (1). Sudden cardiopulmonary collapse, disseminated intravascular coagulation, and end-organ failure are commonly associated morbidities (2). This case report describes the peripartum management and successful application of veno-arterial (VA) extracorporeal membrane oxygenation (ECMO) in a patient who suffered from an AFE.

Case One:
A 37-year-old G1P0 pregnant woman with chronic hypertension and type 1 diabetes was scheduled for an induction of labor at 34 weeks' gestation for superimposed preeclampsia with severe features by blood pressure. Intrapartum, the patient required an emergency cesarean section (CS) under epidural anesthesia due to a prolonged fetal bradycardia. The CS was uneventful with a quantitative blood loss of 600 mL. Before leaving the operating room, the patient became acutely anxious and complained of difficulty breathing despite reassuring vital signs. Shortly thereafter, the patient became unresponsive with had seizure-like movements, and ventricular tachycardia was noted on the monitor. The patient was pulseless, leading to immediate initiation of chest compressions and endotracheal intubation, quickly followed by defibrillation and administration of epinephrine 1 mg. Return of spontaneous circulation occurred within 5 minutes. She received two dosages of atropine, ondansetron, and ketorolac. Massive blood transfusion was activated although the patient did not appear to have disseminated intravascular coagulation. The patient remained with a high pressor requirement and point-of-care ultrasound showed global hypokinesis. AFE was suspected as the etiology of cardiopulmonary collapse. She was hypoxemic on 100% FiO2 and PEEP of 16. The patient was successfully cannulated for VA ECMO through right femoral arterial and venous sheaths 60 minutes from initial arrest. The patient was transferred to the intensive care unit. Neurologic work-up, including EEG and CT head, was unremarkable. The patient's cardiac function improved by postoperative day (POD) 1, but she remained on ECMO due to ARDS. The patient's pulmonary status improved, and she was decannulated from ECMO on POD 2. The patient was discharged in stable condition on POD 9 without any neurologic deficits.

Discussion:
AFE presentation can be rapidly progressive and requires immediate recognition and a multidisciplinary response. ECMO can be used for rapid cardiopulmonary stabilization to prevent persistent hypoxemia and prevent end-organ failure (3). Prompt initiation should be considered, given 50% death occurs in the

first hour, 25-50% in the next 4-5 hours, and a high rate of serious neurologic and end-organ complications in survivors (1). This case demonstrates the favorable outcome in a patient with AFE who was resuscitated with VA-ECMO.

References:

Global Cardiology Science & Practice. 2024.6 (2024): e202451. Journal of Perinatal Medicine. 0 (2025). Critical Care. 26.1 (2022): 96.

THURS - CR - BS 1 - BR 2B - Call for ECMO! - 02

Seconds to Deliver: Maternal Arrest and Resuscitative Cesarean Delivery in Suspected Amniotic Fluid Embolism

Presenting Author: Brianna A. Hidreth, MD

Presenting Author's Institution: University of Pittsburgh Department of Anesthesiology and Perioperative Medicine - Pittsburgh, Pennsylvania

Introduction:
Amniotic Fluid Embolism (AFE) is a rare obstetric emergency (~1 in 40,000 U.S. deliveries), caused by amniotic fluid or fetal material entering maternal circulation and triggering a systemic response [1,2]. Presentation varies and may include cardiovascular collapse, respiratory failure, seizures, and confusion [3]. AFE often follows a biphasic course, with initial cardiopulmonary collapse followed by a hemorrhagic/coagulopathic phase [3].

Case One:
We present a 38-year-old G3P2 at 39w3d after spontaneous rupture of membranes. Labor was induced with oxytocin, and an epidural was placed. At 5 cm dilation, she developed hypotension with fetal decelerations, initially managed with vasopressors, repositioning, and terbutaline. A subsequent episode progressed to severe hypotension, vomiting, unresponsiveness, seizure-like activity, and PEA arrest. CPR was initiated, and a peri-arrest cesarean delivery after three minutes achieved return of spontaneous circulation [4]. Dobutamine was started, and the neonate survived. Postpartum, she developed hemorrhage requiring uterotonics, tranexamic acid, JADA device placement, and massive transfusion. FAST exam revealed hemoperitoneum, prompting emergent laparotomy. During transfer for uterine artery embolization, she developed recurrent ventricular arrhythmias. VA-ECMO was ineffective due to abdominal compartment physiology and severe left ventricular dilation. Death was pronounced. Autopsy showed pulmonary petechiae, consistent with AFE.

Discussion:
This case highlights the complexity of maternal cardiac arrest, where AFE remains a diagnosis of exclusion and adherence to the AHA ACLS-Pregnancy algorithm is essential [5]. Guidelines emphasize high-quality CPR with manual left uterine displacement, early POCUS to identify reversible causes, and prompt inotropic support [2,4]. Maternal cardiac arrest is rare (~1 in 12,000 deliveries) [6] and requires consideration of AHA's ABCDEFG framework [5]. AFE can present abruptly even in the first stage of labor, and outcomes depend on rapid recognition, hemodynamic stabilization, and correction of coagulopathy. Resuscitative cesarean delivery is time-critical for mother and fetus, and clinicians must maintain a high index of suspicion and follow pregnancy-specific protocols without delay [4].

References:
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THURS - CR - BS 1 - BR 2B - Call for ECMO! - 03

Regional Anesthesia with Extracorporeal Membrane Oxygenation (ECMO) Backup and Remifentanil Infusion for Cesarean Delivery and Mediastinal Biopsy in a Parturient with a Large Anterior Mediastinal Mass

Presenting Author: Vinay Khare, MBBS

Presenting Author's Institution: University Of Washington Medical Center - Seattle, Washington

Co-Authors: Paige Keasler, DO, DO - University of Washington

Introduction:
Anterior mediastinal masses in pregnancy pose major anesthetic challenges because airway or vascular compression may precipitate catastrophic cardiopulmonary collapse. Published experience favors neuraxial techniques and multidisciplinary rescue planning.

Case One:
A 32-year-old G1P0, at 34 weeks and 4 days of gestation, with primary mediastinal large B-cell lymphoma and prior intensive-care admission for airway and superior vena cava compromise, required delivery for severe fetal growth restriction and maternal comorbidities. Mediastinal mass, positional dyspnea, dysphagia, pulmonary artery compression, left internal jugular vein thrombosis, therapeutic enoxaparin, and anticipated need for post-delivery biopsy created substantial anesthetic complexity. Imaging and echocardiography were reviewed to assess airway and vascular compression, supine tolerance was evaluated, anticoagulation timing was coordinated, and rescue strategies were formalized. Thoracic surgeons and perfusionists were present with rigid bronchoscopy and extracorporeal membrane oxygenation immediately available. Invasive arterial monitoring and large-bore intravenous access were established, and the patient was positioned semi-upright to minimize airway compromise. After an appropriate anticoagulation hold, a combined spinal–epidural anesthetic was given with reduced intrathecal dosing. Cardiothoracic surgery placed bilateral femoral venous cannulas preoperatively to permit rapid initiation of veno-venous ECMO in the event of maternal respiratory compromise. A remifentanil infusion was used to supplement anxiolysis and surgical tolerance while preserving spontaneous ventilation. Hemodynamics and oxygenation remained stable, and cesarean delivery was completed uneventfully. The patient subsequently proceeded to mediastinal mass biopsy in the same setting under continued neuraxial anesthesia and monitored sedation. Postoperatively, she recovered in the post-anesthesia care unit with close respiratory surveillance and delayed resumption of anticoagulation.

Discussion:
This case illustrates the central role of anesthesiologist-directed planning in a parturient with a mediastinal mass, including multidisciplinary coordination, neuraxial-focused techniques, low-dose spinal, maintenance of spontaneous ventilation, invasive monitoring, and real-time cardiothoracic rescue

capability.

References:

1. Anesthesiol Clin. 2012 Dec;30(4):749-58 2. JA Clin Rep. 2017;3(1):28

THURS - CR - BS 1 - BR 2B - Call for ECMO! - 04

Triple (Threat) Therapy: Acute Exacerbation of Pulmonary Hypertension During Cesarean Delivery - A Case Report

Presenting Author: Jessica White, MD

Presenting Author's Institution: University of Minnesota - Minneapolis, Minnesota

Introduction:
We present a 29 year old G2P0101 at 36w0d with past medical history of idiopathic pulmonary hypertension (PH) who presented for repeat cesarean delivery. Her intraoperative course was complicated by acute exacerbation of PH requiring the use of inhaled nitric oxide. We discuss the complex multidisciplinary peripartum management of this parturient with PH.

Case One:
A 29 year old G2P0101 at 36w0d presented for cesarean delivery secondary to idiopathic PH. The patient had mild shortness of breath prior to pregnancy and was followed by cardiology with serial echocardiograms during pregnancy to ensure optimization. Triple therapy included tadalafil, treprostinil, and digoxin. At 12w0d the patient underwent right heart catheterization demonstrating mild PH with PVR of 5 WU. Multidisciplinary care conferences were held throughout pregnancy and included representatives from OB, MFM, cardiology, ECMO, anesthesia and NICU. Admission echocardiogram demonstrated an EF of 55-60%, mild PH, and normal right ventricular size and function. Intrapartum management included placement of an arterial catheter, with subsequent placement of an epidural catheter and pulmonary artery (PA) catheter. The epidural was slowly dosed with in-line vasopressin infusion to support SVR. Prior to uterine incision, the patient reported worsening shortness of breath and syncopal symptoms associated with anxiety. PA pressures were briefly suprasystemic, prompting expeditious nitric oxide initiation via high flow nasal cannula. PA pressures rapidly downtrended and symptoms resolved. Nitric oxide was weaned prior to CVICU transfer for postpartum care, without noted increases in central venous pressure or PA pressure. Subsequent nitric oxide wean failed, requiring initiation of a fourth agent, nifidepine. Postpartum echo demonstrated mild RV dilation and moderately reduced RV function. The patient was ultimately discharged from the CVICU on postpartum day 4, and discharged to home on postpartum day 5.

Discussion:
Pregnancy is generally not recommended among women with PH due to the considerable maternal mortality rates quoted as high as 56%. Women who become pregnant with PH are encouraged to establish care at a tertiary care center with multidisciplinary collaboration. Avoiding teratogenic pharmacologic therapies and encouraging anticoagulation during pregnancy should be counselled. PH results in reduced compliance leading to the inability to adapt to increased pulmonary blood flow during pregnancy, and ultimately results in RV dysfunction. Serial echocardiograms are safe and encouraged during pregnancy to monitor RV function. Anesthetic considerations for safe delivery of our patient

included preferred epidural anesthesia and ideally avoiding hypoxia, hypercarbia and systemic hypotension. Invasive blood pressure monitoring, PA pressure monitoring, available vasopressors, inhaled nitric oxide, and ECMO on standby allowed for rapid correction of elevated PA pressures.

References:

1. Integr Blood Press Control 2022; 15:33-41

THURS - CR - BS 1 - BR 2B - Call for ECMO! - 05

Obesity and ECMO Challenges in Postpartum Code Blue

Presenting Author: Fiona Chambers

Presenting Author's Institution: UNC Hospitals - Anesthesiology - Chapel Hill, North Carolina

Co-Authors: Lindsey Gouker - UNC Hospitals - Anesthesiology
Michael Hart - UNC Hospitals - Anesthesiology

Introduction:
A 37-year-old G1P0 female at 19w3d gestation with a past medical history of chronic hypertension, fibroids, and obesity (BMI 44) was admitted for risk stratification and close monitoring of new-onset pre-viable super-imposed pre-eclampsia. She had transaminitis, hypertension, proteinuria, and early-onset fetal growth restriction. During admission, she required antihypertensives and ultimately opted to proceed with D&E for maternal health benefits. On HD4 the fetus was delivered uneventfully but her fibroid burden, the largest 14x14x14 located posteriorly, impeded the delivery of the placenta and initial plans were to continue medical management until spontaneous delivery of the placenta. However, she ultimately required delivery of the placenta via classical hysterotomy secondary to superimposed preeclampsia with severe features in the OR on HD5.

Case One:
On HD6, she developed seizures and hemodynamic instability progressing to cardiac arrest. Bedside ultrasound showed no hemoperitoneum, and she was taken emergently to the OR for extracorporeal membrane oxygenation (ECMO) cannulation and exploratory laparotomy. Peripheral VA ECMO cannulation was unsuccessful due to body habitus, active CPR, a gravid uterus, and concurrent abdominal exploration, necessitating sternotomy for central cannulation. Approximately 50 minutes of ACLS elapsed before ROSC. She was transferred to the ICU, required re-exploration for bleeding later that day, and on HD7 was transitioned to comfort care and subsequently died.

Discussion:
The prevalence of obesity continues to increase and the implications relative to pregnancy are often unrecognized or overlooked, and the lack of evidence-based treatment options further expands the gap in care1. Previously, a BMI >40 was considered a relative contraindication to ECMO2. Although studies evaluating mortality in obese patients on ECMO have shown mixed results, it is recognized that obesity increases complications. The increased adiposity can obscure underlying vessels and result in suboptimal cannula positioning for ECMO3. For this patient, peripheral ECMO cannulation was difficult due to body habitus, active CPR, a large uterus, and an ongoing ex-lap. Central cannulation was ultimately required, and this patient experienced a delay in receiving ECMO support due to the challenges with cannulation. While our patient had class 3 obesity, the challenges presented by her body habitus and ongoing resuscitation were unexpected, and therefore, resulted in a delay of critical ECMO support. This case highlights the additional challenges one may face in special populations with co-existing conditions

like obesity and pregnancy and mobilizing ECMO earlier should be considered to offset unanticipated cannulation challenges.

References:

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THURS - CR - BS 1 - BR 2B - Call for ECMO! - 06

Peripartum Decompensation in a Patient with History of Septal Myectomy for Hypertrophic Obstructive Cardiomyopathy

Presenting Author: Lauren Brown, MD

Presenting Author's Institution: University of Cincinnati Medical Center - Cincinnati, Ohio

Introduction:
Hypertrophic obstructive cardiomyopathy (HOCM) is defined by asymmetric septal hypertrophy, dynamic left ventricular outflow tract (LVOT) obstruction, and systolic anterior motion (SAM) of the mitral valve. Pregnancy adaptations, including increases in blood volume and heart rate, and reduced systemic vascular resistance, may exacerbate diastolic dysfunction and precipitate hemodynamic instability. Although septal myectomy effectively relieves LVOT obstruction and pregnancy is generally tolerated postoperatively, residual diastolic dysfunction may persist and increase peripartum risk.1

Case One:
A 39-year-old G5P3 F with HOCM s/p septal myectomy, LBBB, hypertension, gestational diabetes, and OSA presented at 5 weeks' gestation for care. She previously underwent three cesarean deliveries with neuraxial anesthesia without complication. Following her third pregnancy, she developed progressive dyspnea, palpitations, and chest discomfort. Echo showed asymmetric septal hypertrophy, moderate SAM, severe MR, severe LVOT gradient, and preserved systolic function (LVEF 65–70%). She underwent septal myectomy in July 2023 with resolution of SAM, improvement of MR to mild, elimination of significant LVOT obstruction, and preserved systolic function. Cardiac MRI in February 2025 confirmed LVEF 70% and mild MR. During the current pregnancy, she was followed by a multidisciplinary team. At 12 weeks' gestation, echocardiography demonstrated preserved systolic function, mild residual SAM, grade II diastolic dysfunction, moderate MR, and a moderate LVOT gradient . She experienced progressive dyspnea and edema during pregnancy, prompting admission at 23 weeks for evaluation; imaging remained stable. Serial ECHOs throughout the second and third trimesters showed preserved systolic function, stable LVOT gradients, and persistent diastolic dysfunction. A planned repeat cesarean at 37 weeks was performed under a CSE without intraoperative complications. She was discharged on POD3 but re-presented on POD7 with worsening dyspnea and edema. Evaluation revealed pulmonary edema with elevated BNP. Echo demonstrated preserved systolic function and minimal LVOT obstruction, comparable to pre-pregnancy measurements. Symptoms improved rapidly with diuretic therapy.

Discussion:
This case demonstrates that successful septal myectomy and preserved systolic function do not eliminate peripartum risk in patients with HOCM. Residual diastolic dysfunction and postpartum volume shifts can precipitate decompensation despite stable intraoperative and antepartum courses. Careful interpretation of peripartum symptoms, anesthetic management to avoid preload changes, and serial surveillance are

essential to optimize outcomes in this population.

References:

Eur Heart J. 2002;23(20):1553–1560

PPD Echo.pdf

THURS - CR - BS 1 - BR 2B - Call for ECMO! -0 7

From Postpartum Hemorrhage to Cardiac Arrest: Multidisciplinary Management With VA-ECMO

Presenting Author: Anne Bryden, MD

Presenting Author's Institution: University of North Carolina - Chapel Hill, North Carolina

Introduction:
A 40-year-old G1P1 woman undergoing induction of labor at 40 weeks developed catastrophic postpartum hemorrhage with refractory shock, PEA arrest, and venoarterial (VA) ECMO support. Management principles of postpartum hemorrhage were applied with prompt airway control, hemodynamic support, and resuscitation. However, ongoing evaluation prompted deployment and coordination of the multi-disciplinary resources of a SOAP center of excellence for rescue with VA ECMO.

Case One:
Following operative vaginal delivery for fetal heart rate decelerations, the patient developed uterine atony and massive hemorrhage (~1600 mL). Despite uterotonic therapy, hemorrhage persisted and she was emergently transferred to the operating room for exploratory laparotomy and hysterectomy. En route, she developed hypoxia, hypotension, and altered mental status requiring endotracheal intubation. Intraoperatively, the patient developed pulseless electrical activity (PEA) arrest requiring immediate CPR. Massive transfusion protocol was activated with an estimated blood loss of 6 liters and evidence of profound consumptive coagulopathy. Trauma surgery performed an emergent aortic cross-clamp, after which return of spontaneous circulation was achieved. Initial transesophageal echocardiography (TEE) demonstrated preserved cardiac function; however, the patient developed refractory hypoxemia despite maximal ventilatory support, with frothy pulmonary secretions and severe metabolic and respiratory acidosis (pH 6.98, PaO_2 39 mmHg, SpO2 65). Due to the patient's persistent hypoxemia, venovenous ECMO was initially planned; however, she developed recurrent PEA arrests, escalating vasopressor requirements, and newly reduced cardiac function on repeat TEE, necessitating VA-ECMO cannulation. Left ventricular ejection fraction was approximately 20% on postoperative day (POD) 1, with complete recovery by POD 4. ECMO was discontinued on POD 3. The patient demonstrated gradual hemodynamic and end-organ recovery, was extubated on POD 7, and discharged home on POD 30 without neurologic deficits.

Discussion:
Catastrophic postpartum hemorrhage remains a leading cause of maternal morbidity and mortality. In this case, rapid progression to hemorrhagic shock was complicated by coagulopathy, recurrent PEA arrests, and severe hypoxemia. The patient's hemodynamic instability, profound acidosis, refractory hypoxemia, and transient stress-induced cardiomyopathy required escalation from standard resuscitation to VA-ECMO. This case illustrates hemodynamic support during massive hemorrhage, continuous

reassessment of cardiac function, and early multidisciplinary team involvement. This case further reinforces the importance of early planning, situational awareness, and teamwork in managing life-threatening complications. Finally, the patient's full cardiac and neurologic recovery highlights the potential for excellent outcomes with coordinated, rapid intervention in extreme obstetric emergencies.

References:

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THURS - CR - BS 1 - BR 2B - Call for ECMO! - 08

Anesthetic Management of Repeat Cesarean Delivery in a Patient Supported by a HeartMate 3 Left Ventricular Assist Device

Presenting Author: Kevin G. Bennett, MD

Presenting Author's Institution: Memorial Healthcare System - Pembroke Pines, Florida

Co-Authors: Angelica Delgado, MD - Envision Physician Services
Sarah Dunn, MD - Envision Physician Services
Daniel Lazar, MD - Envision Physician Services

Introduction:
Pregnancy with Left Ventricular Assist Devices (LVADs) is rare, with only 12 described cases and only three involving the HeartMate 3 (HM3) (1). Anticoagulation and acquired von Willebrand syndrome (AvWS) in these patients may limit the use of neuraxial anesthesia, while hemodynamic shifts following delivery place the parturient at high risk for acute right ventricular (RV) failure. Current literature lacks granular, real-time hemodynamic data following delivery, leaving a gap in evidence-based protocols (2-4). Here we describe the peripartum navigation and repeat C-section of a parturient with a HM3 LVAD.

Case One:
A 37-year-old G3P1011 (BMI 45) with a HM3 LVAD presented for repeat C-section at 37 weeks. A multidisciplinary team (MFM, OB/Cardiac Anesthesia, Heart Failure, CT Surgery) managed the patient with serial evaluation and an anticoagulation bridging plan. Preoperatively, the patient demonstrated platelet dysfunction (ADP/PFA 121s, EPI/PFA 228s) consistent with AvWS (5). Following arterial and central line placement, general endotracheal anesthesia (GETA) was induced and a transesophageal echocardiography (TEE) probe was placed to allow continuous monitoring of RV function (6). The patient's BP dropped to 76/61 mmHg following delivery of a healthy female infant (Apgar 9 and 9). TEE demonstrated maintained RV function with minimal septal shifting, indicating that hypotension resulted from a mismatch between RV accommodation and transient SVR reduction rather than primary RV failure. Milrinone (0.25 mcg/kg/min) and epinephrine were initiated for hemodynamic support. Oxytocin was administered via standard dosing, and hemostasis was achieved with desmopressin and tranexamic acid (QBL = 900 mL). The patient was extubated in the OR and discharged POD 2.

Discussion:
This report describes the first example of a term delivery via repeat C-section in the presence of a HeartMate 3 (9,10). GETA with TEE enabled real-time characterization of the RV after delivery. Our findings suggest the primary challenge is the RV's ability to accommodate rapid preload shifts while maintaining SVR/PVR balance. In this case, oxytocin was sufficient to maintain uterine tone following delivery. Methylergonovine and carboprost were avoided to prevent acute RV afterload increases (7), and cell salvage was available but not required (8). Multidisciplinary navigation with obstetric anesthesia and cardiac anesthesia support were key to successful maternal and fetal outcomes.

References:

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THURS - CR - BS 1 - BR 2B - Call for ECMO! - 09

Veno-Arterial ECMO for Cardiac Arrest and Severe Hypoxia from Pulmonary Edema Associated with Massive Transfusion caused by Necrotizing Chorioamnionitis

Presenting Author: Anika Tanwani, MD

Presenting Author's Institution: University of Texas Southwestern Medical Center - Dallas, Texas

Co-Authors: Hannah Burcham, MD - University of Texas Southwestern Medical Center

Introduction:
Chorioamnionitis can precipitate uterine atony and lead to systemic infection, which is a risk factor for pulmonary edema (1). We present a case of severe necrotizing chorioamnionitis, refractory postpartum hemorrhage, cardiac arrest, and multisystem organ failure requiring extracorporeal life support, highlighting coordinated multidisciplinary resuscitation.

Case One:
A 21-year-old G3P1A1 with history of prior cesarean delivery presented at 38w in active labor with ruptured membrane days prior, unaware of her pregnancy. Obstetric exam revealed foul smelling meconium. Given concern for infection and late decelerations, she was taken urgently for repeat cesarean delivery under combined spinal epidural. Profound uterine atony persisted despite multiple interventions including oxytocin bolus, carboprost, methylergonovine, and rectal misoprostol. Due to rapid blood loss, emergent hysterectomy was started under general endotracheal anesthesia. Massive transfusion protocol was activated and tranexemic acid was given. Blood loss worsened due to rupturing tissues of the infected uterus, and the patient progressed to pulseless electrical activity despite rapid infusion of blood products. Chest compressions were immediately started and return of systemic circulation (ROSC) was achieved. However, blood loss became more pronounced as the chest compressions caused liver lacerations. 40 liters of blood products were given via the rapid infuser causing frank pulmonary edema, leading to inability to ventilate and resulting sustained hypoxia with a PaO2 of 29mmHg. There was concern about the candidacy for heparinization and ECMO due to liver lacerations, but given severe hypoxia, the patient was cannulated, heparinized, and femoral VA ECMO was started. All wounds were packed, and the patient was brought to interventional radiology to identify and embolize remaining bleeding sources. The patient later underwent several open procedures to control bleeding and ultimately close the abdomen. She was successfully weaned off ECMO and mechanical ventilation three and five days respectively after the initial event. She was discharged on POD 19 without neurologic deficits. Placental pathology demonstrated severe necrotizing chorioamnionitis with visible clusters of cocci.

Discussion:
This case illustrates fulminant hemorrhage secondary to chorioamnionitis and breakdown of infected uterus tissue. Multiple transfusions to correct hypovolemia are associated with transfusion-related acute lung injury and pulmonary edema. ECMO may be the only option to treat severe hypoxia, but

heparinization in the presence of ongoing coagulopathy and unrepaired liver lacerations was controversial. Ultimately, use of ECMO was the correct measure to prevent immediate death in this patient. This case underscores complex decision-making processes and highlights the use of in-OR ECMO in managing severe hemorrhage, cardiopulmonary failure, and ongoing coagulopathy and organ injury.

References:

Am J Obstet Gynecol 2024;230(3):S807–S840

THURS - CR - BS 1 - BR 2B - Call for ECMO! - 10

Multi-system Crises and Postpartum Hemorrhage Requiring ECMO and Subsequent Neurosurgical Intervention

Presenting Author: Storm Alexander, BA

Presenting Author's Institution: University of Virginia

Co-Authors: Jacob Jones, MD - INOVA Fairfax Hospital

Benjamin Ludden, GWU - Washington, District of Columbia

Introduction:
Postpartum hemorrhage (PPH) is a leading cause of maternal morbidity & mortality. While uterine atony is usual, unusual areas of bleeding and evolving perioperative complications necessitate vigilance, rapid diagnosis, & multidisciplinary management. We present a challenging case of massive hemorrhage following cesarean delivery recognized at point of care ultrasound in the PACU that led to transfusion related acute lung injury (TRALI) requiring ECMO support, further complicated by intracerebral bleeding.

Case One:
A 34-year-old underwent emergency cesarean delivery for non-reassuring fetal heart tracings. In the PACU she developed hypotension & lethargy. Evaluation revealed good uterine tone, but point-of-care ultrasound (POCUS) by anesthesia demonstrated fluid in the splenorenal recess. The patient underwent laparotomy for hemoperitoneum, requiring a hysterectomy & transfusion with 37 units of blood product. Despite hemostasis, the patient developed hypoxemia with frothy secretions, increasing airway pressures, and a growing Alveolar-arterial gradient, concerning for TRALI. The ECMO team was mobilized for initiation of veno-venous ECMO and the patient was transported to interventional radiology for embolization. In the CVICU the patient was found to be anisocoric and a head CT revealed hemorrhage likely secondary to a ruptured aneurysm, for which she required an emergent craniotomy. Ultimately, the patient was weaned from ECMO and after repeat neurosurgical procedures she gradually regained neurologic function and was discharged to inpatient rehabilitation.

Discussion:
Maternal resuscitation in the setting of hemorrhage & hypoxemia requires broad consideration, early use of POCUS, & coordinated multidisciplinary care [1]. Aggressive interventions carry significant risks, underscoring the need for continuous evaluation. Clearly, postpartum hemorrhage etiologies extend beyond purely intrauterine causes. Although blood may not be visible on vaginal examination or uterine ultrasound, bleeding may still be occurring intraabdominally so all clinical cues should be utilized. Also, its important that providers recognize that even life-saving therapies, including transfusion & ECMO carry substantial iatrogenic risks [2]. As seen in this case, ECMO is a lifesaving intervention for TRALI, but requires anticoagulation which can worsen the bleeding that is trying to be controlled & exacerbate bleeding in other areas of the body that may not yet be recognized [3]. This is why ongoing reassessment

is essential, as critically ill patients may require additional specialty interventions [4].

References:

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THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 01

Making rarity routine: anesthetic and systems approach to TRAP sequence laser ablation in a smaller center

Presenting Author: Jessica V. Bonilla, DO

Presenting Author's Institution: Memorial Healthcare System - Pembroke Pines, Florida

Co-Authors: Ryan Stalder, MD - Memorial Healthcare System

Introduction:
Twin reversed arterial perfusion (TRAP) sequence is a rare monochorionic complication in which an acardiac twin is perfused via placental anastomoses, placing the viable “pump” twin at risk of high-output failure and fetal demise. Interstitial laser ablation is a minimally invasive intervention to interrupt perfusion. For select fetal interventions, consensus guidance supports monitored anesthesia care (MAC) when paired with deliberate multidisciplinary planning and conversion-to-general-anesthesia readiness. We describe an anesthesia-focused planning framework intended to be educational for non–fellowship trained anesthesiologists and reproducible for smaller centers.

Case One:
A 31-year-old G2P1 at 19w5d underwent interstitial laser ablation for TRAP at our large public healthcare system with a growing fetal surgery program. Preparation—not improvisation—was the primary safety strategy. Preprocedure coordination included 1) two OR walk-throughs with fetal surgery, MFM/OB, anesthesia, nursing/OR staff; 2) a running educational email thread with background on TRAP and iterative planning updates; 3) an Epic chat for real-time coordination; 4) a formal anesthesia consult to review anesthetic options and perform an airway assessment; and 5) case review with senior adult, obstetric, and pediatric anesthesiologists, including interinstitutional input from a specialized anesthesia team experienced with fetal surgery. Equipment readiness was verified (laser platform, ultrasound with high-risk sonographer, procedural supplies). The anesthetic was MAC (remifentanil ± dexmedetomidine, minimal benzodiazepine) with supplemental oxygen, continuous capnography, and standard noninvasive monitoring. Airway equipment and induction medications were immediately available for conversion to general anesthesia. Procedure duration was ~3 hours without maternal or fetal instability. Postprocedural ultrasound showed persistent but minimal arterial flow to the acardiac twin. The patient delivered by cesarean section at 27 weeks after PPROM associated with vaginal infection; the acardiac mass was removed at delivery.

Discussion:
This case illustrates a transferable approach for rare, high-stakes fetal interventions in developing programs: 1) anesthetic selection as a shared decision, balancing procedural invasiveness, aspiration/airway risk, and need for maternal cooperation; 2) explicit, predetermined conversion triggers

(maternal intolerance, refractory emesis/aspiration concern, or procedural escalation/poor visualization requiring change in approach); and 3) a systems checklist emphasizing rehearsals, role clarity, equipment readiness, and escalation pathways (NICU, maternal ICU, emergent delivery capability). A structured workflow can make complex fetal procedures safely achievable outside larger referral centers.

References:

1. Chatterjee D, et al. Anesth Analg. 2021;132:1164-1174. 2. Vitucci A, et al. Int J Womens Health. 2020;12:435-443. 3. Vitucci A, et al. Int J Gynecol Obstet. 2022;159:833-840.

TRAP diagram.pdf

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 02

An Early EXIT

Presenting Author: Andrea Fritz, MD, MPH

Presenting Author's Institution: UNC Hospitals - Chapel Hill, North Carolina

Co-Authors: Briel Lee, MD - UNC Hospitals
Christine P. McKenzie, MD - University of North Carolina

Introduction:
Ex utero intrapartum treatment (EXIT) is a specialized mode of delivery in which fetoplacental circulation is maintained during partial fetal delivery, allowing time for critical interventions, such as establishment of an airway or initiation of ECMO, prior to complete delivery. EXIT procedures are indicated for fetal conditions that pose a high risk of cardiopulmonary compromise at birth, including head and neck masses, mandibular anomalies, high airway obstruction, pulmonary malformations, and mediastinal masses. Given case complexity, meticulous planning and interdisciplinary collaboration are critical.1

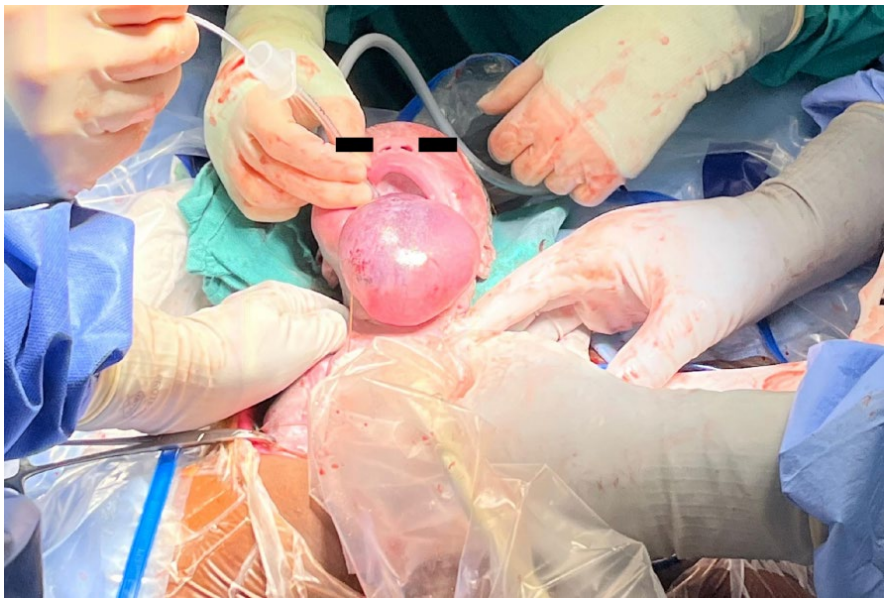
Case One:
The patient was a 19yo G1P0 with a history of asthma, depression, and obesity whose pregnancy was complicated by a fetal oropharyngeal mass with polyhydramnios found at her 22-week ultrasound. She was referred to our institution, where subsequent imaging demonstrated a 6-cm oropharyngeal mass causing oral cavity obstruction. She received counseling regarding the fetus's guarded prognosis and management options, including expectant management with palliative care post-delivery versus planned cesarean delivery with EXIT to airway or ECMO. The patient decided to proceed with a planned EXIT procedure. Extensive interdisciplinary preparation was necessary for this procedure, which was scheduled for 34w0d. However, at 33w6d, the patient presented with preterm premature rupture of membranes, prompting same-day EXIT delivery. Rapid coordination of a multidisciplinary team including MFM, pediatric surgery, otolaryngology, pulmonology, neonatology, perfusion, and obstetric and pediatric anesthesiology was required, in addition to securing two consecutive pediatric operating rooms. Given the team's prior preparation and effective communication that day, the EXIT proceeded expeditiously. The patient underwent neuraxial and general anesthesia for cesarean delivery with EXIT, which was uneventful for her. After failed attempts at nasal fiberoptic intubation, the fetus was orally intubated, delivered completely, and then transferred to the NICU.

Discussion:
Although EXIT procedures are ideally performed at a scheduled time, the fetal anomalies that necessitate EXIT, such as oropharyngeal masses, can cause complications like polyhydramnios and thus carry an increased risk of preterm delivery, as occurred in this case. Early and thorough multidisciplinary planning is essential including back-up planning in case of an urgent, unscheduled delivery.1 This case highlights the critical role of multidisciplinary preparation and effective communication in EXIT procedures. Because the team had engaged in thorough technical and contingency planning in advance, they were able to

adapt rapidly and safely execute an unscheduled early EXIT.

References:

1. Infusino S, Sajankila N, Nuttall E, Cass DL, Puricelli M, Lobeck IN. Decision-making and operative considerations for Ex-utero Intrapartum treatment (EXIT). Best Pract Res Clin Obstet Gynaecol. 2025;102:102649. doi:10.1016/j.bpobgyn.2025.102649



THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 03

Dynamic Maternal Anesthetic Strategies in a Complex Fetal Airway during an Ex-Utero Intrapartum Treatment

Presenting Author: Sanaz Bayani, MD

Presenting Author's Institution: Department of Anesthesia and Pain Management, Mount Sinai Hospital, University of Toronto, Toronto, Canada - North York, Ontario

Co-Authors: Ronald B B. George, MD FRCPC - Mount Sinai Hospital, University of Toronto

Introduction:
Different airway management strategies are available for selected fetal cases involving pathologies that result in anatomical airway compression. These include fetal endoscopic tracheal intubation (FETI) and the ex-utero intrapartum treatment (EXIT) procedure. The EXIT procedure is designed to permit partial fetal delivery via cesarean delivery while maintaining fetal oxygenation through continued uteroplacental circulation, allowing time to secure the fetal airway by intubation or tracheostomy. Although anesthetic management is complex, it plays a crucial role in procedural success. Adequate uterine relaxation, preservation of uteroplacental blood flow, maintenance of feto-maternal stability, and effective postoperative pain control are essential for optimal outcomes.

Case One:
A 33-year-old G3P0 woman with no comorbidities was scheduled for FETI/EXIT and cesarean delivery due to fetal micrognathia and glossoptosis causing anticipated airway obstruction. The initial anesthetic plan was combined spinal-epidural with sedation to permit FETI, with conversion to general anesthesia if required. Uterine relaxation was planned with nitroglycerin infusion. Preoperative bedside ultrasound, however, demonstrated unfavorable fetal positioning, precluding FETI and necessitating a planned EXIT procedure. The anesthetic plan was revised to general anesthesia following spinal intrathecal morphine for postoperative analgesia. Standard monitoring and an arterial line were established. A smooth modified rapid-sequence induction was performed, and maternal intubation was uncomplicated. Anesthesia was maintained with sevoflurane (1.5 MAC) to ensure uterine relaxation, supplemented with rocuronium and low-dose norepinephrine to maintain hemodynamic stability. Eight minutes after incision, the fetal head was partially delivered, and the otolaryngology team successfully secured the airway. After confirmation of endotracheal tube placement, the neonate was delivered and the umbilical cord clamped. Sevoflurane was replaced with a propofol infusion, and carbetocin (100 mcg) was administered, resulting in adequate uterine tone. Estimated blood loss was 750 mL. The 3,410 g male neonate (Apgar 5-7) was stable and transferred. Maternal hemodynamics remained stable; The patient was extubated uneventfully, transferred to recovery, and had well-controlled pain without additional opioid requirements for 24 hours.

Discussion:
Successful management of FETI and EXIT procedures requires meticulous multidisciplinary planning and real-time anesthetic adaptability. Ensuring uterine relaxation, placental perfusion, maternal-fetal

hemodynamic stability, and effective analgesia allows flexible application of multiple anesthetic strategies, each with distinct challenges. This case highlights the anesthesiologist's critical role in dynamic intraoperative decision-making in such procedures.

References:

1. Fetal Diagn Ther 2022;49:496–501 2. Acta Oto-Laryngol Case Reps 2023;8(1):72–76

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 04

Anesthetic Management of High-Risk EXIT for Fetal CHAOS in Preterm Labor With Suspected Concealed Abruption

Presenting Author: Austin Zheng, MD Candidate

Presenting Author's Institution: UCSF - San Francisco, California

Co-Authors: Jeremy Juang, MD, PHD - UCSF Anesthesia
Man Kuan Lei, MD - UCSF Anesthesia

Introduction:
Congenital high airway obstruction syndrome (CHAOS) carries high perinatal mortality without airway establishment at delivery. Ex-utero intrapartum treatment (EXIT) enables airway intervention under placental support but requires multidisciplinary planning and maternal stability. Limited guidance exists for EXIT during preterm labor. We describe anesthetic and perioperative management in this high-risk scenario.

Case One:
A 30-year-old G4P3003 at 33+3 weeks presented with fetal CHAOS and polyhydramnios.[1] Her course was complicated by preterm contractions and low fibrinogen concerning for concealed abruption. Because abruption can compromise placental support and necessitate emergent delivery, the feasibility of EXIT depends on timely delivery. After multidisciplinary discussion involving maternal-fetal medicine, obstetric and pediatric anesthesia, pediatric otolaryngology and surgery, neonatology, blood bank, nursing, and radiology, consensus favored expedited delivery. The team determined further expectant management was unlikely to improve fetal outcome and risked maternal deterioration that could eliminate the EXIT option. Anesthetic goals included maintaining uteroplacental perfusion during EXIT, enabling rapid uterine contractility after placenta delivery, and preparing for resuscitation during hemorrhage. We placed large-bore IVs, an arterial line, and prepared packed red blood cells, plasma, platelets, and cryoprecipitates. We administered general anesthesia with a volatile agent of 2 MAC for uterine relaxation, plus single-shot intrathecal morphine for post-operative pain control. Fetal heart rate was continuously assessed during the EXIT interval and placental support phase. After controlled hysterotomy using Harrison staplers, the fetal head, shoulder, and arm were delivered while maintaining placental circulation. Rigid laryngoscopy and bronchoscopy revealed severe infraglottic obstruction with minimal patent lumen. Fetal bradycardia developed, necessitating resuscitation with atropine and epinephrine IM, emergent tracheostomy was performed on placental support. Tracheostomy achieved immediate lung aeration and hemodynamic recovery. The cord was then clamped; volatile anesthetic was stopped and switched to total intravenous anesthesia, uterotonics administered, and uterine tone restored. Maternal hemodynamics remained stable with controlled blood loss.

Discussion:
Evolving maternal risk, specifically concern for abruption, directly influenced EXIT feasibility and timing in

this case. Successful EXIT procedure depends on multidisciplinary planning with patient preferences, preparation for hemorrhage, and anesthetic techniques allowing rapid transition from uterine relaxation to contraction. The case highlights how maternal safety considerations must drive decision-making even when fetal intervention is the primary goal.

References:

1. J Pediatr Surg. 2019;54:1153-1158.

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 05

Simulation-based Interprofessional team training to prepare for Ex Utero Intrapartum Treatment-to-Airway for fetal neck mass.

Presenting Author: Darragh O'Reilly, MBBS, MSc, FCAI

Presenting Author's Institution: BC Women's Hospital, University of British Columbia - Vancouver, British Columbia

Co-Authors: Juliana Kruthof, MD, MSc, FRCPC - BC Women's Hospital, University of British Columbia

Introduction:
Ex-utero intrapartum treatment (EXIT) procedures enable establishment of a secure neonatal airway in anticipated critical obstruction while maintaining fetoplacental circulation. These cases require coordinated action across a large interprofessional team of maternal and pediatric specialists who may not routinely work together, with multiple time-critical steps to optimize maternal and neonatal safety. Simulation-based team training applies human factors principles by reducing cognitive load and supporting shared mental models in low-frequency, high-stakes events.[1] Rehearsal in a simulated environment can improve personnel and equipment flow, clarify communication pathways, and identify problems and mistake-proofing steps before clinical execution.

Case One:
A 30-year-old G2P0 was referred at 32 weeks' gestation after prenatal imaging identified a large fetal neck mass (57×54×60 mm) with concern for peripartum airway obstruction. Following multidisciplinary consultation, an EXIT-to-airway procedure was planned. To optimize interprofessional performance for this high-acuity, low-frequency event, a full-length simulation was conducted in which subspecialty teams wore color-coded attire and rehearsed multiple maternal and neonatal contingencies. The simulation clarified equipment and personnel positioning, refined communication pathways, and identified critical communication "touchpoints". The exercise was livestreamed to a remote expert team for real-time evaluation, followed by a debrief to incorporate feedback and implement process changes. The EXIT-to-airway was performed at 36 weeks' gestation. An epidural and radial arterial line were placed prior to induction of general anesthesia which was maintained with sevoflurane. Uterine relaxation was achieved with a nitroglycerin infusion, and hemodynamic stability was maintained with phenylephrine infusion. The neonatal airway was secured using video laryngoscopy with oral endotracheal intubation; uterine incision-to-delivery time was 10 min. After delivery, uterine tone was restored with carbetocin. Quantitative blood loss was 1700 mL, with 186 mL returned via cell salvage. Maternal and neonatal courses were uncomplicated.

Discussion:
Simulation prior to complex interprofessional cases allows teams to attend to the human factors demands of rare events. A recent Cochrane review found that simulation based team training in obstetric emergencies improves team performance, and potentially reduces neonatal mortality.[2] In this case, simulation served to allow sharing of mental models leading to increased team situational awareness,

improved communication, and anticipation of errors. Continued education on human factors science and routinely scheduled interval team-based simulation may increase the probability of optimal performance in rare obstetric cases such as this.

References:

1.Psychology of Learning and Motivation.2011:37-76. 2.Cochrane Database Syst Rev. 2020;12(12):CD011545.

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 06

The EXIT Procedure and Considerations for the Obstetric Anesthesiologist

Presenting Author: Lilly Fang, MD

Presenting Author's Institution: UT Southwestern Medical Center - Dallas, Texas

Co-Authors: Hannah Burcham, MD - University of Texas Southwestern Medical Center

Introduction:
The ex-utero intrapartum therapy, or EXIT, procedure is one in which the fetal head and shoulders are delivered to manage airway anomalies while using placental perfusion to maintain oxygenation. We present a case in which an EXIT procedure was successfully performed to secure the fetal airway prior to delivery.

Case One:
A 34-year-old presented to our hospital at 36 weeks gestation. MRI showed severe craniofacial abnormalities associated with Nager syndrome that indicated a high likelihood for fetal airway compromise at delivery. After a multidisciplinary discussion that included maternal-fetal medicine, obstetric anesthesia, pediatric anesthesia, and ENT, the EXIT procedure was recommended to secure the fetal airway prior to delivery. For the procedure, the patient was induced for general anesthesia. To keep the uterus relaxed, we used high doses of sevoflurane and a nitroglycerin infusion, while using phenylephrine to maintain maternal blood pressure. Once the head and shoulders of the fetus was delivered, fetal anesthesia was achieved with intramuscular fentanyl and vecuronium, and a pulse oximeter was placed to monitor oxygenation during airway securement. The airway was secured after four attempts over twenty minutes with little to no blood loss despite profound uterine relaxation. The umbilical cord was clamped, and the fetus was delivered and further stabilized. After delivery, we started oxytocin and reduced the dose of sevoflurane to reverse uterine hypotonia. At the end of the surgery the patient was extubated without complication and had an uneventful postoperative course. She was discharged from the hospital on post-operative day 2. Her newborn was transferred to the children's hospital in stable condition for further treatment.

Discussion:
In this EXIT procedure, the team was able to secure a difficult airway without compromising fetal oxygenation and the uterus remained highly relaxed with a total quantitative blood loss of less than 300ml. The EXIT offers life-saving interventions but carries high risk of complications and requires diligent and extensive multidisciplinary planning across many disciplines. For the anesthesiologist, the primary goal is to achieve profound uterine relaxation so that uteroplacental circulation is maintained, while also ensuring maternal hemodynamic stability (1). With regards to anesthetic technique, general endotracheal anesthesia is most utilized, as it allows for quickly reversible and titratable uterine relaxation with sevoflurane. Use of neuraxial anesthesia has been reported but is less favorable hemodynamically and can be stressful for an awake parturient (2).

References:

1. Marwan, A. and T. M. Crombleholme (2006). "The EXIT procedure: principles, pitfalls, and progress." Seminars in Pediatric Surgery 15(2): 107–115. 2. Kumar, K., C. Miron and S. I. Singh (2019). "Maternal anesthesia for EXIT procedure: A systematic review of literature." J Anaesthesiol Clin Pharmacol 35(1): 19–24.

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 07

Ex-Utero Intrapartum Treatment (EXIT) for Parturient with Maternal Hyperthyroidism and Goiter Complicated by Fetal Goiter and Potential Fetal Airway Obstruction

Presenting Author: Sayo E. McCowin, MD, PhD

Presenting Author's Institution: University of Virginia - Charlottesville, Virginia

Co-Authors: Sunny Chiao, MD - University of Virginia Health System
Kelley A. Smith, MD - University of Virginia

Introduction:
EXIT is a specialized intervention where securing the fetal airway is performed prior to complete delivery of the fetus. Historically, these procedures have been performed for fetuses with congenital airway obstructions or cardiopulmonary malformations that would otherwise result in fetal demise post-delivery (1). EXIT procedures allow for neonatal cardiopulmonary stability through partial delivery of the fetus while maintaining placental circulation. Anesthetic management is challenging requiring profound uterine relaxation, maintenance of uteroplacental blood flow, and fetal anesthesia. Here we present a successful case of an EXIT procedure with general anesthesia (GA) in a patient and fetus with both maternal and fetal goiters.

Case One:
A 27-year-old G2P10001 female at 36 weeks' gestation with a past medical history significant for toxic multinodular goiter was admitted for a scheduled cesarean delivery and EXIT procedure. Her pregnancy was complicated by worsening hyperthyroidism requiring uptitration of propylthiouracil and increased dyspnea. Her goiter had multiple 3-4 cm nodules. Prenatal ultrasound at 32 weeks' gestation revealed initial evidence of a fetal goiter, subsequently confirmed via MRI showing the thyroid gland encasing the fetal upper airway and cervical trachea. Prior to delivery, the parturient underwent weekly intraamniotic injections of 400 mcg levothyroxine for four weeks resulting in a slight decrease in size of fetal goiter by delivery. The planned EXIT procedure involved establishing the neonatal airway immediately postpartum with a contingency plan for ECMO cannulation. To better evaluate maternal goiter, ENT performed a flexible laryngoscopy preoperatively which was reassuring for no airway compression. The parturient underwent rapid sequence induction and was intubated uneventfully using video laryngoscopy. GA was maintained with 3% sevoflurane to promote uterine relaxation while providing adequate maternal and fetal anesthesia with phenylephrine to avoid maternal hypotension. Following partial delivery, the neonate was intubated successfully by the pediatric ENT using a Parson’s laryngoscope while maintaining maternal-fetal circulation. Apgar’s were 8 and 9 at 1 and 5 minutes, respectively. Sevoflurane was then reduced to 1%, 50% nitrous oxide, and an intravenous infusion of oxytocin was started to enhance uterine tonicity. Parturient was successfully extubated at the end of the surgery with a quantitative blood loss of 1121 mL. The neonate went to the NICU but was extubated on postpartum day 0 (hour of life 10).

Discussion:
This case demonstrates successful use of GA for EXIT procedure in a pregnancy complicated by both maternal and fetal goiters. Balancing parturient hemodynamics, uterine tone, and placental perfusion in order to perform the fetal intubation on placental bypass necessitates a calculated approach and collaboration of multi-disciplinary teams with diverse expertise.

References:
1. Int J Gynaecol Obstet. 2025 May;169(2):474-484.

SOAP_Ex-Utero Intrapartum Treatment (EXIT) for Parturient with Maternal Hyperthyroidism and Goiter Complicated by Fetal Goiter and Potential Fetal Airway Obstruction_Image 1.pdf

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 08

Balancing the Lifeline: Anesthetic Management of Uterine Relaxation During an EXIT Procedure for Treacher Collins Syndrome

Presenting Author: Noorul Asyikeen Kasim, MD

Presenting Author's Institution: Hospital Tengku Ampuan Rahimah, Klang, Selangor, Malaysia - Toronto, Ontario, Ontario

Introduction:
The Ex Utero Intrapartum Treatment (EXIT) procedure is a high-stakes multidisciplinary intervention requiring a specialized anesthetic approach to secure a fetal airway while maintaining the "placental lifeline." A primary goal is achieving profound uterine relaxation to prevent placental abruption and maintain uterine volume. We present a case of an EXIT procedure for a fetus with Treacher Collins Syndrome, focusing on the dynamic titration of volatile anesthetics and a synchronized dual-operator airway technique.

Case One:
A 40-year-old G4P3 at 38 weeks gestation presented for an elective EXIT procedure. Antenatal imaging revealed a fetus with severe bilateral ventriculomegaly and craniofacial abnormalities, including micrognathia and low-set ears, indicative of Treacher Collins Syndrome. Maternal history included advanced maternal age, gestational diabetes mellitus on diet control, and bronchial asthma. A multidisciplinary team including obstetric anesthetists, pediatric anesthetists, ENT, and neonatology was assembled. Following an awake arterial line placement, a modified rapid sequence induction was performed using propofol and suxamethonium. Maintenance anesthesia utilized a target-controlled infusion of remifentanil at 1–7 ng/ml.

Discussion:
Successful EXIT procedures rely on the precise, dynamic manipulation of uterine tone. In this case, sevoflurane was titrated from 1.0 MAC up to 1.5–2.0 MAC following uterine incision to achieve the profound relaxation required for fetal intervention. To counteract the resulting vasodilation, a phenylephrine infusion was titrated to maintain a mean arterial pressure >70 mmHg, ensuring stable uteroplacental flow. Warm sterile normal saline was being stand by to be infused into the uterus via a rapid infuser to maintain volume and prevent premature placental separation in the event of prolonged intubation time. The fetal airway was successfully secured via synchronized dual-operator laryngoscopy to navigate the severe micrognathia. The total EXIT time from incision to cord clamping was 20 minutes. Upon cord clamping, sevoflurane was reduced to 0.8 MAC, and uterine contraction was rapidly achieved with IV carbetocin (100 μg) and 1g of tranexamic acid. Total estimated blood loss was approximately 800 mL. Proactive anesthetic management allowed for a controlled, successful outcome despite high-risk fetal anatomy.

References:

1. Schwartz DA, et al. Anesthetic management of the ex utero intrapartum treatment (EXIT) procedure. J Clin Anesth. 2001;13(5):387-91. 2. Marwan A, Crombleholme TM. The EXIT procedure: principles, pitfalls, and progress. Semin Pediatr Surg. 2006;15(2):107-15.

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 09

Integrated Ex-Utero Intrapartum Treatment and Postnatal Resection of Giant Cervical Teratoma: Anesthetic Management Across the Perinatal Continuum

Presenting Author: Marina S. Noia, MD

Presenting Author's Institution: Santa Joana Hospital & Maternity - Sao Paulo, Sao Paulo

Co-Authors: Fernanda Marques Ferraz Savoia - University of Iowa Hospitals and Clinics

Introduction:
Giant cervical teratomas cause life-threatening airway obstruction. EXIT procedures enable airway establishment via uteroplacental support but risk uterine atony, maternal instability, and massive hemorrhage. Subsequent neonatal tumor resection remains high-risk due to airway distortion and hemodynamic instability.

Case One:
A 32-week pregnant woman was referred due to a fetus diagnosed with a giant cervical teratoma. Fetal MRI at 28 weeks revealed a solid-cystic mass (9.23×3.0×6.0 cm) occupying the anterior cervical space. The pregnancy was complicated by severe polyhydramnios requiring amniodrainage. An elective cesarean delivery under EXIT protocol was planned by a multidisciplinary team. Combined spinal–general anesthesia was performed using intrathecal hyperbaric bupivacaine, fentanyl and morphine, followed by rapid-sequence induction of general anesthesia. Deep uterine relaxation was achieved at high-dose sevoflurane, while maternal blood pressure and uteroplacental perfusion were preserved with a titrated norepinephrine infusion. Magnesium sulfate was administered for fetal neuroprotection and continuous ultrasound monitoring ensured fetal well-being. Fetal anesthesia was achieved with rocuronium and atropine. Due to airway distortion, tracheal intubation via rigid optical laryngoscopy succeeded in 7 minutes. Maternal blood loss (2100 mL) triggered a massive hemorrhage protocol. Hemodynamic stabilization followed, with an uneventful recovery.

Case Two:
Post-EXIT, the preterm neonate was NICU-admitted on mechanical ventilation. Neck CT angiography revealed a large cervical tumor with vascular involvement and marked axis deviation. The neonate developed respiratory distress, anemia, and hyperbilirubinemia. Due to tumor progression and risk of airway/vascular compromise, surgical resection was performed on day 5. The procedure included extensive resection, thyroidectomy, tracheostomy, reconstruction, and central access. Three pediatric anesthesiologists provided anesthesia using advanced monitoring (NIRS). Induction and maintenance included fentanyl, ketamine, rocuronium, and sevoflurane. Ventilation was challenging due to airway obstruction and tumor manipulation. Blood loss was 130g (73% of blood volume), requiring transfusion. After a 7-hour course, the neonate returned to the NICU stable on tracheostomy ventilation, with progressive respiratory improvement.

Discussion:
This case emphasizes three key learning objectives: (1) to describe strategies to preserve uteroplacental circulation during EXIT procedure; (2) to discuss anesthetic challenges in neonatal cervical tumor resection, including airway management and massive blood loss; (3) to highlight the anesthesiologist's central role in coordinating complex perinatal care across fetal, maternal, and neonatal phases.

References:
1.Mohammad S, Olutoye OA. PaediatrAnaesth. 2020; 2.García-Díaz L et al. BMC Pregnancy Childbirth. 2020; 3.Kloka JA et al. Front Med (Lausanne). 2024.

THURS - CR - BS 1 - BR 2B - A TRAP and Many EXITS - FETAL HOUR - 10

Application of finger guided blindy vision orotracheal intubation in resuscitation of neonatal asphyxia

Presenting Author: Mingjun Xu, PhD

Presenting Author's Institution: Capital Medical University - Beijing, Beijing

Co-Authors: Mingjun Xu, PhD - Capital Medical University

Abstract :

Objective:
To summarize the application of finger guided blindy vision orotracheal intubation in resuscitation of neonatal asphyxia.

Methods: The procedure of finger guided blindy vision orotracheal intubation （FGBI） is shown as figure 1. In the first part, the medical documents of FGBI in resuscitation of 1063 asphyxiated newborns during January 1st, 2000 to June 30th, 2019 in Beijing Obstertrics and Gynecology Hospital affiliated to Capital Medical University were analyzed retrospectively. The success rate of intubation,incidence of secondary intubation and the adverse symptom related intubation were noted.In the second part, Laryngoscopy guided direct vision orotracheal intubation(LGVI) and finger guided blindy vision orotracheal intubation(FGBI) on manikins completed respectively by same 10 operators duiring September 1st,2024 to December 31th,2024,The insertion time of intubation of each group were recorded and compared between the two group.

Results
1. All 1063 cases of asphyxia neonates were successfully intubated by FBVI,the success rate of FBVI intubation was 100% in retrospective analysis. 5 cases of reintubation were recorded in all asphyxia resuscitation,the reintubation incidence rate was 0.47%. No adverse symptom as pharynx and larynx edema and/or hemorrhage after resuscitation were recorded in all asphyxiated newborns medical documents. 2. The average insertion time were prospective observed,It was 5.22 + 0.71s by FGBI, significantly lower than that by LGVI 18.71 + 1.97s, with statistically significant difference ($F = 4.642$, $t = 20.341$, $P = 0.000$) (Table 1). All 20 intubations were completed at once time,no reintubation occurred.

Conclusion:
Base above information, It can be concluded that finger guided blindy vision orotracheal intubation (FGBI) was an effective, time-saving and safe technique which have been successfully applicated in neonatal asphyxia resuscitation. Besides the routine laryngoscopy guided direct vision orotracheal intubation(LGVI), finger guided blindy vision orotracheal intubation(FGBI) as one of the backup intubation techniques for neonatal asphyxia resuscitation especially in emergency situation or in medical material shortage places can be considered.

References:

Figure1_Table1.pdf

Pregnancy Risk Assessment and Anesthetic Management for Oocyte Retrieval in a Patient with Severe Airway Pathology

Presenting Author: Elana Kreiger-Benson, MD

Presenting Author's Institution: Brigham & Women's Hospital - Boston, Massachusetts

Co-Authors: Kate J. Frost, MD - Brigham and Women's Hospital
Kyle Jespersen, MD - Brigham & Women's Hospital

Introduction:
Risk stratification and management of obstetric patients with significant airway pathology remains challenging, particularly when comorbidities exist. We present a case of a patient with severe tracheal stenosis and bronchiectasis, referred to our center for infertility from out of state. This case illustrates the challenges of preconception counseling and anesthetic planning in patients with airway comorbidities.

Case One:
A 31-year-old with past medical history of tracheoesophageal fistula (TEF) and infertility was referred to our center. Her TEF repair in infancy was complicated by tracheostomy decannulated in adulthood, extensive tracheal stenosis, tracheomalacia, severe bronchiectasis, and recurrent pneumonia. She was deemed too high risk for ovulation induction or in vitro fertilization in her home state. At baseline, she used nocturnal oxygen and reported good functional status, but was unable to lie flat or speak in full sentences. She had frequent pneumonia requiring daytime oxygen. She underwent tracheal dilations with steroid injections every few months. Imaging showed a tracheal diameter of 6mm, right main bronchus diameter of 4mm, and diffuse bronchiectasis. FEV1 was 22%, FEV1/FVC 33%. At our center, consultation with Maternal-Fetal Medicine, Obstetric and Thoracic Anesthesiology, Pulmonology, and Thoracic Surgery was obtained. She was ultimately counseled against pregnancy for extremely low respiratory reserve and high risk of life-threatening maternal and fetal decompensation. Oocyte retrieval to pursue surrogacy was deemed acceptable risk if done in the main operating room for advanced airway equipment and Thoracic availability. For oocyte retrieval, ASA monitors and 6L/min O2 by simple face mask were placed. After L3-4 spinal with hyperbaric bupivacaine 1mL 0.75% and fentanyl 15mcg, she was kept upright for 4 min, then placed in lithotomy with the head of the bed at 45 degrees. She received no IV analgesic or sedating medications and remained awake. She was hemodynamically stable with oxygen saturation >95%. High-flow nasal cannula and jet ventilation were available. She was transferred to PACU and discharged home in stable condition.

Discussion:
This case demonstrates high-risk airway and pulmonary pathology ultimately deemed a contraindication to pregnancy. While data are limited, tracheal stenosis >50% confers increased maternal-fetal risk, and the pathology often worsens during pregnancy.(1) Cystic Fibrosis data suggest that pregnant

bronchiectasis patients may do well with multidisciplinary management, but FEV1< 50% elevates risk.(2,3) Concurrent high-risk pathologies were felt to pose undue risk of maternal-fetal harm. In this case, neuraxial anesthesia for oocyte retrieval was optimal and multidisciplinary collaboration was key to her overall evaluation and management. Further work to risk-stratify this population is warranted.

References:

1. Int J Gynaecol Obstet 2025;Epub ahead of print 2. BJOG 2025;Epub ahead of print 3. J Cyst Fibros 2020;19:1

Airway Management Planning for Delivery in a Parturient with Congenital Mandibular Hypoplasia: A Case Report

Presenting Author: Maria Santa Cruz, DO

Presenting Author's Institution: Albany Medical Center - Albany, New York

Co-Authors: Aaron Paul, BS - Albany Medical Center

Introduction:
This case report highlights anesthetic challenges in obstetric patients with severe mandibular hypoplasia and the importance of multidisciplinary collaboration among obstetrics, anesthesia, and otolaryngology.

Case One:
A 25-year-old G1P0 woman with limited prenatal care was referred at 31 weeks for anesthesia evaluation due to congenital mandibular hypoplasia and concern for a difficult airway. ENT was consulted. The exam showed marked retrognathia and an inability to open the mouth, making oral intubation difficult. Flexible fiberoptic nasal endoscopy showed the left nasal passage could accommodate a small endotracheal tube (6.0 or smaller). The epiglottis was visible and the vocal folds were mobile. After multidisciplinary planning with obstetrics, anesthesia, and ENT, early epidural analgesia was recommended for vaginal delivery to reduce the risk of emergent general anesthesia. Spinal anesthesia was planned for cesarean delivery. The patient was flagged as a difficult airway, and contingency planning ensured rapid access to emergency airway equipment and ENT and trauma teams for a possible surgical airway. At 37 weeks 6 days, she presented in active labor at 8 cm dilation and progressed quickly. An epidural was placed at L3–4. During pushing, a category II tracing with late decelerations became prolonged, prompting vacuum-assisted vaginal delivery. Delivery was successful without cesarean, and no airway intervention or general anesthesia was required.

Discussion:
This case highlights the importance of early identification and multidisciplinary planning for obstetric patients with anticipated difficult airways. Failed intubation occurs in approximately 1 in 250–300 obstetric patients, significantly more often than in the general surgical population, and maternal mortality from failed intubation is nearly four times higher [1,2]. In congenital mandibular hypoplasia, mandibular underdevelopment and retrognathia may obstruct the airway, with pregnancy-related edema further increasing airway difficulty [3]. ASA guidelines recommend early neuraxial catheter placement in patients with anticipated difficult airways [4]. Accordingly, early epidural analgesia was planned to reduce the risk of emergent general anesthesia if operative delivery became necessary. Multidisciplinary coordination and contingency planning ensured rapid access to emergency airway equipment and specialized personnel. If general anesthesia had been required, awake fiberoptic intubation would have been the

preferred approach [4–6]. This case demonstrates how proactive planning, team-based care, and comprehensive prenatal assessment can minimize general anesthesia and reduce airway-related complications, resulting in excellent maternal and fetal outcomes

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Prepared Before the Push: Peripartum Management in a Parturient with Gorlin and Sotos Syndromes and a Known Difficult Airway

Presenting Author: Sophia Jacob, MD

Presenting Author's Institution: Stony Brook University Hospital - Hicksville, New York

Co-Authors: Haleila Harrison, BS - Stony Brook School of Medicine
Katrina Kerolus, MD - Stony Brook University Hospital

Introduction:
Parturients with known difficult airways require meticulous peripartum planning, particularly when rare genetic disorders complicate both airway and neuraxial management. Gorlin Syndrome may involve facial dysmorphism, macrocephaly, meningiomas, and vertebral anomalies, i.e. spinal bifida, and fused vertebra. While Sotos Syndrome is associated with intellectual disability, preeclampsia, macroglossia, and mandibular hypoplasia. Together, these syndromes present unique challenges for obstetric anesthesia, especially if an emergent cesarean delivery becomes necessary. When feasible, early neuraxial labor analgesia is recommended to reduce the likelihood of requiring general anesthesia in a high-risk airway.

Case One:
A 40-year-old G6P3 at 36+5 weeks with Gorlin and Sotos Syndromes presented for induction of labor for pre-eclampsia with severe features. Her history included meningioma resection and hydrocephalus requiring ventricular drainage. During a prior neurosurgical procedure she had an unanticipated difficult airway, direct laryngoscopy failed, and intubation was achieved with indirect laryngoscopy (Grade 2b) using a bougie, leading to documentation of a difficult airway. During this pregnancy, she had stable intracranial pressure and neurosurgical clearance for vaginal delivery. A lumbar MRI ruled out tethered cord and confirmed no contraindication to neuraxial anesthesia. ENT performed flexible laryngoscopy and noted a hypertrophied tongue, reinforcing the anticipated airway challenge. After an anesthesia consultation reviewing cesarean delivery contingencies, the patient chose early epidural placement. As a precaution for possible general endotracheal anesthesia, a fiberoptic bronchoscope was readily available and ENT surgery was on standby. A dural-puncture epidural was placed without complication, and the patient underwent successful vaginal delivery.

Discussion:
This case underscores the need for meticulous planning in parturients with difficult airways and complex comorbidities. This patient faced both airway and potential neuraxial challenges, making early multidisciplinary preparation essential. Without a functioning neuraxial technique, an emergent cesarean delivery may have required awake fiberoptic intubation. Early epidural placement was prioritized to reduce the likelihood of general anesthesia, where delayed intubation would pose significant maternal

and fetal risks.

References:

1. Dasari, K. and Clayton, R. (2015), An obstetric patient with Gorlin syndrome, Meigs' syndrome and peripartum cardiomyopathy. Anaesthesia Cases, 3: 50-52. 2. Ocansey, S., Cole, T. R. P., Rahman, N., & Tatton-Brown, K. (2004). Sotos Syndrome. In M. P. Adam (Eds.) et. al., GeneReviews®. University of Washington, Seattle.

Navigating a High-Risk Airway in an Obstetric Patient: A Case of Venolymphatic Malformation

Presenting Author: Desby Cheribin

Presenting Author's Institution: UNC - Chapel Hill, North Carolina

Co-Authors: Briel Lee, MD - UNC Hospitals

Introduction:
A 22-year-old G1P1001 at 38 weeks 6 days gestation was admitted for induction of labor due to a known PIK3CA-positive venolymphatic malformation involving the subglottic airway, right neck, and mediastinum, raising concern for a difficult airway. History was notable for prior supraglottic resection with tracheostomy and subsequent decannulation over 10 years ago, as well as endoscopic airway debulking and sclerotherapy. She was treated with alpelisib to limit lymphatic malformation progression, but it was discontinued in the first trimester of pregnancy due to concerns over teratogenicity. Interval MRI demonstrated a stable 6.6-cm right paratracheal mediastinal mass with extension into the right neck and supraclavicular region. Flexible laryngoscopy performed by ENT revealed persistent venolymphatic malformation involving the right hypopharynx with extension across the midline. Awake fiberoptic intubation was recommended due to ongoing airway vulnerability during labor and delivery.

Case One:
A multidisciplinary team comprising obstetric anesthesiology, ENT, MFM, and hematology/oncology developed a peripartum plan. Specific anesthesia priorities included an early neuraxial analgesia to facilitate vaginal delivery and prompt conversion to surgical anesthesia for potential operative delivery while mitigating the risks of airway management and emergent general anesthesia. Given her complex airway anatomy, general anesthesia, if required, would be considered in a non-emergency scenario with awake fiberoptic intubation using a small-caliber endotracheal tube. Supraglottic airway placement was also considered as a temporizing measure in the event of an emergency, recognizing the elevated aspiration risk in a gravid patient. Labor analgesia was successfully managed with a lumbar epidural. After roughly five hours, the labor epidural became unreliable requiring prompt replacement with a dural puncture epidural which proved adequate. Labor progressed without complication, and she had a spontaneous vaginal delivery, avoiding the need for operative delivery or airway instrumentation, and was discharged home on postpartum day 2.

Discussion:
Although this patient's labor course was uncomplicated, this case highlights meticulous anesthetic planning for a parturient with vascular malformations involving the airway. Anesthetic management of pregnant patients with significant airway malformations presents unique challenges. Pharyngeal vascular malformations are rare in pregnancy and require heightened awareness, as lesions may enlarge due to

airway edema and increased vascularity. In this case, MRI demonstrated stable lesion size; however, the discontinuation of alpelisib therapy raised concern for further growth. This posed potential risks to both maternal and fetal safety if an emergent general anesthetic became necessary. Despite the complexity of her pathology, extensive multidisciplinary planning led to a favorable outcome.

References:

JA Clinical Reports, vol. 9, article 88, 14 Dec. 2023.

THURS - CR - BS 1 - BR 3A - Triple A Airway, Angioedema, Anaphylaxis – 05

Serial Assessment of the Airway in a Single Parturient: Transnasal Endoscopic Laryngoscopy, Mallampati Evolution, and Multidisciplinary Collaboration

Presenting Author: Daniel Conti, MD

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Co-Authors: Hannah Bechtold, MD - UC Davis Department of Anesthesiology and Pain Medicine
Maggie Kuhn, MD MAS - UC Davis Health

Abstract :

Background:
With renewed attentiveness to intra-operative pain during cesarean delivery[1] and a new meta-analysis finding no increased risk of NICU admission after general anesthesia (GA),[2] an uptick in peripartum GA and endotracheal intubation is expected. Obstetric airway management is uniquely challenging, yet current literature is largely limited to external markers during the immediate peripartum. There is precedent for the use of transnasal endoscopy among pregnant patients with subglottic stenosis.[3] Nasal endoscopy has also been used to assess nasal patency in a small prospective study of parturients but did not include the larynx.[4] This investigation sought to track airway changes throughout pregnancy via serial airway assessment, both at the level of the glottis and above, with the hypothesis that there would be observable changes in inflammation and predictors for difficult intubation.

Methods:
We performed 11 serial airway evaluations on a healthy 38-year-old multipara during the 2nd and 3rd trimesters, latent labor, 2 hours and 5.5 weeks postpartum. Evaluations included oropharyngeal photography (Mallampati (MP) assessment) and transnasal flexible videolaryngoscopy using a disposable endoscope (3.8mm scope with 2% lidocaine topicalization for the first five exams; 2.8mm without topicalization for the final six exams). A multidisciplinary team (Emergency Medicine, Otolaryngologist, Intensivist Anesthesiologist and an Obstetric Anesthesiologist) assigned MP scores blinded to gestational age. An Otolaryngologist assigned Reflux Finding Scores (RFS) via blinded video review.

Results:
MP scores increased during late pregnancy and peaked 2 hours post-partum. MP score remained higher than the 2nd trimester baseline at 5.5 weeks post-partum. The 2.8mm Verathon endoscope was reported to be more comfortable by our patient despite omitting topicalization. RFS remained low during pregnancy but increased post-partum with the highest-recorded score of 7 assigned to 5.5 weeks post-partum video.

Conclusions:
This study represents the first reported longitudinal use of transnasal endoscopy for serial laryngeal

evaluation throughout pregnancy and postpartum. While generalizability is limited by the single-subject design, we demonstrated that serial endoscopic laryngeal evaluation is feasible and well-tolerated. Our findings suggest that oropharyngeal changes (MP score) may contribute more to airway complexity than laryngeal changes (RFS) during pregnancy. Furthermore, pregnancy-induced airway changes may persist well into the "fourth trimester," necessitating thoughtful airway approaches during the postpartum period. Finally, this study demonstrates the value of a successful collaborative approach among multidisciplinary airway specialists in advancing maternal health.

References:
DOI:

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[2] 10.1097/ALN.0000000000005785

[3] 10.21037/joma-25-4

[4] 10.5606/kbbihtisas.2016.34545

Serial Assessment of the Airway in a Single Parturient Transnasal Endoscopic Laryngoscopy, Mallampati Evolution, and Multidisciplinary Collaboration.pdf

Successful Use of Continuous Chloroprocaine Epidural Analgesia for Labor in a Patient With Confirmed Lidocaine Allergy

Presenting Author: Maegan Tupinio, MD

Presenting Author's Institution: University of Utah Health - Salt Lake City, Utah

Co-Authors: Zuzana Stehlikova, MD - University of Utah Health

Introduction:
Neuraxial anesthesia is the gold standard for labor analgesia, yet its use is challenging in patients with amide local anesthetic allergy. Chloroprocaine, an ester local anesthetic, may serve as an alternative, though its use as a continuous labor epidural infusion is uncommon and requires careful consideration of dosing, volume, and motor blockade.

Case One:
We present a 29-year-old G2P2012 at 39 weeks' gestation who presented for induction of labor. She was Russian-speaking with all prior deliveries occurring in Ukraine. Her anesthetic history was notable for a reported lidocaine allergy confirmed by skin testing abroad, resulting in severe rash, pruritus, and swelling. She had received epidural analgesia for prior deliveries but was unsure of the medications used. Additional complexity included a history of scoliosis and prior difficult epidural placement. Given the reported allergy and uncertain cross-reactivity with other amide local anesthetics, all amides, including bupivacaine, were avoided. An ester-based technique using chloroprocaine was selected. An L3–4 dural puncture epidural was placed with ultrasound guidance. Skin infiltration was performed with 3 mL of 1% chloroprocaine while closely monitoring for allergic reaction. After an appropriate observation period, the epidural was placed, and a test dose of 3 mL of 1% chloroprocaine with 50 mcg epinephrine was administered. A 1.5% chloroprocaine infusion was prepared by mixing 100 mL of 3% chloroprocaine with 100 mL of normal saline under sterile conditions. We ran her epidural infusion at 10ml/hr with a 10ml patient-controlled bolus every 15-minutes. She was frequently reassessed throughout the day. At one hour, she demonstrated a dense sensory block with a Bromage score of 2/4 in the right lower extremity and 3/4 in the left. To reduce motor blockade while maintaining volume-dependent analgesia, a new infusion of 1% chloroprocaine was prepared rather than decreasing the infusion rate. Two hours later, the patient reported excellent analgesia with pressure only during contractions and minimal bolus use. She delivered vaginally eight hours after epidural placement without complication. Postpartum evaluation revealed no evidence of allergic reaction.

Discussion:
This case highlights the successful use of chloroprocaine-based labor epidural analgesia in a patient with a reported amide local anesthetic allergy. In addition to anesthetic considerations, language barriers complicated assessment of anesthetic history, evaluation of epidural efficacy and potential side effects.

Chloroprocaine may be a viable alternative in select obstetric patients when amide local anesthetics are contraindicated, though safe use requires close monitoring and heightened awareness of communication challenges in patients with complex anesthetic histories.

References:

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THURS - CR - BS 1 - BR 3A - Triple A Airway, Angioedema, Anaphylaxis – 07

Angioedema following Cesarean Section under General Anesthesia

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Introduction:
Angioedema is a rare but potentially life-threatening cause of postoperative airway compromise. Recognition in the post-anesthesia care unit (PACU) is critical in obstetric patients where the diagnostic differential includes anaphylaxis, residual anesthetic effects, and pre-eclampsia–associated airway edema(1,2). Angioedema may present without hypotension or multisystem involvement, complicating early identification. While angioedema has been described in perioperative settings and in cesarean patients under neuraxial anesthetic techniques(3,4), specific reports of angioedema after cesarean under general anesthesia are lacking in the literature.

Case One:
A 27-year-old G1P0 at 38w5d with a history of chronic idiopathic urticaria and angioedema was admitted for decreased fetal movement. She was found to have mild range blood pressures, coagulopathy, and elevated liver function tests, creatinine, and uric acid concerning for acute fatty liver of pregnancy and pre-eclampsia with severe features. She underwent emergent cesarean section under general anesthesia. Intraoperative course was notable for coagulopathy requiring fibrinogen. On arrival to PACU, she was hypertensive, tachycardic, and increasingly somnolent. Physical exam showed tongue swelling, stridor, and increased work of breathing. Labs showed respiratory acidosis. Labetalol was given to improve hemodynamics. She was treated with Diphenhydramine, Dexamethasone, Famotidine, and Epinephrine due to concern for angioedema and/or anaphylaxis. She was placed on bilevel positive airway pressure with improvement in respiratory status and mentation. She was transferred to the surgical intensive care unit for further management.

Discussion:
Upper airway edema in the immediate postoperative period after cesarean delivery presents a diagnostic challenge, particularly in patients with pre-eclampsia, given its association with endothelial dysfunction, capillary leak, and airway swelling(2). However, isolated tongue edema and a prior history of idiopathic angioedema raises concern for angioedema rather than pre-eclampsia alone. Perioperative triggers—including airway manipulation, physiologic stress, and medications—are recognized precipitants of angioedema(1,5). In perioperative settings, management relies on frequent airway reassessment, continuous monitoring of ventilation and oxygenation, and early escalation planning to prevent delayed airway compromise(1). This case underscores the importance of heightened vigilance for airway compromise in parturients with pre-eclampsia and a history of angioedema following cesarean delivery under general anesthesia. Awareness of idiopathic perioperative angioedema and its atypical

presentation may facilitate timely diagnosis, appropriate monitoring, and optimized patient safety.

References:

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THURS - CR - BS 1 - BR 3A - Triple A Airway, Angioedema, Anaphylaxis – 08

Anesthetic Management of Emergent Cesarean Delivery in a Patient with Hereditary Angioedema Type III

Presenting Author: Lamiya Rahman, BA

Presenting Author's Institution: Renaissance School of Medicine at Stony Brook University - Jackson Heights, New York

Co-Authors: Genevieve Monanian - Stony Brook University Hospital

Introduction:
Hereditary angioedema, a rare genetic disorder, presents with recurrent swelling due to increased production of bradykinin. Hereditary angioedema type III (HAE type III) is the subtype with normal C1-esterase inhibitor levels with recurrent swelling episodes that can be triggered with estrogen exposure. Pregnancy and cesarean sections can trigger an angioedema episode which can result in life threatening airway swelling. There are limited cases and guidance on obstetric anesthetic management for patients with HAE type III. We present the management of a patient with HAE type III who underwent emergent cesarean section under neuraxial anesthesia.

Case One:
28-year-old G1P0 at 31-weeks gestation with low-lying placenta presented with vaginal bleeding and concern for preterm labor and preterm premature rupture of membranes. Her history was significant for HAE type III, for which she was asymptomatic at presentation. Preterm labor was managed with tocolysis, and she was treated with latency antibiotics, magnesium sulfate for fetal neuroprotection, and betamethasone for fetal lung maturity. The patient was monitored for further evidence of vaginal bleeding. After observation, the patient reported increased cramping and passage of a large clot followed by heavy vaginal bleeding, concerning for placental abruption. This prompted multidisciplinary discussion of cesarean section and the procedure triggering an angioedema episode with potential complications for airway management. The patient reported that previous episodes presented with eye and lip swelling which was treated with a C1-esterase inhibitor medication. The patient had no angioedema rescue medications with her, and our institution had no C1-esterase inhibitor medications or alternatives readily available. Due to fetal malpresentation and progression of labor, we proceeded with emergent cesarean delivery without complication under combined spinal epidural anesthesia with close monitoring for facial or airway swelling.

Discussion:
This case describes the obstetric anesthetic management of a patient with a history of HAE III who required an emergent cesarean section due to progression of preterm labor and concern for placental abruption. This case highlights the importance of multidisciplinary discussion given the risk of the procedure triggering an angioedema episode and the unavailability of C-1 esterase inhibitors. Proceeding with neuraxial anesthesia and limiting airway manipulation was a key point of discussion with the obstetric

team and the patient. It was crucial to monitor the patient for potential airway swelling intraoperatively and postoperatively. Proper anesthetic and delivery planning for patients with HAE type III is critical to achieve a safe and successful delivery.

References:

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Peripartum Management of Progesterone Hypersensitivity: A Multidisciplinary Approach to Catamenial Anaphylaxis in Pregnancy

Presenting Author: Sunitarani Kucharlapati, MD

Presenting Author's Institution: UPMC - pittsburgh, Pennsylvania

Co-Authors: Sukhpreet Singh, MD - UPMC
Christopher Smith, MD - UPMC

Introduction:
Catamenial anaphylaxis is a rare progesteronemediated hypersensitivity disorder. Evidence to guide peripartum management is extremely limited, with most published reports describing nonpregnant patients and no standardized anesthetic approach [1–3].

Case One:
A 30yearold G1P0 at 39 weeks' gestation with a history of anaphylaxis to endogenous and exogenous progesterone presented for delivery. Prior reactions included urticaria, bronchospasm, and angioedema. During pregnancy, she experienced intermittent cutaneous and respiratory symptoms consistent with progesterone hypersensitivity. Allergy and immunology evaluation confirmed the diagnosis. A multidisciplinary plan involving obstetric anesthesiology, allergy/immunology, and maternal–fetal medicine emphasized strict trigger avoidance, early recognition of symptoms, and immediate availability of rescue therapy. Prophylactic and rescue medications included diphenhydramine, famotidine, corticosteroids, an IgEbinding monoclonal antibody, and intramuscular epinephrine for airway involvement. Elective induction of labor was initiated at 39 weeks. Early epidural analgesia was placed without complication to minimize the need for emergent general anesthesia should anaphylaxis occur. Despite adequate contractions and appropriate augmentation, labor arrested in the active phase, and the patient proceeded to cesarean delivery for failure to progress. The epidural was successfully extended for surgical anesthesia. Cesarean delivery and postpartum recovery were uneventful, with no anaphylactic episodes.

Discussion:
Existing literature describes progesterone hypersensitivity as a heterogeneous condition with cutaneous, respiratory, and systemic manifestations, but pregnancyspecific guidance remains sparse. Prior reports highlight diagnostic uncertainty, variable treatment strategies, and the potential for severe reactions during hormonal fluctuations [1–3]. This case adds to the limited evidence by demonstrating that anticipatory multidisciplinary planning, early neuraxial analgesia, and readiness for rapid anaphylaxis treatment—including IgEtargeted therapy—can mitigate peripartum risk. The ability to extend a wellfunctioning epidural for cesarean delivery further underscores the value of early neuraxial placement in highrisk patients. Proactive coordination, individualized anesthetic planning, and early neuraxial analgesia can support safe labor and operative delivery in pregnant patients with progesterone

hypersensitivity, even when intrapartum circumstances necessitate cesarean birth.

References:

1 Buchheit KM, Bernstein JA. Progestogen hypersensitivity. UpToDate. 2 Patrawala M, Lee G. Ann Allergy Asthma Immunol. 2018. 3 Lin K et al. BMJ Case Rep. 2018.

Suspected Intravenous Carboprost Administration Mimicking Anaphylaxis and Severe Preeclampsia During Cesarean Delivery: A Case Report

Presenting Author: Jacelyn E. Lever, MD, PhD

Presenting Author's Institution: University of Alabama at Birmingham - Vestavia Hills, Alabama

Co-Authors: Xiao Lu Zhang, DO, PhD - University of Alabama at Birmingham

Introduction:
Medication errors remain a significant cause of perioperative morbidity in obstetric anesthesia. Carboprost tromethamine, a prostaglandin F2α analog, is associated with tachycardia, hypertension, bronchospasm, flushing, and urticaria when administered intravenously. Confusion between similarly appearing medication vials may increase the risk of inadvertent administration. We report a case of acute maternal hemodynamic instability during cesarean delivery in which inadvertent intravenous carboprost administration was suspected.

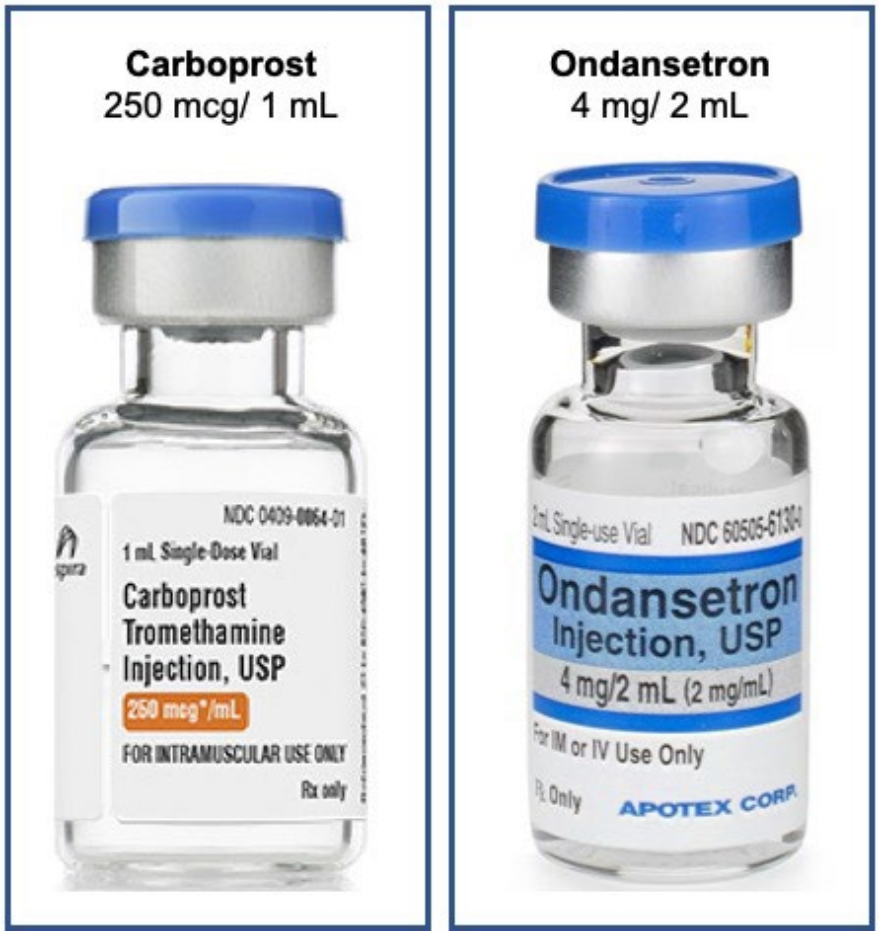
Case One:
A 30-year-old P0000 at 40.1 weeks with PMH autosomal dominant tubulointerstitial kidney disease and preeclampsia without severe features underwent urgent primary low transverse cesarean delivery for arrest of descent after prolonged second stage. A poorly functioning labor epidural was removed, and patient sat for a combined spinal–epidural, which was placed uneventfully. The patient had previously tolerated epidural bupivacaine and fentanyl without complication. Intrathecal medications included reduced-dose isobaric bupivacaine (5 mg), fentanyl (15 mcg), and morphine (100 mcg) and the patient received ondansetron IV (4 mg). Shortly after supine positioning with left lateral tilt, the patient developed acute tachycardia to the 150s, severe hypertension (SBP >170 mmHg), dyspnea, chest and facial urticaria, and fetal bradycardia. Cefazolin and phenylephrine infusion were discontinued. Oxygen saturation remained normal. Due to concurrent hypertension and tachycardia, epinephrine was withheld. Management included diphenhydramine, esmolol, corticosteroids after delivery, and supplemental oxygen. Stat cesarean delivery was performed due to fetal heart tones; APGAR 6/9. Serum tryptase was sent; 5.1mcg/L (normal< 11). Postoperatively, hypertension persisted and was treated with labetalol and magnesium sulfate with subsequent normalization of vital signs. Total length of hospitalization, including labor, was 3 days.

Discussion:
The differential diagnosis included new-onset severe preeclampsia, anaphylaxis or anaphylactoid reaction, phenylephrine dosing error, intravascular local anesthetic or epinephrine, or medication error. However, the abrupt onset of tachycardia, hypertension, dyspnea, and urticaria shortly after presumed ondansetron administration raised concern for inadvertent intravenous carboprost administration, a known cause of these symptoms when given intravenously. Review revealed near-identical appearance

of carboprost and ondansetron vials in the medication dispensing system. This case highlights the diagnostic challenge of distinguishing medication reactions from obstetric pathology and underscores the potential for look-alike medication errors in obstetric anesthesia. Standardized medication storage, labeling practices, and heightened awareness are essential to reduce the risk of inadvertent intravenous Carboprost administration and other medication errors.

References:
1. Anesthesiol Clin 2017; 35:207 2. Curr Opin Anaesthesiol 2024;37:736

Figure 1: Comparison of Carboprost and Ondansetron vials



Cesarean Delivery in a Parturient with Severe MS, PH, and VSD: A Case Report

Presenting Author: Connor Crowe

Presenting Author's Institution: University of Texas Health Science Center Houston - Houston, Texas

Co-Authors: Soujanya Tirupati - UT Health Houston

Introduction:
Cardiovascular disease is a leading cause of maternal mortality in high-resource countries, driven by advanced maternal age and the survival of congenital heart disease patients into adulthood. Mitral stenosis (MS) is particularly hazardous; a mitral valve area (MVA) of 1 cm² or less combined with pulmonary hypertension (PH) carries a maternal mortality rate of up to 15%. In this case, management was further complicated by a ventricular septal defect (VSD), creating a high-stakes hemodynamic "balancing act."

Case One:
A 32-year-old G4P2 female at 36w3d gestation presented with severe rheumatic MS, PH, and a restrictive VSD. Preoperative Transthoracic Echocardiography (TTE) revealed: • MVA: 0.56 cm² (Critical MS) • Systolic PAP: 71.3mmhg (Severe PH) • Other: Mild pulmonic stenosis and VSD. The patient's "fixed" cardiac output meant she could not tolerate tachycardia or sudden changes in systemic vascular resistance (SVR), which risked pulmonary edema or shunt reversal. Management A multidisciplinary team (OB-Anesthesia, Cardiac Anesthesia, Cardiology, MFM, and Pulmonology) coordinated the care. Hemodynamic Monitoring & Safety: To mitigate the risk of circulatory collapse, the team placed a FloTrac arterial line and a Pulmonary Artery (PA) catheter for real-time data. Crucially, ECMO sheaths were placed pre-emptively in the femoral vessels to ensure rapid mechanical circulatory support if needed. Anesthesia Technique: A low-dose Combined Spinal-Epidural (CSE) was performed at L3-L4. To avoid precipitous hypotension, the spinal dose was titrated using: • 1 ml of 0.75% bupivacaine • with additives: 15 mcg Fentanyl, 150 mcg Morphine, and 100 mcg Epinephrine. The gradual onset allowed for precise hemodynamic titration. The patient delivered a healthy infant without intraoperative complications and was monitored postoperatively in the Heart and Vascular ICU (HFICU).

Discussion:
The triad of severe MS, PH, and VSD presents conflicting goals: 1. MS: Requires a slow heart rate for diastolic filling. 2. PH: Requires high SVR and avoidance of increased PVR (hypoxia/acidosis). 3. VSD: Requires stable SVR to prevent right-to-left shunting. A titrated neuraxial approach was chosen over general anesthesia to avoid the sympathetic surge of intubation and the negative effects of positive pressure ventilation on right heart preload. Conclusion Successful management of complex cardiac parturients requires meticulous planning, advanced monitoring (PA catheter/ECMO standby), and a multidisciplinary approach to ensure maternal and fetal survival.

References:

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THURS - CR - BS 1 - BR 3A - Heart - Congenital and Valve Challenges – 02

Right Heart, Wrong Time: Severe Tricuspid Regurgitation During Labor

Presenting Author: Jacob Davis, MD

Presenting Author's Institution: University of North Carolina - Chapel Hill, North Carolina

Introduction:
Tricuspid regurgitation (TR) is a common valvulopathy that may be encountered in pregnancy.[1] Physiologic increases in blood volume lead to elevated preload and ventricular distension, which can impair leaflet coaptation and result in regurgitant flow.[2,3] While most patients tolerate these changes, primary tricuspid regurgitation due to intrinsic leaflet pathology may cause peripheral edema, ascites, and right ventricular failure. We present a case of severe tricuspid regurgitation secondary to recurrent endocarditis in a laboring patient.

Case One:
A 31-year-old G4P2103 at 39 weeks of gestation was admitted for induction of labor in the setting of severe tricuspid regurgitation and right ventricular dilation. She had a history of endocarditis in 2016 and 2024, neither treated with a complete antibiotic course. During pregnancy, she reported intermittent chest pain, dyspnea, and mild lower extremity edema. Echocardiography demonstrated preserved left ventricular function, mild right ventricular dilation, severe tricuspid regurgitation (maximum velocity 2.7 m/s), and mild pulmonary hypertension (pulmonary artery systolic pressure (PASP) of 38 mmHg). After multidisciplinary planning, epidural analgesia was placed without complication, and labor and postpartum recovery were uneventful.

Discussion:
Management of severe tricuspid regurgitation depends on symptom burden and regurgitant severity.[2] Treatment focuses on maintaining euvolemia and avoiding significant changes in hemodynamics and pulmonary vascular resistance. Loop and potassium-sparing diuretics are first-line therapy for volume overload. Neuraxial anesthesia remains appropriate, with precautions to prevent sympathectomy-associated bradycardia that may exacerbate regurgitant flow.

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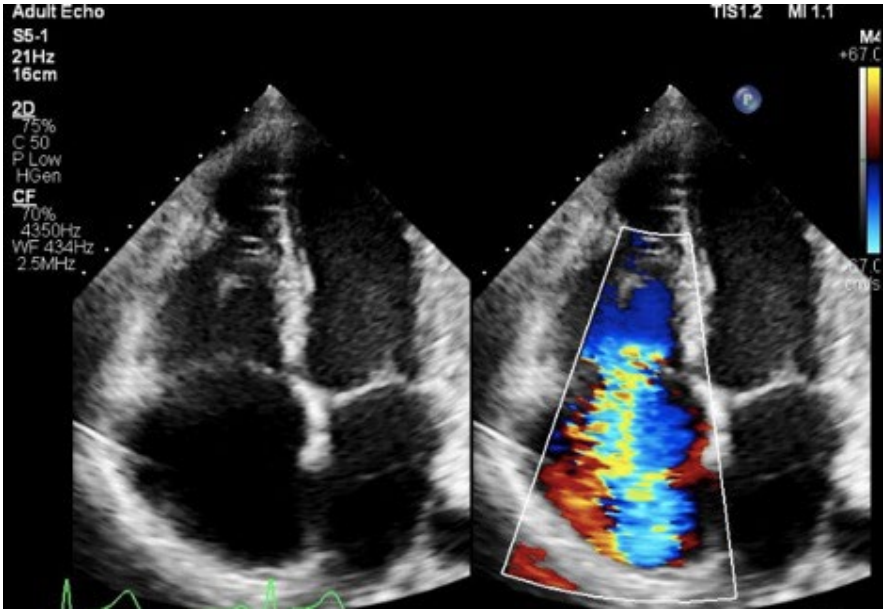
Adult Echo
TIS1.2 MI 1.1
S5-1
21Hz
16cm
2D
75%
C 50
P Low
HGen
CF
70%
4350Hz
WF 434Hz
2.5MHz

Anesthetic Management for Cesarean Delivery in a Parturient with Severe Bicuspid Aortic Stenosis and Left Ventricular Hypertrophy: A Case Report

Presenting Author: Melika Hajykarim, BS

Presenting Author's Institution: UTHealth McGovern Medical School - Houston, Texas

Co-Authors: Soujanya Tirupati - UT Health Houston

Introduction:
Parturients with severe aortic stenosis (AS) and significant left ventricular hypertrophy (LVH) represent some of the highest-risk cases in obstetric anesthesia. [1] The fixed stroke volume and reduced ventricular compliance make these patients extremely sensitive to fluctuations in systemic vascular resistance (SVR) and preload. This case describes the successful management of a 31-year-old female with critical AS undergoing Cesarean delivery using titrated epidural anesthesia and advanced hemodynamic monitoring with ECMO standby.

Case One:
A 31-year-old G3P2 female at 33 weeks and 5 days of gestation presented for an elective Cesarean delivery. She had a known history of severe AS secondary to a congenital bicuspid aortic valve. Preoperative Evaluation Transthoracic echocardiography (TTE) revealed: - Severe AS with a peak velocity of 5.4 m/sec and a mean gradient of 72 mmHg. - Aortic Valve Area (AVA) was 0.8 cm2 - Severe concentric LVH with septum and posterior wall thickness measuring 1.9 cm. - Ejection Fraction (EF) of 70–75%. Management A multidisciplinary team (OB-Anesthesia, Cardiac Anesthesia, Cardiology & MFM coordinated the care. The team placed a FloTrac arterial line and a Pulmonary Artery (PA) catheter for real-time data. Crucially, ECMO sheaths were placed preemptively in the femoral vessels to ensure rapid mechanical circulatory support if needed. Anesthetic Technique - An epidural catheter was placed at the L3-L4 interspace to provide a gradual onset of sympathetic blockade. - 3 mL of 1.5% lidocaine with epinephrine (1:200,000) was administered to rule out intravascular or intrathecal placement. - 20 mL of 2% lidocaine with epinephrine was administered in 5 mL increments over 20 minutes to achieve a surgical level. Hemodynamic stability was maintained during the initial phase. Following the delivery of the infant and the initiation of oxytocin infusion, the patient experienced a significant episode of hypotension. It was managed aggressively with fluid boluses, Phenylephrine infusion (to maintain SVR) and 30 mcg bolus of norepinephrine. These interventions successfully restored coronary perfusion pressure and stabilized the patient for the remainder of the procedure. The epidural catheter was removed intact at the end of the surgery. The patient was transferred to the Cardiac Intensive Care Unit for close postpartum monitoring. She remained hemodynamically stable and was discharged on postoperative day 4 without any adverse events.

Discussion:

This case highlights the importance of maintaining SVR, avoiding tachycardia, and ensuring adequate preload. The use of a titrated epidural technique [2] is often preferred over a single-shot spinal to prevent the precipitous drop in afterload. The inclusion of ECMO standby and advanced cardiac output monitoring provided a critical safety net for this high-risk parturient.

References:

1.Journal of Cardiothoracic and Vascular Anesthesia, Volume 29, Issue 6, 1632 - 1635 2. J Clin Anesth. 2006 Mar;18(2):142-4.

Anesthetic Considerations for Mitral Valve Replacement During Pregnancy

Presenting Author: Kelley A. Smith, MD

Presenting Author's Institution: University of Virginia - Charlottesville, Virginia

Co-Authors: John McNeil, MD - University of Virginia
Austin Smith, MD - University of Virginia

Introduction:
Care of the pregnant patient with cardiac disease represents a unique opportunity for multidisciplinary coordination. Cardiac disease in pregnancy is a leading cause of maternal mortality and the need for surgical intervention has steadily increased over time (1). While advancements in obstetric and cardiac care have improved such that maternal mortality now approaches that of non-pregnant women, fetal mortality remains as high as 27% to 34% (2,3).

Case One:
We present the case of a 25-year-old primigravida at 15 weeks gestation who underwent a mitral valve replacement after being diagnosed with Staphylococcal endocarditis complicated by a mobile vegetation and leaflet perforation resulting in severe valvular regurgitation. The decreased systemic vascular resistance and increased heart rate in pregnancy allows regurgitant lesions to be better tolerated than stenotic lesions in this population (1). This is counterbalanced by the detrimental increases in cardiac output and blood volume in a population prone to heart failure. After admission to the cardiac ICU, she was additionally maintained on clevidipine to decrease afterload and improve forward flow. Intraoperative goals were discussed between anesthesia, cardiac surgery, perfusion, and maternal fetal medicine. In addition to minimizing cardiopulmonary bypass and clamp time, it was decided to maintain normothermia and perfusion pressures greater than 70mmHg to support the fetus. Though not performed in this case, pulsatile flow on cardiopulmonary blood flow has also shown benefits in fetal survival (1).
Cardiopulmonary bypass lasted 77 minutes with 58-minute cross-clamp time. Given the non-viable age of the fetus, fetal heart tones were only checked before and after surgery. She was extubated without complication and discharged home on post-operative day 5 with IV antibiotics. After a short re-admission for pleural effusions that was managed with diuretics, she has continued an otherwise uncomplicated pregnancy three months later.

Discussion:
As in our case, maternal safety often necessitates urgent intervention, while postponing surgery for fetal viability is not possible. Our case highlights the complex multidisciplinary teamwork required to care for an expectant mother with a cardiac emergency while also supporting the pregnancy. It provides hope that advancements in evidence-based care can lead to a positive outcome for mother and fetus.

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1. Dong Z, et al. Management of cardiopulmonary bypass in pregnancy: challenges and progress in maternal-fetal protection. Front Cardiovasc Med. 2025;12:1637826. 2. van Steenbergen GJ, et al. Timing of cardiac surgery during pregnancy: a patient-level meta-analysis. Eur Heart J. 2022;43(29):2801-2811. 3. van der Zande JA, et al. Valve replacement during pregnancy: literature review including new data from the Registry Of Pregnancy And Cardiac disease III. Eur J Cardiothorac Surg. 2025;67(7)

Anesthetic Considerations for Mitral Valve Replacement During Pregnancy.pdf

THURS - CR - BS 1 - BR 3A - Heart - Congenital and Valve Challenges – 05

Emergent cesarean section in a parturient with an unbalanced atrioventricular (AV) canal defect status post complete repair

Presenting Author: Alexia Gagliardi, MD

Presenting Author's Institution: University of Minnesota - Minneapolis, Minnesota

Co-Authors: Susanne S. Rupert, MD - University of Minnesota

Introduction:
Patients with cyanotic congenital heart defects including unbalanced AV canal defects, hypoplastic left heart, tricuspid atresia, and double outlet right ventricle may undergo the Glenn procedure to anastomose the superior vena cava (SVC) to the pulmonary artery (PA) and relieve cyanosis. Glenn physiology is characterized by passive blood flow from the SVC to the pulmonary artery and is therefore dependent upon preload and low pulmonary vascular resistance (PVR) to maintain circulation.

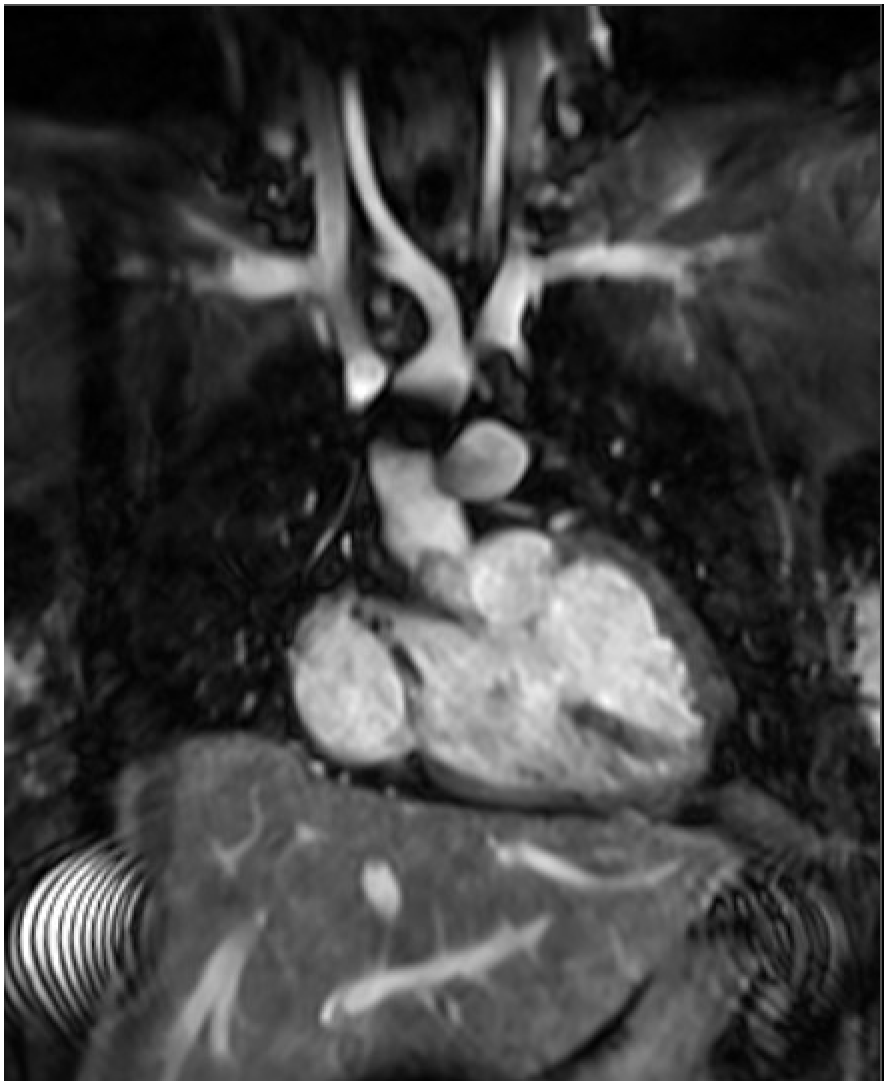
Case One:
A 30 year-old G1P0 parturient with history of congenital unbalanced AV canal defect repaired with the modified, bidirectional Glenn procedure - reconstructing the right AV valve into left and right components and anastomosing the SVC to the right PA - was followed closely by our obstetric high risk multidisciplinary team. She was medically managed well with digoxin and captopril with only occasional intermittent supraventricular tachycardia. Her recent ECHO was notable for mild bilateral AV valve stenosis with moderate regurgitation only mildly reduced function. Modified WHO Class was II-III. Functional status I. Her initial delivery plan was for vaginal delivery with early epidural, assisted second stage, with adult congenital heart and CVICU co-management. However, she presented at 37 weeks with category II fetal heart tracings with persistent fetal bradycardia, necessitating emergent cesarean delivery. General anesthesia was induced with propofol and maintained via continuous propofol infusion. A phenylephrine infusion and a single 5-mg bolus of ephedrine were used for hemodynamic support. Estimated blood loss was 450 mL, and total intravenous fluid administration was 1200 mL of lactated Ringer’s solution. End-tidal carbon dioxide was maintained below 30 mmHg, and positive end-expiratory pressure (PEEP) was limited to 5 mmHg. The patient remained hemodynamically stable throughout the procedure.

Discussion:
This case highlights the anesthetic challenge of managing preload-dependent Glenn physiology in the setting of pregnancy. Potential risks compromising pre-load included inferior vena cava compression and potential for significant blood loss. Phenylephrine was selected as the primary vasopressor to maintain diastolic filling time and systemic vascular resistance. Ventilation prioritized hyperventilation, but with low tidal volumes and minimal PEEP to preserve venous return and avoid elevations in PVR. Glenn physiology necessitates careful attention to preload and low PVR for stable intraoperative management in

this high-risk obstetric patient.

References:

1. Yamashita K, Kibe T, Kohjitani A, et al. General Anesthesia During Lip Repair and Palatoplasty After Glenn Surgery. Anesth Prog. 2020;67(2):107-108. doi:10.2344/anpr-67-02-05 2. Jooste EH, Haft WA, Ames WA, Sherman FS, Vallejo MC. Anesthetic care of parturients with single ventricle physiology. J Clin Anesth. 2013;25(5):417-423. doi:10.1016/j.jclinane.2012.08.003



Caesarean section in Rheumatic Heart Disease with simultaneous severe Mitral Stenosis, moderate Mitral Regurgitation and Pulmonary Hypertension

Presenting Author: Reda Hafiane

Presenting Author's Institution: University Of Ottawa - Ottawa, Ontario

Co-Authors: Mohamed S. Eissa, Assistant Professor - University of Ottawa
Leo M. Jeyaraj, MD, FRCA - The Ottawa Hospital (U of Ottawa)

Introduction:
Valvulopathies represent 1/3 of cardiac pathology in pregnancy and each has distinct clinical implications(1). Rheumatic heart disease(RHD) leads to progressive valvular deformities that can have significant hemodynamic implications during pregnancy and delivery. After obtaining consent, we present a case of simultaneous severe mitral stenosis (MS) and moderate mitral regurgitation (MR) requiring abdominal delivery.

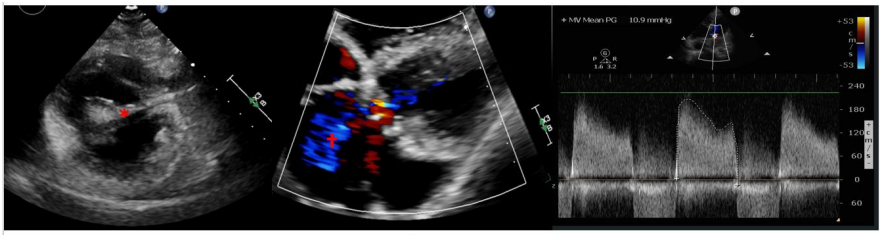
Case One:
34 years old G1P0 presented to our high-risk obstetrical clinic at 11 weeks gestational age. Her medical history was significant for childhood RHD for which she underwent MV repair at age 25. Subsequently, she developed severe MS. Initial cardiac evaluation revealed normal sinus rhythm, EF 57%, severe MS with a gradient of 12mmHg, moderate MR, RV overload and bi-atrial dilatation. BNP was 844. During her pregnancy, she progressively became symptomatic with initial dyspnea evolving to orthopnea during the third trimester. Monthly exams showed a progression of mitral gradient to 15mmHg and an increase in BNP to 1442. Bi-basilar crackles could be heard on physical exam. She received metoprolol, aspirin and furosemide. A multidisciplinary team (Obstetrics, Cardiology and Anesthesia) decided on cesarean delivery at 34 weeks. Cardiology recommended general anesthesia with TEE and postop recovery in the cardiac ICU (CICU). Upon presentation to the OR, despite the outlined pathology, patient was comfortable in supine position with no dyspnea. Based on her clinical presentation, we were comfortable offering her an alternative plan of neuraxial block with TTE. After discussing risks and benefits of both options, the patient chose epidural anesthesia. To avoid stress-induced tachycardia, dexmedetomidine infusion was started at 0.5mcg/kg/hr. An arterial line and lumbar epidural catheter were then placed under ultrasound guidance. A sensory block to T6 was gradually achieved over 20 min with epidural lidocaine 2%. Simultaneously, norepinephrine (NE) infusion at 2mcg/min helped offset the sympathectomy. Surgery proceeded uneventfully with an EBL of 850mL and a restrictive fluid replacement strategy of 500mL crystalloid total. Of note, the acute blood loss from uterine incision was accompanied by a 20% drop in BP compensated for immediately with an increase in NE infusion to 8mcg/min. She remained stable throughout surgery and a healthy newborn with APGARs 9/9 was delivered. She was transferred to the CICU in stable condition where she was monitored for the next 72 hours uneventfully.

Discussion:

This case illustrates the challenges of addressing simultaneously two valvular lesions with competing management strategies: severe stenosis vs moderate regurgitation. Careful multidisciplinary planning and titration of drugs with predictable hemodynamic impact under constant monitoring allowed us to provide a safe and comfortable experience to a new mother who was able to bond with her newborn from the first moments of her life.

References:

1.Clin Obstet Gynecol 2020;63:910



A B C

Figure: Cardiac findings on transthoracic echocardiography.
A: Parasternal short-axis view demonstrating septal flattening.(*).
B: Subxiphoid view demonstrating mitral regurgitation.(†)
C: Intraoperative continuous-wave Doppler performed after delivery demonstrating a mean MV gradient of 10.9 mmHg.

THURS - CR - BS 1 - BR 3A - Heart - Congenital and Valve Challenges – 07

Midnight VACTERL Challenge: A Complicated Cesarean Delivery After Dark

Presenting Author: Emily G. Bliss, MD

Presenting Author's Institution: University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine - Lexington, Kentucky

Co-Authors: James Damron, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine, Division of Obstetric Anesthesia
Chris Denny, MD - Cincinnati Children's Hospital Medical Center, Department of Anesthesia, Division of Cardiac Anesthesia

Introduction:
VACTERL is a rare collection of congenital abnormalities that pose significant challenges throughout life with some complicating care during pregnancy and delivery. This case describes the urgent cesarean delivery of a 23-year-old with complex multi-system abnormalities, including severe pulmonary regurgitation. Ultrasound guidance facilitated successful neuraxial anesthesia despite challenging anatomy while hemodynamic management focused on right ventricular stability. This case highlights the complexity of anesthetic management in patients with VACTERL association, particularly when urgent cesarean delivery is required.

Case One:
A 23-year-old G2P0101 at 34 weeks gestation presented overnight with painful contractions and spontaneous rupture of membranes. History included VACTERL and chronic hypertension. Congenital abnormalities included cervical fusion at C2-3, C4-5, C6-T1 with anterior subluxation of C4, levoconvex lumbar curvature, coccygeal agenesis, imperforate anus, neurogenic bowel status post Malone Antegrade Colonic Enema (MACE), repaired tetralogy of Fallot with chronic severe pulmonary insufficiency, chronic renal insufficiency, left radial hypoplasia, and left thumb aplasia. An early-pregnancy echocardiogram showed severe pulmonary regurgitation with flow reversal into the pulmonary arteries, moderate right ventricular dilation with reduced function, and normal left ventricular function. Due to extensive pelvic floor reconstruction and prior cesarean delivery, an urgent repeat cesarean section was indicated. Ultrasound guidance aided placement of a combined spinal-epidural, achieving a T4 sensory level. Fluids were restricted, with phenylephrine and ephedrine used to maintain hemodynamic stability. Surgery was notable for dense abdominal adhesions and maternal anxiety requiring multiple propofol boluses. Postoperatively, she was monitored for 24 hours without cardiac events.

Discussion:
VACTERL occurs in approximately 1 in 10,000-40,000 live births, defined by the presence of at least three abnormalities including vertebral, anal, cardiac, tracheoesophageal, renal, or limb defects (1). Associated scoliosis may make neuraxial procedures challenging and resulting blockade can be unpredictable. Cervical spine abnormalities, such as congenital fusion, may complicate endotracheal

intubation. Although successful cesarean deliveries in patients with VACTERL have been reported, anesthetic management must be individualized (2,3). Furthermore, given the added cardiovascular burden in pregnancy, early workup is vital. In this case, severe pulmonary regurgitation required fluid restriction, avoidance of increases in pulmonary vascular resistance, and maintenance of baseline sinus tachycardia (4). This case highlights the complexity of anesthetic management in patients with VACTERL, particularly when urgent cesarean delivery is required overnight.

References:

1. PMID: 21846383 2. PMID: 36798639 3. PMID: 23519725 4. PMID: 32491496

THURS - CR - BS 1 - BR 3A - Heart - Congenital and Valve Challenges – 08

Management of Cesarean Delivery in a Patient with Fontan Physiology

Presenting Author: Kevin Rivera, MD

Presenting Author's Institution: University of Maryland Medical Center - Baltimore, Maryland

Co-Authors: Shobana Bharadwaj, MBBS - University of Maryland
Rosa Drummond, MD - University of Maryland Medical Center

Introduction:
Fontan physiology is characterized by circulation that lacks a subpulmonary ventricle, relying on non-cardiac forces for pulmonary blood flow to provide preload to the systemic ventricle, resulting in low cardiac output and systemic venous hypertension. Obstetric patients with Fontan physiology are becoming increasingly common and have an increased risk of pregnancy complications.

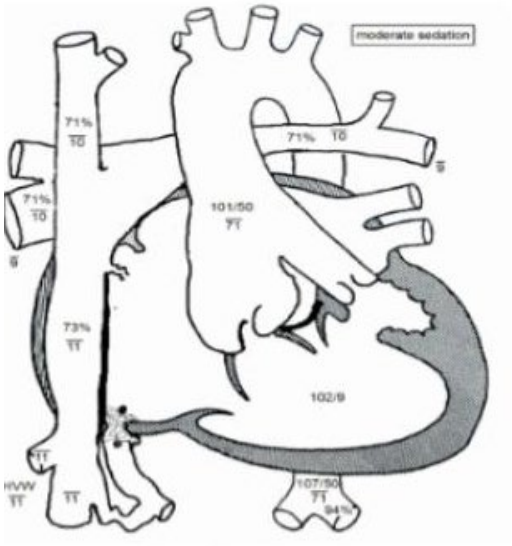
Case One:
We present a 26-year-old G1P0 patient with double inlet left ventricle status post Fontan procedure in infancy. She has a permanent pacemaker secondary to complete atrioventricular block, moderate to severe aortic regurgitation, baseline oxygen saturation of 92-94%, and thrombocytopenia (platelet count 146×10^9/L). She presented with recurrent vaginal bleeding and due to non-reassuring fetal heart tones, concern for uterine rupture, worsening thrombocytopenia, and hypofibrinogenemia, cesarean section was performed at 30 weeks 5 days gestation. During her prenatal anesthesia consultation, neuraxial anesthesia was favored to avoid significant increases in pulmonary vascular resistance and systemic vascular resistance; however, she ultimately underwent general anesthesia given nonreassuring fetal status and coagulopathy. Her intraoperative course was uncomplicated. Placental abruption involving 40% of the placenta was confirmed upon delivery, with an estimated blood loss of 800 mL. Her postpartum course was complicated by an episode of non-sustained ventricular tachycardia while in the ICU, with an otherwise unremarkable recovery. She was discharged home on postpartum day 5.

Discussion:
Fontan physiology presents multiple peripartum implications that are important for anesthesiologists to understand to optimally manage these patients. Vaginal delivery allows for more gradual hemodynamic changes, which are better tolerated in the context of the limited preload reserve and inability to augment cardiac output that characterize Fontan physiology. Cesarean delivery is reserved for standard obstetric indications or for patients at risk of maternal decompensation, such as acute heart failure, refractory arrhythmias, or the need for coordinated cardiovascular interventions. Neuraxial analgesia is strongly recommended for labor as it provides effective pain control, reduces catecholamine surges, and allows for rapid conversion to surgical anesthesia if emergent cesarean delivery is required. Maintaining preload and avoiding increases in pulmonary vascular resistance are critical in Fontan patients. Excessive fluid administration can precipitate heart failure and pulmonary edema. Multidisciplinary planning including decision on candidacy for initiation of extracorporeal life support with obstetric, cardiology, and

anesthesiology teams is critical for the care of these patients .

References:

1. Prog Pediatr Cardiol. 2020;59:101314. 2. Circulation. 2019;140(6):e234-e284. 3. . Curr Opin Cardiol. 2023;38(3):241-249. 4. Circulation. 2023;147(11):e657-e673



Arrows indicate catheter course.

Diagnoses / Procedures

47. Double Inlet LV
56. Hypoplastic right vent.
113. L-TGA w/ vent. inversion
132. VSD, muscular
718. Damus-Kaye-Stansel proce. (sp)
650. Modified Blalock-Taussig Shunt (sp)
667. Hemi Fontan (sp)
730. Fontan procedure (sp)
688. Pacemaker insert, surgical (sp)
599. Other intervention, cath (sp)
66. Mitral insufficiency
10. Aortic insufficiency
799. Other surgery (sp)

Age at cath: 25 years
Gender: Female

Procedure Time: 1 h 44 min (08:22-10:06)

Attending: Renelle George, MD
Assistant:

Height: 159.0 cm Weight: 52.3 kg
BSA = 1.52 m2

Fluoro: 7.50 min Contrast: 35.00 mL
Total DAP: 1918.37 cGy-cm2
Vein: Left femoral 7fr
Artery: Left femoral 4fr

Baseline

Qp = 4.01 L/min (2.64 L/min/m2)
Qs = 4.35 L/min (2.86 L/min/m2)
Rp = 0.25 units (0.38 units x m2)
Rs = 13.78 units (20.95 units x m2)
Qp/Qs = 0.92 : 1 | Rp/Rs = 0.02

Heart Rate: 75 bpm
VO2: 112 ml/min/m2
Hemoglobin: 12.5 gm/dL

Inspired O2: 21%
pH:
pCO2:
pO2:
HCO3:

Thermo CO:

%O2	Site	Sys/A	Dias/V	Mean
71	SVC			10
73	RA			11
	RV			
	PA			
71	RPA			10
71	LPA			10

Right		Left
9	Wedge Mean	9

%O2	Site	Sys/A	Dias/V	Mean
	LA			
	LV	102.0	9	
	aAO	101	50	71
94.0	dAO	107	50	71

hep vein
Mean: 11
hep vein wedge
Mean: 11
IVC
Mean: 11

Anesthetic Management of a Parturient with Single-Ventricle Physiology and Congenitally Corrected Transposition of the Great Vessels during Cesarean Delivery

Presenting Author: Emily Breland Edwards, MD

Presenting Author's Institution: UAMS - Little Rock, Arkansas

Co-Authors: Cash Arcement, MD - UAMS
Muhammad W. Athar, MD - UAMS
Matthew T. Williams, MD - UAMS

Introduction:
Pregnancy in patients with uncorrected complex congenital heart disease (CHD) presents significant anesthetic risk due to abnormal circulatory physiology and dependence on a narrow balance between systemic vascular resistance (SVR), pulmonary vascular resistance (PVR), preload, and heart rate. In single-ventricle physiology with transposition of the great vessels (TGV), reductions in SVR or preload may worsen right-to-left shunting and compromise systemic perfusion.

Case One:
We report a 22 year old woman G1P0 with limited access to childhood medical care. She was diagnosed at age 13 with surgically uncorrected CHD, including congenitally corrected TGV, heterotaxy syndrome, single-ventricle physiology, and pulmonic valve stenosis. She presented during pregnancy. Echocardiogram shows bicuspid pulmonary valve with severe stenosis (PG 65 mmHg), large inlet to outlet VSD (right to left shunt in systole), EF 55%. Given her preload-dependent circulation, fixed pulmonary outflow obstruction, and risk of vagal-mediated hemodynamic compromise during labor, a multidisciplinary team including maternal fetal medicine, cardiology, and cardiovascular ICU recommended elective cesarean delivery.

Discussion:
Anesthetic Management: Preoperatively, large peripheral IV access was obtained, and an arterial line was placed for close blood pressure monitoring. A carefully titrated neuraxial technique was selected to avoid abrupt decreases in systemic vascular resistance and maintain preload. A low-dose combined spinal–epidural (CSE) was performed with an intentionally reduced intrathecal dose (0.8 ml 0.75%/8.25% bupivacaine/dextrose), followed by gradual epidural dosing to achieve surgical anesthesia. Smaller-than-standard epidural boluses (2-3 ml q3 minutes) were used throughout. Vasopressin was selected as the first-line vasopressor to support systemic vascular resistance while minimizing increases in pulmonary vascular resistance and was started just prior to performing the CSE. Hemodynamics remained stable, and the patient tolerated the procedure without maternal or fetal complications. Postoperatively, the patient was monitored in the cardiovascular intensive care unit for close hemodynamic observation and

recovered without complications. Outcome and Conclusion: Cesarean delivery proceeded without complication, with stable maternal hemodynamics and favorable neonatal outcome. Postoperatively, the patient was monitored in the cardiovascular intensive care unit and recovered without complications. This case demonstrates that carefully titrated neuraxial anesthesia, guided by an understanding of SVR–PVR balance and shunt physiology, can be safely achieved in patients with uncorrected complex CHD undergoing cesarean delivery.

References:

1. Obstetric Anesthesia and Heart Disease: Practical Clinical Considerations PMID: 34046669

CHD CS Cath Image.pdf

THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 01

Navigating the Nuances: A Case of Post Dural Puncture Headache Followed by Massive Cerebral Venous Sinus Thrombosis

Presenting Author: Jean-Paul Russo, MPH

Presenting Author's Institution: University of Miami Miller School of Medicine - Miami, Florida

Co-Authors: Mohammad Siddiqi, MD - Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami

Introduction:
Inadvertent dural puncture is a well-known complication of neuraxial procedures. Cerebral venous sinus thrombosis (CVST) is a rare and potentially life-threatening complication during the postpartum period. The signs and symptoms of CVST during the early stages may mimic those of a PDPH, thus making diagnosis and management for these conditions complex. This case report aims to discuss the nuances between the symptoms of PDPH and CVST, and to increase awareness on the association between UDP and development of CVST. We present a case of a patient whose course was complicated by unintentional dural puncture during epidural catheter placement, acute onset of PDPH managed with an epidural blood patch, and a subacute presentation of extensive CVST with multifocal venous infarcts.

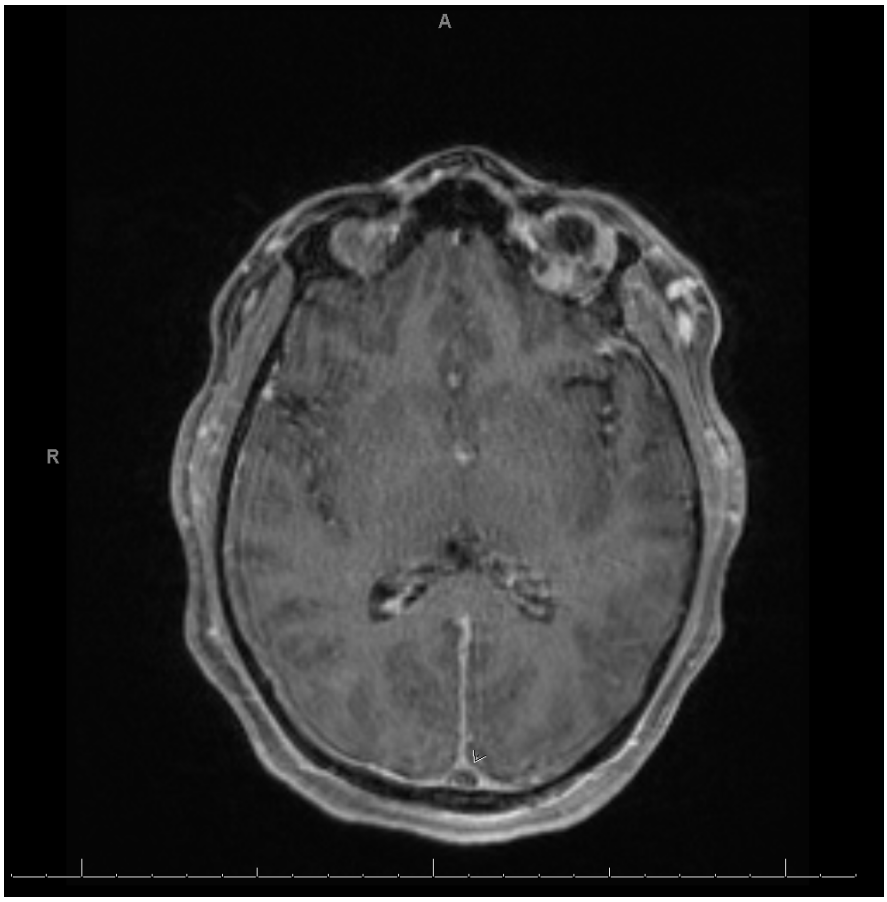
Case One:
A healthy 35-year-old G4P1021 woman presented in active labor at 39 weeks of gestation. The combined spinal-epidural was complicated by unintentional dural puncture. On postpartum day (PPD) 1, the patient developed a positional headache characteristic of PDPH. An epidural blood patch procedure was performed with no complication and subsequent complete resolution of the headache. The patient returned to the hospital on PPD9 with an isolated symptom of a recurring headache and vague description of positional changes in intensity. She was discharged with Fioricet for conservative management as requested by the patient. On PPD11, she presented to the obstetric ED with worsening headache, somnolence, altered mental status and neurologic deficits. A CT venogram showed extensive CVST in the superior sagittal sinus, bilateral transverse sinuses, right sigmoid sinus, and the right jugular foramen with involvement of cerebral veins. MRI confirmed thrombosis with venous infarcts. The patient required therapeutic anticoagulation with supportive care in the neuro ICU. Neurologic deficits of left hemiparesis and gaze preference improved gradually. The patient was discharged on PPD25 to inpatient rehabilitation on apixaban with near-baseline function.

Discussion:
This case highlights the slight differences in symptoms and onset between PDPH and CVST during the postpartum period. The patient's initial positional headache was likely a PDPH from the unintentional dural puncture. The patient's recurrent headache was likely from an evolving CVST, as suggested by recurrence of headache after a successful blood patch, loss of postural character, and onset of

neurological symptoms. Some proposed mechanisms of CVST after accidental dural puncture are due to alterations in CSF fluid dynamics, resulting in cerebral venous dilatation and stasis of flow. Heightened vigilance is warranted in obstetric patients with unintentional dural puncture. Early neuroimaging can be a crucial diagnostic tool for atypical/refractory postpartum headache after neuraxial anesthesia. Therapeutic anticoagulation is first line treatment for CVST, with prompt diagnosis yielding favorable outcomes.

References:

1. Int J Obstet Anesth. 2022;49:103218.



THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 02

Clinical Course and Management of Pneumocephalus Complicated by Postdural Puncture Headache After Labor Epidural Anesthesia: Update in Management

Presenting Author: Samuel Sorbazo

Presenting Author's Institution: Houston Methodist Hospital, Department of Anesthesiology - Houston, Texas

Co-Authors: Brendan Olson, BS - Texas A&M University College of Medicine

Introduction:
Pneumocephalus (PC) and Postdural Puncture Headache (PDPH) are potential complications of unintentional dural puncture (UDP) during labor epidural anesthesia that can present with overlapping symptoms.1 PDPH often presents as a postural HA occurring within 36 hours accompanied by neck stiffness and treated with Epidural Blood Patch (EBP).1 The HA of PC often presents within 24 hours with neurological symptoms.1 PC is diagnosed with a computed tomography (CT) scan and treated with 100% oxygen.1 We present a 33-year-old female who underwent labor epidural anesthesia complicated by pneumocephalus and postdural puncture headache after UDP.

Case One:
A 33-year-old G6P4115 female with past medical history of prior PDPH presented for induction of labor on 5/5/22 and had an epidural for labor anesthesia. During epidural placement, UDP was noted, and the patient developed an immediate HA. She had a successful vaginal delivery. On 5/7/22, the patient reported a postural HA accompanied by ear pressure and decreased hearing. She underwent EBP which ultimately failed after 3 attempts at epidural placement. During the procedure, the patient reported a frontal occipital HA with accompanying neck stiffness. A CT scan was done and showed pneumocephalus with air in the frontal horn of the left lateral ventricle (A), basal cisterns (B), and upper cervical canal (C) (Figure 1.) 100% oxygen was started which resulted in HA improvement. However, she was still experiencing postural HA with neck stiffness. She agreed to a second EBP attempt which was successfully performed. She felt immediate symptom relief and was discharged the next day on 5/9/22.

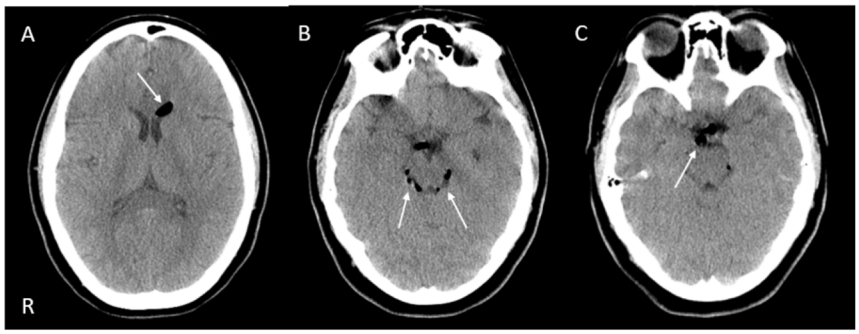
Discussion:
The overlap in presentation between PDPH and PC poses a challenge to diagnosis, and it is made more difficult when both occur concomitantly as in our patient. Small and self-limiting PCs can be missed or under-diagnosed if not considered early in differential. Since post dural HA usually presents after 36h of dural puncture, patients will likely be treated for concomitant PDPH, while PC is left untreated. Recognition of distinguishing clinical features and symptom onset may aid in prompt investigation and treatment. In our patient, the defining features were the sudden onset HA and neurological deficit (ear pressure/reduced hearing). Several reports have described similar PC presentation.1,2 Thus, clinicians should have PC on the differential if the HA presents immediately after UDP especially if there are

accompanying neurological deficits. Furthermore, clinicians should be aware of the possibility of both PC and PDPH occurring concomitantly.

References:

1. Reddi S, et al. Neurol Clin Pract. 2015;5:376-82. 2. Nistal-Nuño B, et al. F1000Res. 2014;3:166.

Figure 1. Head CT without contrast



THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 03

Aborted Epidural Blood Patch in an Obstetric Patient With Undiagnosed Lumbar Spinal Stenosis and Epidural Lipomatosis

Presenting Author: Briel Lee, MD

Presenting Author's Institution: UNC Hospitals - Chapel Hill, North Carolina

Co-Authors: Shahzeb Leghari - SGU
Christine P. McKenzie, MD - University of North Carolina

Introduction:
The incidence of unintentional dural puncture (UDP) in obstetric neuraxial anesthesia is approximately 1.5%, with post-dural puncture headache (PDPH) occurring in up to 70% of affected patients. Epidural blood patch (EBP) is the procedure of choice for patients with severe or refractory PDPH, with a low association with neurologic complications. We present a case of a patient undergoing multiple attempts of EBP that were aborted due to concerning neurologic findings, subsequently attributed to an undiagnosed spinal pathology.

Case One:
A 39-year-old gravida 1 patient at 17 weeks' gestation with a monochorionic diamniotic twin pregnancy came in for a cervical cerclage and microwave cord occlusion procedure. She received a combined spinal-epidural for neuraxial anesthesia which was complicated by an UDP with a 17G tuohy needle at the L2-3 interspace followed by successful epidural placement at L3-4. The surgical procedure was uneventful. On Postoperative Day (POD) 2, the patient began to experience a postural headache along with neck stiffness and photophobia. An EBP was planned at the L3-4 spinal level; however, fluid aspiration from the EBP needle raised concern for repeat dural puncture, and the procedure was abandoned after shared-decision making . The continued presence of PDPH-associated symptoms led to a second EBP attempt at L2-3 on POD3. On initial loss of resistance the patient experienced a severe paresthesia and the needle was withdrawn. On next attempt with needle advancement led to LOR with fluid from tuohy needle. A lidocaine test dose resulted in unilateral sensory changes. The procedure was aborted. An MRI of the lumbar region showed congenital spinal stenosis with small pedicles, large posterior epidural lipomatosis, air in the posterior epidural and subdural spaces, and a fluid collection in the posterior subdural space. The patient’s symptoms were managed with conservative therapy including intravenous fluids and oral analgesic medications. Her symptoms resolved within two weeks.

Discussion:
Extreme vigilance during EBP, especially in the presence of neurological symptoms and abnormal fluid return, is critical to avoid neurologic complications. Undiagnosed spinal stenosis and epidural lipomatosis significantly alter epidural anatomy increasing the risk of inadvertent intrathecal or subdural injections. Aborting EBP in the setting of neurologic symptoms or uncertain needle placement is critical to patient

safety, and imaging should be considered when clinical findings are atypical.

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THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 04

Beyond post-dural puncture headaches: Subdural hematomas after neuraxial placements

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Introduction:
Subdural hematoma (SDH) is a rare but potentially life-threatening complication in post-partum patients with an incidence of 1.5 per 100,000 deliveries.1,2 It is theorized that cerebral spinal fluid (CSF) leakage from the dural puncture can cause intracranial hypotension and traction on the bridging veins resulting in SDH. Among post-partum patients with a post-dural puncture headache (PDPH), the incidence of SDH increases to 147 per 100,000 deliveries.1

Case One:
A 29-year-old multigravida woman presented for elective repeat cesarean delivery. Combined spinal epidural (CSE) placement was difficult requiring 3 attempts. On post-operative day (POD) 1, she developed a non-positional, frontal headache and neck pain that did not improve with cyclobenzaprine and acetaminophen with caffeine. On POD 2, an epidural blood patch (EBP) with 20 mL of blood was performed for presumed PDPH given difficult CSE placement and persistent symptoms. Her headache briefly resolved but returned. The patient refused a repeat EBP and was discharged home on POD 3. Five weeks postpartum, she presented to the emergency department with severe, non-positional headache and emesis. Head CT revealed a large right frontoparietal subdural hematoma with mass effect and 14 mm left midline shift (Figure 1). Neurosurgery performed a craniotomy for SDH evacuation. Her symptoms improved, and she was discharged home on POD 2.

Case Two:
A 37-year-old multigravida woman with gestational hypertension was admitted for active labor. Dural puncture epidural placement was difficult requiring 2 attempts. She had an uncomplicated spontaneous vaginal delivery and was discharged home on post-partum day (PPD) 2. On PPD 5, she presented to the emergency department with worsening bilateral neck pain and headache concerning for PDPH. The brain MRI demonstrated bilateral SDHs (left: 5 mm, right: 2 mm), consistent with intracranial hypotension secondary to CSF leak. An EBP was performed with 18 mL of blood. Her symptoms resolved. Two hours later, she declined further recommended monitoring and left against medical advice.

Discussion:
Patients who develop PDPH after neuraxial anesthesia for childbirth have an increased absolute risk for SDH compared to patients without headache.1 Although symptoms of SDH can resemble those of PDPH,

clinicians should suspect SDH in patients with headaches that are persistent, severe, non-positional, or accompanied by neurological changes. Outcomes for SDH vary from full recovery to severe disability and death.

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Figure 1.pdf

THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 05

Cortical Vein Thrombosis Presenting After Apparent Resolution of Post-Dural Puncture Headache Following Epidural Blood Patch

Presenting Author: Juliana Kruthof, MD, MSc, FRCPC

Presenting Author's Institution: Department of Anesthesia, BC Women's Hospital, Vancouver, Canada. Department of Anesthesiology, Pharmacology and Therapeutics, University of British Columbia, Vancouver, Canada - Vancouver, British Columbia

Introduction:
Post-dural puncture headache (PDPH) is a common postpartum complication after neuraxial anesthesia and may require epidural blood patch (EBP)(1). In obstetric cohorts, EBP performed < 48 h after accidental dural puncture is associated with higher failure and repeat intervention, supporting delayed EBP when clinically feasible(2). However, postpartum headache has a wide differential with secondary causes that can mimic PDPH, including cerebral venous thrombosis (CVT) and intracranial hemorrhage3. Both of which can have severe long term sequalae(3).

Case One:
A healthy 34-year-old G2P1 at 39+1 weeks requested labour epidural analgesia. Placement required four attempts and unintentional dural puncture was not recognized. After uncomplicated vaginal delivery, she developed a severe positional frontal headache with neck/shoulder pain and auditory changes consistent with PDPH. Neurologic examination was normal. After counselling regarding higher early EBP failure rates, she deferred EBP until approximately 48 h postpartum. On postpartum day 2, she re-presented with persistent symptoms and underwent EBP (22 mL autologous blood and single midline L3–4 attempt) with complete symptom resolution. Within 24–48 h, she developed new left-sided sensory symptoms and mild weakness (leg > arm), most notable for impaired proprioception, without recurrence of positional headache. Neuroimaging demonstrated cortical vein thrombosis. Therapeutic low-molecular-weight heparin was initiated; she subsequently experienced a generalized tonic-clonic seizure and recurrent focal seizures despite levetiracetam and lacosamide. After CT evidence of hemorrhage, anticoagulation was held. She required brief ICU admission for seizure management and was discharged on dual antiseizure therapy with intensive physiotherapy. At 1-year follow-up she remains seizure-free on dual therapy, with mild motor recovery but persistent cognitive and word finding difficulties. Written informed consent was obtained.

Discussion:
Symptom resolution after EBP does not exclude evolving CVT in postpartum patients initially treated for PDPH. Although delaying EBP may improve efficacy, evidence is insufficient to determine whether delay modifies rare neurovascular risk. Postpartum patients treated for PDPH who develop new neurologic symptoms (including proprioceptive disturbance) or a change in headache phenotype after EBP should undergo urgent neuroimaging to exclude CVT and hemorrhage, and should not be presumed recurrent or

refractory PDPH

References:

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THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 06

More Than Just Air: A Case of Pneumocephalus, PDPH, & CVT

Presenting Author: Niketu Patel, MD

Presenting Author's Institution: University of Vermont Medical Center - Burlington, Vermont

Co-Authors: Liana Dagdavaryan, DO - University of Vermont Medical Center
Jennifer C. Gage, MD - University of Vermont

Introduction:
Pneumocephalus is a rare complication of epidural anesthesia resulting from the injection of air into the subarachnoid space usually due to an inadvertent dural puncture. The immediately ensuing headache can be severe and variably positional (1). Commonly concurrent in this clinical scenario, a post dural puncture headache (PDPH) is more insidious, persistent and usually positional. A pneumocephalus headache can delay the diagnosis and treatment of a PDPH which carries higher morbidity not limited to cerebral vein thrombosis or subdural hematoma (2).

Case One:
A 27-year-old G2P2 on PPD #2 after SVD at an outside hospital presented with new right arm weakness and worsening positional headache. The initial headache began during epidural placement using a loss of resistance to air technique. CT head confirmed pneumocephalus and she was treated with oral analgesics and supplemental oxygen. Prior to discharge from an outside hospital, she had symptomatic improvement and repeat CT showed reduction of air. Upon presentation, she was evaluated by acute pain service; however, an epidural blood patch (EBP) was deferred due to neurological deficits and the inability to distinctly discern between pneumocephalus headache and PDPH. Imaging prompted by new focal neurological deficits demonstrated residual pneumocephalus, evidence of intracranial hypotension, cortical vein thrombosis (CVT) and epidural fluid collections extending up the cervical spine. Therapeutic anticoagulation was initiated with enoxaparin. The etiology of the right arm weakness was unclear but was transient and fully resolved shortly after admission. She continued to have a positional headache and was amenable to an EBP. With hematology coordination, she was transitioned to heparin, which was paused for an EBP on PPD #4. Her headache resolved completely, and she was transitioned back to enoxaparin and discharged the following day.

Discussion:
The diagnosis of pneumocephalus can distract clinicians and delay the diagnosis of PDPH. Pneumocephalus is self-limiting and should not preclude a simultaneous PDPH evaluation. Acute changes in symptoms warrant a thorough evaluation for other etiologies (2). The CVT likely developed secondary to a persistent intracranial CSF volume loss, venous stasis and a prothrombotic peripartum period (2). The underlying issue of a CSF leak needs to be addressed to prevent further complications. In this case, it required multidisciplinary coordination to pause anticoagulation and safely perform an EBP in accordance with ASRA guidelines.

References:

1. Ahmad M, Bellamy S, Ott W, Mekhail R. Pneumocephalus secondary to epidural analgesia: a case report. J Med Case Reports. 2023;17(1):217 2. Uppal V, Russell R, Sondekoppam RV, et al. Evidence-based clinical practice guidelines on postdural puncture headache: a consensus report from a multisociety international working group. Reg Anesth Pain Med. 2024;49(7):471-501

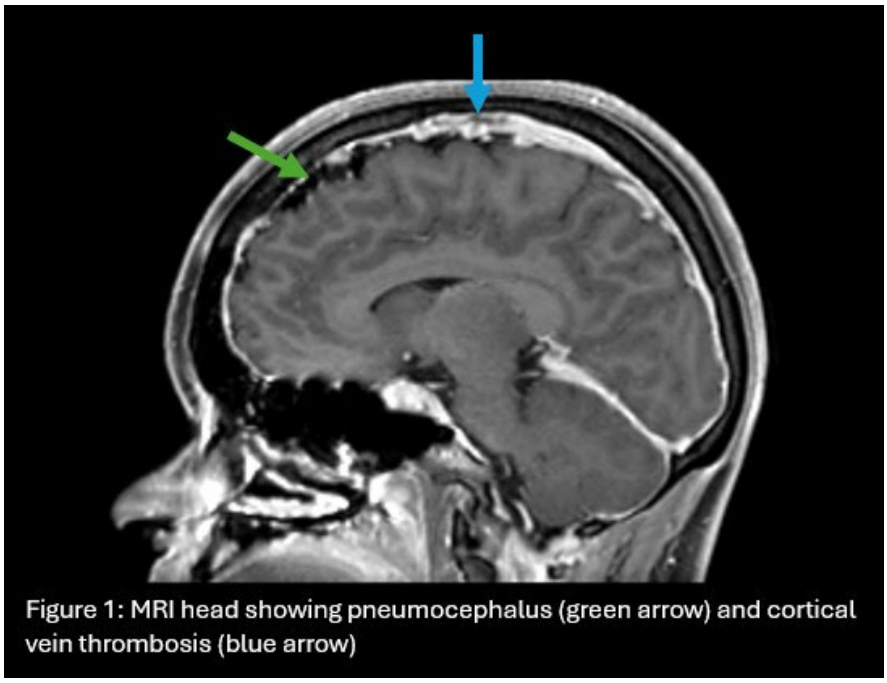

Figure 1: MRI head showing pneumocephalus (green arrow) and cortical vein thrombosis (blue arrow)

THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 07

Murphy's Law in Neuraxial Anesthesia: A Case of Iatrogenic Pneumocephalus After Repeat Epidural Blood Patch

Presenting Author: Anna Wright, MD

Presenting Author's Institution: Wake Forest University School of Medicine - Winston Salem, North Carolina

Co-Authors: Jessica Meister-Berger, MD, JD - Wake Forest University School of Medicine
Joe Mullis, DO - Wake Forest University School of Medicine

Introduction:
Pneumocephalus (PC), or air in the intracranial space, is a rare complication of neuraxial anesthesia procedures. The incidence is difficult to determine due to its rarity and reliance on imaging for diagnosis, but studies suggest rates up to 11% with epidural anesthesia (1). It is rarely associated with epidural blood patch (EBP) procedures. Studies show no statistically significant difference in overall success or complications between using loss of resistance to air (LORA) or saline (LORS) during EBP.

Case One:
An epidural procedure in a 24 year old G3P0020 parturient with LORA at L4/5 resulted in inadvertent dural puncture and subsequent intrathecal catheter placement. She developed a post dural puncture headache (PDPH) following catheter removal postpartum (PP) day 0. An EBP was placed at L3/4 with LORS PP day 0 due to limited access to care and PDPH severity. She experienced PDPH relief only until 72 hours PP, so a second EBP was then offered and proceeded uneventfully using LORA with < 1 ml of air at L4/5. Despite immediate PDPH relief, the patient developed a different, severe headache one hour after the EBP and was found to have moderate to large volume PC by MRI. Conservative management provided full resolution of symptoms by PP day 5, and no other complications or symptoms were noted at her time of discharge.

Discussion:
The degree of air entrapment in our patient is unclear and not consistent with the uneventful EBP nor the minimal air volume used for the LORA technique. Few mechanisms to explain PC resulting from neuraxial procedures have been postulated; the "inverted soda bottle" theory proposes that a negative pressure in the intrathecal space created by CSF loss or valsalva could provide a gradient for air to travel through the dural puncture (2), and the "ball valve" theory proposes that a one-way valve could have been created in the dura causing subdural air entrapment (3). Most cases associated with neuraxial procedures are classified as simple PC, which are treated with oxygen therapy and conservative management, but large volumes of air could lead to tension PC and herniation, which is life threatening and necessitates surgical intervention (2, 3). Utilizing a LORS technique when performing EBP for PDPH may be beneficial to preventing clinically significant PC.

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Murphy's Law in Neuraxial Anesthesia - A Case of Iatrogenic Pneumocephalus After Repeat Epidural Blood Patch.pdf

THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 08

Cerebral Venous Sinus Thrombosis Following Suspected Post–Dural Puncture Headache After Neuraxial Labor Analgesia

Presenting Author: Adrienne Clark, MD

Presenting Author's Institution: University of California San Francisco - San Francisco, California

Co-Authors: Ani Chilingirian, MD - UCSF Anesthesia
Man Kuan Lei, MD - UCSF Anesthesia

Introduction:
Postpartum headache following neuraxial anesthesia is commonly attributed to post–dural puncture headache (PDPH); however, serious intracranial pathology may present with overlapping features. Cerebral venous sinus thrombosis (CVST) is a rare but potentially life-threatening postpartum complication that can be difficult to distinguish from PDPH, particularly in the setting of suspected dural puncture. This case describes the diagnosis and management of a postpartum case of cerebral venous sinus thrombosis following neuraxial labor analgesia.

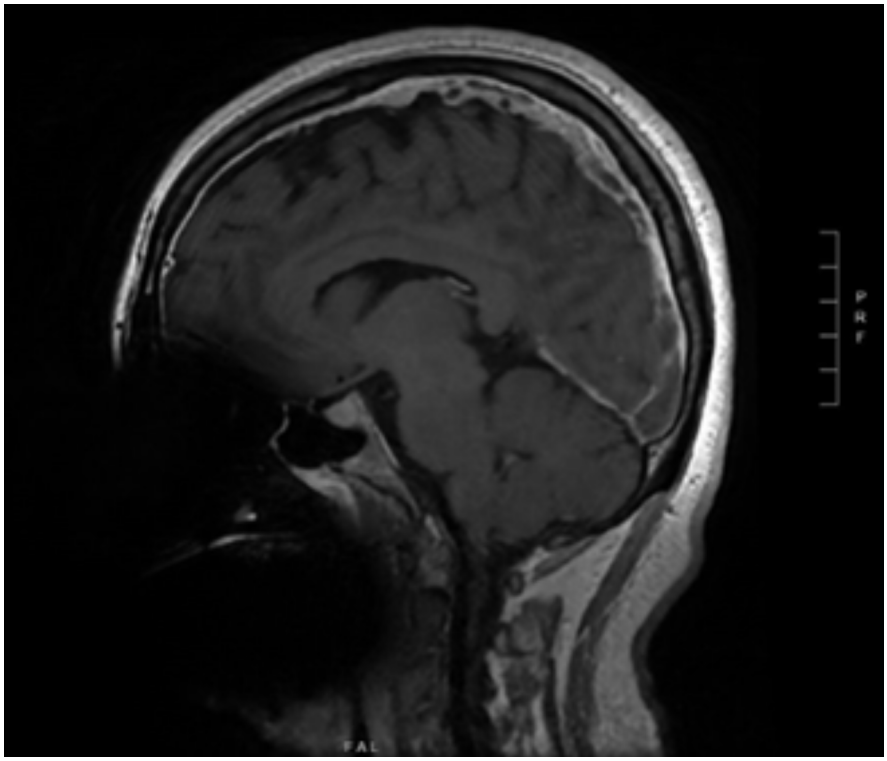
Case One:
A 25-year-old G3P0020 at 39w6d underwent a technically challenging combined spinal-epidural placement with multiple attempts. Labor and vaginal delivery were uncomplicated. She was discharged on postpartum day (PPD) 2 without symptoms. On PPD4, she re-presented with a positional frontal and occipital headache associated with nausea and vomiting. Neurologic exam and preeclampsia evaluation were unremarkable. She preferred conservative management of presumed PDPH with fluids and acetaminophen-butalbital-caffeine tablets and was instructed to return to care for consideration of an epidural blood patch if symptoms persisted. Symptoms initially improved but worsened on PPD8, becoming severe and non-positional with associated neck tenderness. Neuroimaging revealed extensive thrombosis of the superior sagittal sinus with extension into the transverse sinus and cortical veins, along with diffuse pachymeningeal enhancement and bilateral subdural fluid collections consistent with intracranial hypotension. She was admitted to the neurovascular service and treated with intravenous heparin. Repeat imaging was stable, and she was discharged on hospital day 5/PPD12 after transitioning to therapeutic enoxaparin. Follow-up hypercoagulability workup was negative, and MR venography at three months showed interval improvement.

Discussion:
This case highlights the diagnostic challenge of postpartum headache following neuraxial anesthesia. When headache features or severity evolve or fail to respond to conservative therapy, alternative diagnoses or complications should be considered (1). While PDPH is relatively common after unintentional dural puncture, the differential diagnosis for postpartum headache remains broad, especially with atypical or evolving headache presentation. Additionally, dural puncture itself has been identified as a risk factor for major neurologic complications including CVST and SDH (2, 3). This case emphasizes

the need for careful consideration of these alternative diagnoses as well as the utility of neuroimaging in early identification and treatment.

References:

1. JAMA. 2023;6(8):e2325387. 2. Int J Obstet Anesth. 2022; 49:103218. 3. Turk J Anaesthesiol Reanim. 2023 Apr 1;51(2):147–149



THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 09

Epidural Blood Patch Through an Epidural Catheter

Presenting Author: Jennifer Garcia, MD

Presenting Author's Institution: University of Texas Southwestern Medical Center - Dallas, Texas

Introduction:

Over 70% of laboring patients receive epidurals1. Inadvertent dural puncture is one of the well-known complications with epidural analgesia, occuring in about 0.2-0.9% of patients2-3. Of those, about 50-80% develop a post-dural puncture headache (PDPH)2-3. PDPH usually presents with a positional headache and may have associated nausea, neck pain/stiffness, dizziness, or visual symptoms not relieved by common medications. The gold standard treatment is an epidural blood patch (EBP)4. In most cases, the patient's labor epidural is removed prior to symptom onset. Thus, a new neuraxial is performed, posing additional risks. In patients with catheters still in place or having additional procedures, such as tubal ligation, EBP may be performed through an epidural catheter.

Case One:

A 24-year-old G3P2A0 female at 40w3d presented for active labor. She desired an epidural for labor, which was placed uncomplicated at L3-L4 level. Upon reassessment, the patient was not experiencing adequate pain control, and after troubleshooting, the decision was made to replace the epidural. During the first replacement attempt, an inadvertent dural puncture occurred with the Tuohy needle. At the second attempt, epidural was placed at L4-L5 level, and CSF was unable to be obtained with the pencan needle. The catheter was placed without dural puncture. The patient had an uncomplicated vaginal delivery, and her epidural was removed. She later developed a headache concerning for PDPH. EBP was offered, but after medication administration her headache improved, and EBP was deferred. The next day, she was scheduled for tubal ligation to be done under spinal analgesia. Prior to surgery, she again developed a severe positional headache and requested an EBP. We placed an epidural catheter to be used for both the tubal and the EBP to minimize the amount of neuraxial procedures. An epidural was placed at L3-L4 level and successfully used for the procedure. Once complete resolution of motor and sensory symptoms occurred, an EBP was performed with 20 milliliters of sterile blood injected into the epidural catheter. The catheter was removed immediately after injection. The patient experienced resolution of the headache with no recurrence of symptoms.

Discussion:

Here, we present a case where an EBP was performed through an epidural catheter. Performing an EBP through a preexisting catheter may be an option to relieve symptoms in patients with PDPH. It can help minimize additional neuraxials, especially in patients who underwent multiple attempts for initial placement. This can minimize risks such as inadvertent dural puncture, bleeding, and infection.

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1. Delgado C, et al. Anesth Analg. 2020;131(3):850-856. 2. Buddeberg BS, et al. Minerva Anestesiol. 2019;85(5):543-553. 3. Uppal V, et al. Reg Anesth Pain Med. 2024;49(7):471-501. 4. Uppal V, et al. JAMA Netw Open. 2023;6(8):e2325387.

THURS - CR - BS 1 - BR 3A - PDPH - Management and Morbidity – 10

Fluoroscopic Evidence of Retrograde Contrast Spread from the Epidural to Subarachnoid Space During an Epidural Blood Patch in an Obstetric Patient

Presenting Author: Charlotte E. Bloom, DO

Presenting Author's Institution: Dartmouth Hitchcock Medical Center - Lebanon, New Hampshire

Co-Authors: Simran Sehgal, BS, MA - Geisel Medical School

Introduction:
Post dural puncture headache (PDPH) is a common complication in neuraxial anesthesia and an epidural blood patch (EBP) is considered definitive treatment. While EBPs are commonly successful, they are not without risk. We present a case of fluoroscopic evidence of communication between the epidural and subarachnoid space. This case highlights the importance of weighing the risks and benefits of EBPs.

Case One:
A 39-year-old female, G5P4 presented at 37 weeks and 4 days for an induction of labor in the setting of prior cesarean delivery and current twin pregnancy, with the presenting fetus in cephalic position and the following fetus in complete breech position. Early placement of a labor epidural was recommended in the setting of planned breech extraction and elevated risk of emergent cesarean delivery. The patient's course was complicated by inadequate epidural analgesia followed by intentional intrathecal catheter placement after risks and benefits were reviewed extensively. The intrathecal catheter remained in place for a total of 16 hours and worked well throughout labor and vaginal delivery, including a breech extraction of the second twin. On postpartum day 0, she developed symptoms consistent with a severe PDPH. Approximately 1 hour after the intrathecal catheter removal, the patient underwent an EBP with fluoroscopic guidance. The fluoroscopic images obtained during the EBP revealed both epidural spread and a striated cauda equina pattern consistent with subarachnoid involvement. Following additional review of risks and benefits with the patient, the decision was made to proceed with the EBP. The patient had resolution of her neurological symptoms within one hour, was ambulatory within two hours, and continued to remain asymptomatic from complications on postpartum days 3 and 7.

Discussion:
An EBP remains the most effective treatment for PDPH, yet it is an invasive neuraxial procedure with known risks (1,2). Additionally, our understanding of complications from both an untreated PDPH and performing an EBP is evolving. This case reports the first fluoroscopic correlate for complications of intrathecal blood, such as arachnoiditis or chemical meningitis (3), although no such complications were observed in this patient. Fortunately these risks are rare but can be catastrophic when they do occur. This case further supports the importance of shared decision making with patients when treating PDPH.

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an Obstetric Patient with Postdural Puncture Headache: A Case Report and Synthesis of the Literature. Tan B, ed. Case reports in anesthesiology. 2020;2020(2020). 2. Rice I, Wee MY, Thomson K. Obstetric epidurals and chronic adhesive arachnoiditis. Br J Anaesth. 2004 Jan;92(1):109-20. 3. Chiapparini L, Sghirlanzoni A, et al. Imaging and outcome in severe complications of lumbar epidural anaesthesia: report of 16 cases. Neuroradiology. 2000;42(8):564-571.

SOAP 2026 Abstract Epidural Blood Patch.pdf

THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 01

Unusual Presentation of Uterine Rupture

Presenting Author: Silvia Chiang, MD

Presenting Author's Institution: University of California Irvine - Orange, California

Introduction:
Uterine rupture is a rare but life-threatening obstetric complication most commonly associated with trial of labor after cesarean delivery. Classic findings include abdominal pain, vaginal bleeding, abnormal fetal heart rate tracings, and loss of fetal station; however, atypical presentations may delay diagnosis. Management is particularly challenging in the setting of intrauterine fetal demise (IUFD), where the absence of fetal considerations may influence the threshold for surgical intervention.

Case One:
A 34-year-old G3P2002 woman with two prior low transverse cesarean deliveries presented for induction of labor following IUFD at 36 weeks' gestation and desired a trial of labor after cesarean. On hospital day two, she developed acute shortness of breath and chest pain radiating to her back, with tachycardia and hypotension. She had no abdominal tenderness, distension, vaginal bleeding, cervical change, or loss of fetal station. Bedside EKG showed sinus tachycardia; FAST scan was negative for intra-abdominal free fluid, and transthoracic echocardiography was limited. Due to concern for a cardiopulmonary etiology, she was transferred to the ICU, and uterine rupture was initially considered less likely. Shortly after ICU admission, the patient developed new abdominal pain and rapidly decompensated, requiring intubation and vasopressor support. Repeat FAST scan demonstrated moderate intra-abdominal free fluid, with hemoglobin decreasing from 12.5 to 9.1 g/dL. She was taken emergently to the operating room, where vaginal bleeding was first noted. Exploratory laparotomy revealed a transverse rupture of the lower uterine segment at the prior uterine incision. She received massive transfusion and recovered without further complications.

Discussion:
We describe an unusual case of uterine rupture presenting with sudden chest pain, shortness of breath, hypotension, and tachycardia. A stable cervical exam, absence of vaginal bleeding, and lack of abdominal tenderness initially prompted consideration of alternative, primarily cardiopulmonary, diagnoses. The absence of a viable fetus also influenced the decision to initially pursue conservative management despite acute maternal decompensation. In cases with potential fetal viability, management would likely prioritize rapid intervention, including emergent cesarean delivery. This case highlights the importance of early multidisciplinary involvement during acute maternal decompensation. In atypical presentations that mimic non-obstetric emergencies, anesthesiologists play a pivotal role in navigating diagnostic uncertainty and coordinating timely operative readiness. Early activation of multidisciplinary response teams may improve outcomes in uterine rupture and other rare but life-threatening obstetric events.

References:

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THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 02

From Spontaneous Unscarred Uterine Rupture With Occult Retroperitoneal Hematoma To Upper Extremity Phlegmasia Cerulea Dolens: A Cascade Of Coagulopathy And Paradoxical Thrombosis

Presenting Author: Francinni Mambrini Pires Rego, MD

Presenting Author's Institution: Hospital das Clinicas da Universidade de São Paulo - Sao Paulo, Sao Paulo

Co-Authors: Andre M. Henrique, MD - Hospital das Clinicas da Universidade de São Paulo

Mariana Rego de Carvalho, MD - Hospital das Clinicas da Universidade de São Paulo

Introduction:
Spontaneous rupture of an unscarred uterus occurs in 1:5,700-20,000 deliveries.[1] When hemorrhage dissects into the retroperitoneum, diagnosis is delayed, intensifying the cascade from consumptive coagulopathy to paradoxical hypercoagulability. Upper extremity Phlegmasia Cerulea Dolens (PCD) carries amputation rates of 12-50%.[2],[3],[4] We report the first case of spontaneous unscarred uterine rupture with occult retroperitoneal hematoma leading to massive transfusion and upper extremity PCD.

Case One:
A 35-year-old primigravida at 40+1 weeks underwent labor induction for lethal fetal anomalies. During labor under combined spinal-epidural analgesia, she developed sudden collapse (BP 60/40, HR 140) and profuse vaginal hemorrhage. Rupture was not suspected (unscarred uterus, no oxytocin, no trauma). Emergency ultrasound was negative as blood dissected into the retroperitoneum with no intraperitoneal fluid. Forceps delivery yielded a stillbirth. Progressive shock prompted laparotomy, revealing spontaneous rupture with 3,500 mL isolated retroperitoneal hematoma. ABG: pH 6.98, lactate 12.4, base deficit -18. The patient underwent hysterectomy, salpingo-oophorectomy, and retroperitoneal exploration. MTP: 4U PRBC, 1,400 mL FFP, 3g fibrinogen,[5] 6L crystalloids, vasopressors. Vascular access: bilateral 16G IVs, CVC, arterial line. EBL: 5,200 mL. Six hours postoperatively, sudden cyanosis, pain (8/10), and edema (3+/4+) developed in the left upper extremity. Doppler confirmed DVT of brachial, cephalic, and basilic veins (PCD).[6] Enoxaparin 60 mg SC q12h initiated 18 hours post-op.[7] Complete resolution over 72 hours. Discharge POD 9 with full limb function.

Discussion:
This unprecedented case illustrates paradoxical transition from consumptive to thrombotic coagulopathy. Unscarred uterine rupture[8] with isolated retroperitoneal dissection produced false-negative ultrasound, delaying intervention and intensifying coagulopathy.[9] Prolonged shock created Virchow's triad: consumptive coagulopathy followed by rebound hypercoagulability,[10] compounded by endothelial injury from IV resuscitation.[11] No prior reports exist of upper extremity PCD following obstetric MTP. Early anticoagulation proved limb-salvaging.[12] Key insights: (1) suspect rupture even with unscarred uterus; (2)

retroperitoneal hemorrhage masks ultrasound; (3) coagulation cascade is rapid; (4) examine all extremities post-MTP; (5) aggressive IV access predisposes to thrombosis; (6) early anticoagulation prevents amputation. Occult retroperitoneal hemorrhage precipitates a coagulopathic cascade culminating in rare upper extremity PCD.

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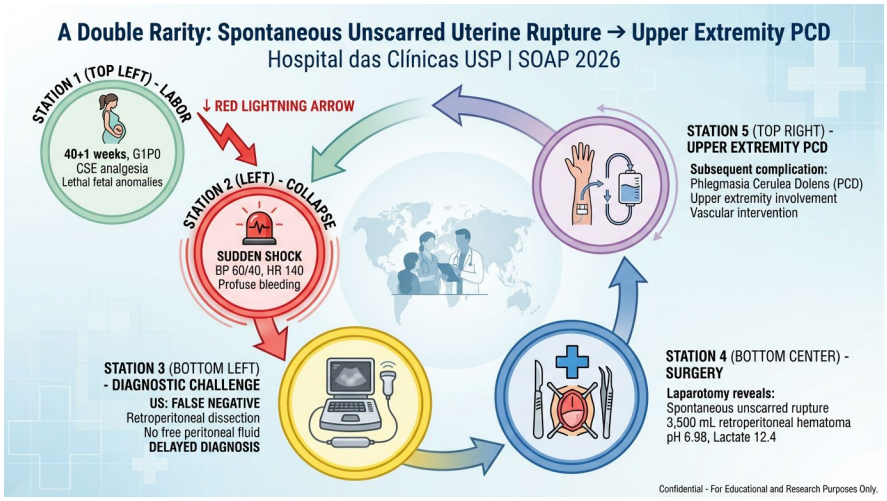

THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 03

Early Gestational Uterine Rupture: A Rare Anesthetic Emergency at 13 Weeks

Presenting Author: Chloe Abbott

Presenting Author's Institution: Atrium Health Wake Forest Baptist Medical Center - Winston-Salem, North Carolina

Co-Authors: Tyler King, MD - Atrium Heath Wake Forest Baptist
Shriram S. Mahabal, MBBS - Wake Forest Baptist Medical Center
John Thomas, MD - Wake Forest University School of Medicine

Introduction:
Uterine rupture is a rare but catastrophic obstetric emergency most associated with labor in the third trimester, particularly in patients with prior cesarean delivery. Emerging literature demonstrates that uterine rupture can occur as early as 9–11 weeks' gestation. Prior uterine scar integrity, maternal comorbidities, and intrapartum management are key contributers [1]. Notably, over half of patients with prior uterine surgery had undergone a low transverse cesarean delivery, indicating that traditionally lower-risk uterine incisions do not eliminate rupture risk [2]. Early-gestation rupture is often overlooked due to nonspecific symptoms and low clinical suspicion, resulting in delayed diagnosis and increased maternal morbidity.

Case One:
A 40-year-old gravida 6 para 1 woman at 13 weeks and 5 days' gestation presented with acute abdominal pain, hypotension, and tachycardia. Her history included a low transverse cesarean delivery seven months prior, transabdominal cerclage, epilepsy, and mild intermittent asthma. Initial evaluation favored non-obstetric etiologies. Laboratory studies revealed severe anemia, metabolic acidosis, and evolving coagulopathy. Persistent hemodynamic instability prompted computed tomography, which demonstrated a full-thickness myometrial defect with peri-uterine hematoma and hemoperitoneum consistent with uterine rupture. Emergent exploratory laparotomy revealed approximately 2 liters of hemoperitoneum and a 4-cm uterine rupture. The defect was repaired, and pregnancy was delivered via classical hysterotomy. General anesthesia was induced with endotracheal intubation using a 6.5-mm tube. An arterial line and internal jugular double-lumen central venous catheter were placed. Anesthesia was maintained with sevoflurane, with norepinephrine and phenylephrine infusions for hemodynamic support. The patient received 7 L crystalloid, 4 units packed red blood cells, and 1 unit fresh frozen plasma. Due to persistent metabolic acidosis, she remained intubated postoperatively and was transferred to the surgical ICU. She recovered without complication and was discharged on postoperative day five.

Discussion:
This case demonstrates that spontaneous uterine rupture can occur in early pregnancy, even following a low transverse cesarean incision and outside the intrapartum period. Uterine rupture should remain in the differential diagnosis for pregnant patients presenting with acute abdominal pain, hemodynamic

instability, or unexplained anemia, regardless of gestational age. Early recognition and prompt surgical intervention are critical to minimizing maternal morbidity and mortality.

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THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 04

Spontaneous Uterine Rupture In An Unscarred Primigravida: Diagnostic Challenges Under Epidural Analgesia

Presenting Author: Charlene Wun Kuk, MS

Presenting Author's Institution: The Ohio State University College of Medicine - Hilliard, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center

Introduction:
Uterine rupture is a rare, life-threatening obstetric emergency. Risk factors for uterine rupture include prolonged use of uterotonic medications, uterine overdistension or anomalies, and connective tissue disorders. Classic symptoms, such as sudden abdominal pain, may be obscured by epidural analgesia. Here, we report a case of spontaneous uterine rupture in a healthy primigravid patient during vaginal delivery with epidural analgesia, highlighting diagnostic challenges and anesthesia management.

Case One:
A 36-year-old primigravida at 40w2d underwent induction of labor with misoprostol and oxytocin and received epidural analgesia. Her obstetric history was uncomplicated aside from resolved placenta previa. After prolonged labor, forceps-assisted delivery was performed for suspected fetal malposition. During repair of a third-degree laceration, brisk bleeding and hemodynamic instability developed. Despite administration of tranexamic acid, methylergonovine, rectal misoprostol, and JADA device placement, hemorrhage persisted JADA. Persistent bleeding prompted bedside ultrasound, which revealed intraabdominal free fluid with the JADA balloon visualized in an extrauterine position, raising concern for uterine rupture. The patient was taken emergently to the operating room for an exploratory laparotomy. General anesthesia was induced with invasive monitoring and multiple large-bore intravenous accesses. Intraoperative findings revealed a 12-cm posterior uterine rupture extending from the cervix with extensive lacerations tracking into the pararectal spaces. Due to uncontrolled hemorrhage and severe tissue friability, hysterectomy with partial vaginectomy and complex vaginal repair were performed. Massive transfusion protocol was activated (23 pRBC, 20 FFP, 6 Platelets, 7 cryoprecipitate), with a quantitative blood loss of 12 liters. The patient was transferred intubated to the surgical ICU and was extubated uneventfully overnight.

Discussion:
This case challenges the assumption that uterine rupture is unlikely in primigravid patients without prior uterine surgery. The combination of oxytocin augmentation and epidural analgesia may increase rupture risk while simultaneously masking pain, contributing to delayed recognition. Vigilance for unexplained hemorrhage and evolving maternal instability is essential, even in the absence of classic risk factors. Prompt interdisciplinary communication, early imaging, and coordinated resuscitation are critical to

improving maternal outcomes in this rare but life-threatening obstetric event

References:

Fitzpatrick KE, PLoS Med, 2019, p. e1002803. Kakoma T, J Obstet Gynaecol, 2020, pp. 1127-1130. Jenkins TM, T, J Trauma Acute Care Surg. 2017, pp. 504–508.

THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 05

Posterior Uterine Rupture: Pain as Presenting Symptom

Presenting Author: Abigail Cantwell, MD

Presenting Author's Institution: Oregon Health and Science University - Portland, Oregon

Co-Authors: Garrett Buechner, MD - Oregon Health and Science University
Meredith Degnan, MD - Oregon Health and Science University

Introduction:
Uterine rupture is a life-threatening complication, and prompt diagnosis is critical for maternal and fetal outcomes. Patients undergoing a trial of labor after cesarean (TOLAC) are at increased risk, with reported rupture rates of 0.7–1.9% depending on prior uterine incision type.(1) Uterine rupture is associated with significant maternal morbidity, including postpartum hemorrhage and hysterectomy, as well as adverse fetal outcomes such as low APGAR scores and fetal mortality, reported as high as 19% in studies.(2) Pain is frequently cited as a hallmark symptom of uterine rupture, particularly when it presents atypically. Abdominal pain is the most commonly reported symptom, though distinguishing abnormal pain from normal labor discomfort remains a clinical challenge.(3)

Case One:
We report a case of a 31-year-old G4P1021 at 39W5D gestation who presented in spontaneous labor and desired TOLAC after a prior low transverse cesarean delivery. She received a functioning epidural and progressed to full dilation. Upon initiation of pushing, she experienced an abrupt increase in pain, prompting evaluation of epidural function. Although normotensive, she was persistently tachycardic during the second stage of labor with initially reassuring fetal heart rate tracing. Dermatomal assessment revealed asymmetric analgesia (T10 on the left, L1 on the right), and the epidural was bolused with transient relief. She subsequently developed new-onset, right-sided abdominal pain distinct from prior labor pain. Her tachycardia worsened into the 130s, and fetal heart rate tracing demonstrated late decelerations, prompting emergent cesarean delivery. The neonate was delivered via repeat low transverse incision without complication; however, uterine atony and hemorrhage ensued. Despite administration of tranexamic acid, oxytocin, methergine, and misoprostol, the patient became hypotensive (nadir 55/32 mmHg) with tachycardia to the 140s. Re-exteriorization of the uterus revealed a posterior uterine defect. General anesthesia and massive transfusion protocol were initiated, including placement of a MAC introducer and arterial line. Due to ongoing hemorrhage, hysterectomy was performed. The patient received eight units of packed RBCs, five units of FFP, and one unit of platelets, guided by TEG. She recovered well and was extubated on postoperative day one.

Discussion:
This case highlights the diagnostic difficulty of uterine rupture during TOLAC, particularly in patients with effective neuraxial analgesia and initially reassuring fetal monitoring. Presentation may be subtle; in this patient, evolving focal abdominal pain despite a functioning epidural was the earliest sign. Atypical pain

inconsistent with labor stage should prompt consideration of uterine rupture. This case underscores pain as an early indicator of uterine rupture and emphasizes the importance of heightened vigilance and multidisciplinary readiness in high-risk obstetric patients.

References:

1.PMID:15598960 2.PMID:35105342 3.PMID:41161685

THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 06

Severe Pain and Diagnostic Pitfalls: Two Cases of Uterine Rupture in a Scarred Uterus

Presenting Author: Borislava Pujic, PhD

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Co-Authors: Slavica Krusic, Anesthesiologist - GAK Narodni Front

Introduction:
Uterine rupture is rare but life-threatening. In patients with prior uterine surgery, severe abdominal pain may precede hemodynamic collapse, and ultrasound can be falsely reassuring. Early recognition and immediate escalation are crutial when maternal status deteriorates despite an initially reassuring fetal assessment.

Case One:
A 37-year-old G4P1 at 38+5 weeks with a prior CD and myomectomy presented with premature rupture of membranes and pain out of proportion to the clinical examination. Initial assessment did not indicate immediate CD. FHR remained reassuring; however, the patient became hypotensive with severe pain. Emergent CD under GA was performed ~60 min after admission. Laparotomy showed complete uterine rupture at the prior myomectomy site with the fetus in the abdominal cavity and ~1.5 L hemoperitoneum. A live neonate (3500 g; Apgar 8/9) was delivered. Oxytocin, methylergonovine, and tranexamic acid were administered, and blood products were transfused (4 U PRBC, 4 U FFP, and 10 U cryoprecipitate). Maternal recovery was uncomplicated; discharged on postoperative day 5 with the neonate.

Case Two:
A 40-year-old G3P2 at 26 weeks with two prior CDs and placenta previa (no antenatal suspicion of PAS) presented with overnight onset of sharp abdominal pain. She was transferred to our hospital at 07:00. Ultrasound demonstrated free intra-abdominal fluid without certain evidence of uterine rupture. Despite persistent abdominal pain and a declining hemoglobin level, diagnostic paracentesis confirmed hemoperitoneum. Emergent CD under GA was performed ~4 h after arrival. Intraoperatively, partial uterine rupture and PAS (suspected percreta) were identified. Cesarean hysterectomy was required and complicated by iatrogenic bladder injury. Cell salvage (~500 mL) and allogenic transfusion were used (4 U PRBC, 5 U FFP; no platelets). The postoperative course was uncomplicated and mother was discharged od postoperative day 10. The neonate (680 g; Apgar 5/6) died on NICU day 20.

Discussion:
In scarred uteri after prior surgery (CD and/or myomectomy), pain out of proportion should be the sign of serious condition. Outcomes depend on rapid multidisciplinary coordination and hemorrhage readiness (cell salvage and a transfusion pathway/MTP, as available). Time- to- delivery decision could be crucial for saving mother’s and baby’s life.

References:

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THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 07

A case of uterine rupture requiring emergent cesarean delivery in a patient with minimal risk factors

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Co-Authors: Vilma E. Ortiz, MD - Massachusetts General Hospital
A. Taylor Thomas, MD, MPH - Massachusetts General Hospital

Introduction:
Uterine rupture is an obstetric emergency that can significantly harm the mother and fetus [1, 2]. A fetal heart rate (FHR) abnormality can be the initial sign, and 9% of patients will present with a triad of abnormal FHR tracing, abdominal pain, and vaginal bleeding [1].

Case One:
A 39-year-old G6P3023 at 39w5d with BMI 40, three prior spontaneous vaginal deliveries, and no prior uterine surgery was admitted for induction of labor due to a small fetal pericardial effusion on biophysical profile. The patient's initial labor course was unremarkable. An epidural was placed with good analgesic effect. One hour later, there was a prolonged FHR deceleration to 60 bpm. The patient also reported severe abdominal pain, and a moderate amount of bright red blood was noted on vaginal exam. Due to ongoing fetal distress and concern for placental abruption, the patient was emergently taken to the operating room (OR). The epidural was dosed with 2% lidocaine with epinephrine and bicarbonate, and an appropriate surgical level for emergent cesarean section was achieved. A diagnosis of uterine rupture was made shortly after incision. The infant was delivered in stable condition within 10 minutes of the decision to bring the patient to the OR. Oxytocin was started. A 16-gauge intravenous catheter and an arterial line were placed, and resuscitation with blood products was initiated. Estimated blood loss (EBL) immediately after delivery was 2L. The patient required escalating doses of vasopressors and resuscitation because of ongoing hemorrhage. After one hour, due to hemodynamic instability, general anesthesia was induced with ketamine, succinylcholine, and Glidescope intubation. Methylergonovine, carboprost, tranexamic acid, and calcium were administered for ongoing atony and surgical bleeding. A bedside transthoracic echocardiogram showed an underfilled left ventricle. Ultimately, surgical repair of the uterus and hemostasis were achieved. Volume resuscitation included 7 units of red cells, 6 units plasma, 1 pool of cryoprecipitate, 1 six-pack of platelets, 500cc albumin, and 2L crystalloid. The total EBL was 6.5L. The patient was transferred to the intensive care unit with an endotracheal tube in place and on a norepinephrine infusion of 4mcg/min. She was weaned off vasopressors and extubated on postoperative day (POD) 1 and discharged from the hospital on POD 5.

Discussion:
Uterine rupture is rare but must be considered for sudden fetal distress, maternal hemodynamic instability, abdominal pain, and/or vaginal bleeding. Neuraxial or general anesthesia can be appropriate

for emergent cesarean delivery [1]. The team's identification of fetal distress, quick surgical intervention, close communication, and prompt resuscitation contributed to a favorable outcome.

References:

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THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 08

Conservative management of uterine rupture after Vaginal Birth After Cesarean

Presenting Author: Flavia Dumitrascu, MB, BCh, BAO

Presenting Author's Institution: SUNY Downstate Health Sciences University - Brooklyn, New York

Introduction:
Uterine rupture is a potentially catastrophic complication of labor and delivery, most often requiring immediate surgical intervention. Factors such as Trial of Labor After Cesarean (TOLAC) and Induction of Labor (IOL) place patients at an increased risk. (1) We present the case of a 33 year-old parturient whose delivery was complicated by uterine rupture and was successfully managed medically.

Case One:
A 33 year-old G3P2 presented at 39 weeks gestational age for IOL and TOLAC secondary to polyhydramnios. She had no past medical history and a past obstetrical history of uncomplicated cesarean delivery due to breech presentation. IOL and TOLAC were successful and the patient delivered vaginally under effective epidural analgesia. Delivery was complicated by uterine atony and postpartum hemorrhage (PPH) with an estimated blood loss of 729mL. PPH was managed medically with intramuscular methylergonovine and rectal misoprostol without further interventions. Two hours after delivery, routine labs showed a decrease in hemoglobin from 9 g/dL to 8.2 g/dL. Despite no further overt bleeding, the patient was found to be dizzy, tachycardic (110 BPM) and hypotensive (SBP 80-90 mmHg). A clinical decision was made to transfuse two units of PRBCs, which led to the resolution of symptoms. On postpartum day one, patient reported worsening abdominal pain and physical exam revealed marked abdominal distension with rebound tenderness in the left upper and lower quadrants. A FAST exam performed bedside showed a significant amount of hypoechoic free fluid between the spleen and diaphragm and a small amount of fluid in the right upper quadrant with overall concern for uterine rupture. A subsequent CT scan of the abdomen and pelvis confirmed the diagnosis of uterine rupture with a large adjacent hematoma measuring 7.6 x 12.4 x 10.4 cm. The patient was extensively counseled on treatment options including surgical intervention, uterine artery embolization and expectant medical management. She opted for expectant monitoring, reserving surgical repair only for further active bleeding. She was transferred to the intensive care unit where over the next few days developed sepsis secondary to endometritis as well as pleural effusion. She was treated with antibiotics, diuresis and thoracentesis and recovered. She left against medical advice at post-partum day 14 and continued her follow up as an outpatient, with serial CT scans showing interval reduction in uterine size and edema.

Discussion:
This case highlights a rare circumstance in which conservative medical management of uterine rupture can be successfully attempted. It also underscores the importance of interdisciplinary coordination between the anesthesia and obstetric teams.

References:

(1) Deshmukh U, Denoble AE, Son M. Trial of labor after cesarean, vaginal birth after cesarean, and the risk of uterine rupture: an expert review. Am J Obstet Gynecol. 2024 Mar;230(3S):S783-S803. doi: 10.1016/j.ajog.2022.10.030. Epub 2023 Jul 13. PMID: 38462257.

Conservative management of uterine rupture after Vaginal Birth After Cesarean.pdf

THURS - CR - BS 1 - BR 3B - Uterine Rupture! - 09

A Case of Uterine Rupture in a Patient with Sickle Cell Disease

Presenting Author: Margaret Duval, MD

Presenting Author's Institution: New York Presbyterian- Weill Cornell Medicine - New York, New York

Co-Authors: Rima Abhyankar, MD
Dorian Batt, MD - Weill Cornell Medicine
Shray Parimoo, BS

Introduction:
Uterine rupture is a rare but catastrophic obstetric emergency that may present with severe abdominal pain and rapidly progress to fetal compromise.1 In sickle cell disease (SCD), labor can precipitate vaso-occlusive events, complicating diagnosis, resuscitation, and anesthetic management of rupture.2

Case One:
A 25-year-old G2P1 with a history of SCD requiring transfusions, prior cerebrovascular accident, prior cardiomyopathy, and prior (preterm?) cesarean delivery presented at 35w5d with lower extremity pain and edema. Labs were notable for hemoglobin of 6, BNP 115, and haptoglobin < 10mg/dL. TTE demonstrated left ventricular hypertrophy with preserved LVEF. She was admitted for management of abdominal pain and optimization of care. Multidisciplinary meeting with hematology, cardiology, and MFM included transfusions, diuresis, serial complete blood and reticulocyte counts, and daily fetal monitoring. On day 4, she developed severe abdominal pain. Abdominal ultrasound, fetal monitoring, pelvic exam, and lab results were unchanged. Therefore, the initial diagnosis was sickle cell crisis; she was initiated on oxygen and a patient controlled IV analgesia. On day 5, she described localized lower abdominal constant pain unlike any prior pain crisis. CT angiography was obtained to rule out mesenteric ischemia and was negative for acute findings. Uterine contractions were observed on external fetal monitoring. Given clinical concern for occult uterine rupture, the decision was made to proceed with cesarean section. Shortly after combined spinal-epidural, fetal bradycardia developed, prompting escalation to emergent delivery. Upon incision, a 3cm transverse uterine rupture was identified with evidence of placental abruption. The infant was delivered successfully with Apgars 7/9. Maternal hemorrhage was managed with transfusion of 4 units of red blood cells, TXA, and calcium. Quantitative blood loss was 1584 mL. Postop pain was managed by PCEA, acetaminophen, and ibuprofen. Epidural was discontinued on post-operative day 3, and the patient was discharged on post-operative day 4.

Discussion:
Uterine rupture may be clinically occult and evade initial imaging despite severe abdominal pain, necessitating vigilance particularly in patients with pre-existing pain disorders.1,2 In patients with SCD, anticipatory multidisciplinary planning, early blood product readiness, and careful coordination of analgesia and resuscitation are essential, given the frequency of pain, anemia and sickling-related complications in SCD pregnancies.2

References:

1. Rottenstreich M, Rotem R, Hirsch A, et al. Delayed diagnosis of intrapartum uterine rupture - maternal and neonatal consequences. J Matern Fetal Neonatal Med. 2021;34(5):708-713. 2. Obadina MA, Pecker LH. Proactive management to improve outcomes of high-risk pregnancy in people with sickle cell disease. Hematology Am Soc Hematol Educ Program. 2025;2025(1):511-522.

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 01

Neuraxial Anesthesia for Cesarean Delivery in a Parturient with Spinal Epidural Lipomatosis and Chiari I Malformation: A Case Report

Presenting Author: Paulina Blanc, DO

Presenting Author's Institution: George Washington Medical Faculty Associates - Washington, District of Columbia

Co-Authors: Jonathan Aronson, MD - UAMS
Paulina Blanc, DO - UAMS

Introduction: Spinal epidural lipomatosis (SEL) is a rare condition characterized by excessive adipose deposition within the epidural space, potentially distorting normal anatomy and altering local anesthetic spread. Neuraxial block performance and reliability may therefore be unpredictable, and SEL is often regarded as a relative contraindication to epidural techniques. The coexistence of SEL and Chiari I malformation presents an additional challenge due to altered cerebrospinal fluid (CSF) dynamics and potential for exaggerated cephalad spread of intrathecal medications. Reports describing anesthetic management in such parturients remain limited

Case One: A 24-year-old G2P1 was admitted for non-reassuring fetal testing and scheduled for cesarean delivery. MRI demonstrated prominent epidural fat throughout the thoracic and lumbar spine with mild-to-moderate thecal sac narrowing extending from L2 to S1, consistent with SEL. A concurrent Chiari I malformation was also noted. Pre-procedural ultrasound was used to map spinal anatomy and identify interspaces. A combined spinal-epidural (CSE) technique was planned using a reduced intrathecal dose. Despite three distinct losses of resistance, CSF could not be obtained, likely due to epidural space distortion from lipomatosis. An epidural catheter was threaded at the L3–4 level. A subsequent single-shot spinal was performed one level below (L4–5). Surgical anesthesia was achieved with the spinal dose, supplemented with one epidural top-up (5 mL of 2% lidocaine with epinephrine and bicarbonate). The patient remained hemodynamically stable, and the intraoperative and postoperative courses were uneventful.

Case Two:

Discussion: This case illustrates the technical challenges and anatomical unpredictability encountered when performing neuraxial anesthesia in a parturient with SEL, further complicated by the presence of Chiari I malformation. Multiple puncture attempts and difficulty accessing CSF highlight the altered epidural and subarachnoid relationships caused by excessive epidural fat deposition. The decision to proceed with a modified CSE approach, guided by ultrasound and followed by careful titration, proved effective and safe. Individualized planning including imaging review, ultrasound guidance, incremental dosing, and preparedness for conversion to general anesthesia are essential in managing these complex

cases. Neuraxial anesthesia can be successfully and safely administered in parturients with concurrent spinal epidural lipomatosis and Chiari I malformation when meticulous technique and vigilant monitoring are employed. While anatomical distortion may complicate spinal access and local anesthetic spread, a cautious, image-guided approach allows for adequate anesthesia without complications. Further case reporting is needed to refine best practices for this rare but challenging clinical scenario.

References: PMID: 30007801 PMID: 31523590 PMID: 15795966).

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 02

Planned General Anesthesia for Cesarean Delivery in Parturient with Chiari Malformation

Presenting Author: Victoria Buckman, MD

Presenting Author's Institution: Beth Israel Deaconess Medical Center - Boston, Massachusetts

Introduction: Chiari malformation presents anesthetic challenges during pregnancy due to concerns regarding altered cerebrospinal fluid dynamics and potential neurologic deterioration with neuraxial anesthesia. While neuraxial techniques are generally preferred for cesarean delivery, their safety in patients with Chiari malformation remains controversial. Successful use of neuraxial anesthesia has been reported in prior case series among asymptomatic patients. However, there remains no consensus guideline. Anesthetic management must be individualized based on symptomatology, imaging results, and multidisciplinary discussion.

Case One: A 30 year old gravida 1 para 1 at 34 weeks 2 days gestation with a known Chiari Type I malformation presented for planned cesarean delivery in May 2025. She had a 4 year history of worsening headaches leading to Chiari malformation diagnosis. She subsequently underwent successful Chiari decompression in September 2020. This pregnancy, the patient again became symptomatic with daily headaches and neck pain . Preoperative MRI demonstrated 8 mm descent of cerebellar tonsils and delayed CSF flow anteriorly and intradurally. Following multidisciplinary consultation with obstetrics, anesthesia, and neurosurgery, assisted vaginal delivery using neuraxial anesthesia was deferred due to concern for potential cerebrospinal fluid pressure shifts and neurologic risk. A planned general anesthetic was performed with key concern of careful hemodynamic control and strategies to ensure smooth induction and emergence. A preoperative radial arterial line was placed. During rapid sequence induction, a low dose remifentanil infusion was started on induction to minimize propofol bolus dosing. Video laryngoscope for ETT size 6.5 intubation.. The intraoperative course was uncomplicated. The patient was extubated awake and demonstrated no new neurologic deficits postoperatively. Neonatal outcomes were favorable, with Apgar scores of 8 and 9 at 1 and 5 minutes, respectively, with no requirement for neonatal intensive care admission.

Discussion: Published reports describe variable anesthetic approaches for parturients with Chiari malformation, reflecting differences in clinical presentation and imaging characteristics. While neuraxial anesthesia may be tolerated in selected patients, the risk of dural puncture and resultant cerebrospinal fluid pressure changes remains a key concern. This case highlights the importance of individualized anesthetic planning and multidisciplinary collaboration. In select patients, planned general anesthesia may mitigate risks associated with emergent airway management or unintended neuraxial complications.

References: 1. Kapoor A, Halling J. HCA Healthc J Med. 2021;2:407–410. 2. Gruffi TR, et al. Int J Obstet Anesth. 2019;37:52–56. 3. Waters JFR, O'Neal MA, Pilato M, et al. Obstet Gynecol. 2018;132:1180–

1184.

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges – 03

Anesthetic management of a parturient with Ebstein anomaly and Tethered cord syndrome: A Case Report

Presenting Author: Shu Zhao, MD

Presenting Author's Institution: VCU - Richmond, Virginia

Co-Authors: Miki Edwards, MD - VCU

Introduction: Ebstein anomaly is a rare congenital cardiac malformation characterized by displacement of tricuspid valve, resulting in a poorly contractile right ventricle, right atrium enlargement, and tricuspid regurgitation. These abnormalities may lead to right-sided heart failure and associated complications, which was seen in our patient. Ebstein anomaly also predisposes individuals to arrhythmias such as Wolff-Parkinson-White syndrome (WPW). The physiological changes of pregnancy further exacerbate these hemodynamic and electrophysiologic challenges, placing affected patients at increased maternal and fetal risk. Our case report details the successful management of a cesarean delivery under general anesthesia in a patient with Ebstein anomaly and spina bifida with tethered cord syndrome.

Case One: A 30-year-old primigravida with a history of repaired Ebstein anomaly complicated by WPW with a pacemaker/ICD, dextrocardia, and spina bifida with TCS presented at 23 1/7 weeks' gestation with preterm premature rupture of membranes. The patient was admitted for fetal monitoring and management of an acute right-sided heart failure exacerbation and underwent aggressively diuresis. At 32 6/7 weeks', concerns for intraamniotic infection prompted urgent delivery. Given this patient's complex history, we had a multidisciplinary meeting for pre-delivery planning. Our anesthesia team discussed the risks and benefits of general anesthesia versus ultrasound-guided epidural and the patient opted for general anesthesia. Pre-induction preparation included placement of an arterial line and two large-bore IVs. Intraoperatively, she developed supraventricular tachyarrhythmias with hypotension requiring phenylephrine infusion and intermittent norepinephrine boluses. Procainamide was available for emergency, but we did not end up using it. Prior to extubation, she received bilateral transverse abdominis plane blocks, ketorolac, and hydromorphone for pain management. The patient reported minimal pain post-delivery and was discharged on postpartum day 6.

Discussion: Neuraxial anesthesia is generally preferred for delivery to minimize risks associated with general anesthesia. However, the feasibility depends on the patient's anatomy and physiology. Although we proceeded with general anesthesia, neuraxial with an epidural could have been a possibility. Prior case reports describe successful placement in parturients with spinal bifida, though inadequate block remains a potential limitation. Review of the patient's lumbar MRI with a neuroradiologist identified the L2-L3 interspace as a possible site for epidural placement. We believed that the use of imaging and ultrasound-guidance could have improved the likelihood for success. This case demonstrates the importance of multidisciplinary planning in optimizing outcomes for high-risk obstetric patients.

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THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 04

Tethered Spinal Cord Precluding Neuraxial Anesthesia in a Parturient with Congenitally Corrected Transposition of the Great Arteries

Presenting Author: Manrit Gill, MD

Presenting Author's Institution: OHSU - Portland, Oregon

Introduction: Neuraxial anesthesia (NA) is often preferred for cesarean delivery (CD) in patients with significant cardiac disease to avoid the hemodynamic stress of general anesthesia (GA). [1,4] We present a parturient with congenitally corrected transposition of the great arteries (ccTGA) and pacemaker dependence in whom tethered spinal cord necessitated GA for primary CD.

Case One: A 26 year old nulliparous patient at 37 3/7 weeks gestation with ccTGA, situs inversus totalis, third degree heart block with single-chamber epicardial pacemaker, and uncorrected tethered spinal cord status post childhood spinal fusion presented for planned CD due to hip dysplasia. She was classified as mWHO III and CARPREG II score 2. Cardiac evaluation found preserved subpulmonary left ventricular function and mildly reduced systemic right ventricular function without pulmonary hypertension. She was 100% pacemaker dependent; the device was placed in asynchronous mode preoperatively. Following confirmation of team readiness, the patient underwent an atraumatic rapid sequence induction with propofol, rocuronium, and fentanyl and was intubated on first attempt using videolaryngoscopy. CD proceeded with delivery of a vigorous neonate 3 minutes after intubation. Hemodynamics were stable throughout, with quantitative blood loss of 732 mL. Transversus abdominis plane blocks were performed for postoperative analgesia. Postoperative recovery was uncomplicated. The pacemaker was restored to preoperative settings and the patient was monitored on telemetry for 48 hours. She was discharged on postoperative day three.

Discussion: NA is favored for CD in patients with complex congenital heart disease due to superior hemodynamics and avoidance of sympathetic stimulation from airway manipulation. [1,4] However, tethered spinal cord is considered a contraindication due to the risk of permanent neurologic injury, which may be 25% of tethered cord patients.[3] Pregnancy in patients with ccTGA poses unique challenges due to a systemic right ventricle and conduction abnormalities requiring pacing.[2] While maternal mortality in ccTGA is low, morbidity including hospitalization, heart failure, and arrhythmias is high.[5] Careful attention to right ventricular physiology is essential, including adequate preload, low pulmonary vascular resistance, preservation of coronary perfusion, and prevention of arrhythmias.[4] This case highlights the importance of individualized anesthetic planning and multidisciplinary coordination when competing high-risk conditions exist, and demonstrates that carefully planned GA can be safely performed when NA is not an option.

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2016;95:e4289 4. Circulation 2023;147:e657 5. Am J Cardiol 2025;250:9

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges – 05

Anesthetic Management of Cesarean Delivery in a Patient With Prior Tethered Cord Release

Presenting Author: Madisen Faulkner, MD
Presenting Author's Institution: University of Alabama Birmingham - Birmingham, Alabama
Co-Authors: Andrew Hackney, MD - University of Alabama at Birmingham
Xiao Lu Zhang, DO, PhD - University of Alabama at Birmingham

Introduction: Tethered cord syndrome (TCS) is a neurologic condition caused by pathologic fixation of the spinal cord, resulting in traction-related symptoms1. Neuraxial anesthesia (NA) in these patients (pts) carries increased risk for neurologic injury, even following surgical detethering2. This abstract details consideration of NA in a pt with prior cord release undergoing cesarean delivery.

Case One: A 20 y.o. G1P0 F with a history of TCS presented for preoperative anesthetic evaluation at 31 weeks' gestation. She was notably diagnosed with TCS at age four, required surgical release at age ten, and suffered urinary dysfunction into adulthood, requiring placement of an InterStim bladder device. Given her history, the pt was recommended to have spinal imaging prior to any consideration of NA in delivery. However, an MRI could not be performed due to the pt's MRI-incompatible InterStim device. At 37 weeks' gestation, the pt was admitted for induction of labor due to gestational hypertension. Analgesia was provided with bilateral erector spinae plane (ESP) catheters containing 0.2% ropivacaine. Despite this, the pt was unable to tolerate contractions. With interdisciplinary agreement, the ASA II pt underwent expedited C-section under general anesthesia (GA) with subsequent successful delivery. The pt's postoperative course was uncomplicated with discharge on postoperative day three. At one-week follow-up, both mother and neonate were doing well.

Discussion: Complications of NA in pts with TCS can range from transient neurologic deficits to permanent disability3. The risk of NA complications in cases of TCS should be considered even in pts who have undergone detethering, as the procedure does not reliably correct the low-lying conus medullaris4. However, this should not preclude NA as it would in pts with active TCS. NA in pts with spinal pathology, even following surgery, is still efficacious despite increased risk of complications2. As such, there should be careful consideration of history and updated MRI prior to pursuing NA in pts with TCS status post (s/p) cord release. In this case, without an MRI, any NA for the C-section was deemed unsafe. Bilateral ESP blocks were placed instead, which has been shown to be a straightforward, reliable alternative for analgesia when a neuraxial approach is not feasible5. In this case, the patient did not tolerate contractions despite the use of the ESP blocks. With no other viable analgesic options and given the risks of NA without updated imaging, GA was appropriately selected for C-section. This case illustrates the need for individualized anesthetic planning and an updated MRI for laboring patients with TCS s/p cord release. Additional literature is needed to inform anesthetic management and support the development of standardized approaches in this patient population.

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THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 06

Interstitial Fluid Mimicking Cerebral Spinal Fluid Leak After Epidural Catheter Removal: A Case Report

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Presenting Author's Institution: HUMC - Hackensack, New Jersey

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Introduction: Hemolysis, elevated liver enzymes, and low platelets syndrome (HELLP) is a severe pregnancy complication. Underlying pathophysiology involves endothelial damage and increased vascular permeability, often resulting in third-spacing of fluid into interstitial tissue and causing generalized edema. Epidural analgesia is typically the standard of care in the anesthetic plan for labor. One of the major risks of epidural catheter placement is inadvertent dural puncture, which would lead to cerebral spinal fluid (CSF) leakage from the spinal canal into the epidural space. This can lead to post-dural puncture headache (PDPH); a postural headache usually self-limiting within weeks, but can be definitely treated with an epidural blood patch.

Case One: We present the case of a 38-year-old G1P0 woman with preeclampsia and HELLP syndrome who developed fluid leakage from the epidural catheter insertion site two days following a cesarean delivery at 33w3d gestation. The anesthetic plan consisted of a combined spinal epidural (CSE) with an 18G Tuohy needle and 27G spinal needle. Spinal level was adequate, epidural catheter placement was uncomplicated with negative aspiration and negative test dose. The patient tolerated the cesarean section well with stable vitals throughout. Catheter remained in place until the following morning to ensure platelet count was not downtrending. Removal was unremarkable with an intact catheter tip. Twelve hours after epidural catheter removal, anesthesia was called to see the patient, who complained of a “wet back.” Upon examination, clear/yellow-tinged fluid was noted to be steadily leaking from the epidural needle track. The back appeared slightly edematous, without signs of erythema or tenderness. The patient also had generalized edema throughout her body that was present prior to cesarean section. At the time, the patient denied symptoms of PDPH. Fluid analysis revealed elevated protein and glucose, and absence of Beta-2-transferrin, consistent with interstitial fluid. The fluid leakage resolved by postoperative day 4, and she was discharged without neurological complications.

Discussion: This report describes a rare instance of postoperative epidural site interstitial fluid leakage due to edema presenting similarly to CSF leakage along an epidural track. It is important to rule out dural puncture as complications including meningitis, intracranial hypotension and cerebral herniation could transpire. Accurate differentiation between interstitial fluid and CSF can guide appropriate management and prevent unnecessary interventions to mitigate the risk of neurological complications associated with dural puncture.

References: 1. Khalid F, Mahendraker N, Tonismae T. HELLP Syndrome. [Updated 2023 Jul 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. 2. Avila Hernandez AN, Hendrix JM. Epidural Anesthesia. [Updated 2025 Mar 27]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-.

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 07

Management of Accidental Dural Puncture and Intrathecal Catheter- No CSF return? A Clinical Conundrum

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Co-Authors: Kalpana Tyagaraj, MD - Maimonides Medical Center

Introduction: Introduction Neuraxial analgesia techniques are among the most popular, effective methods for labor analgesia. A complication of these procedures is an accidental dural puncture which can result in a post-dural puncture headache in approximately 52-60% of obstetric patients. When an accidental dural puncture occurs, there are two possible options: remove the Tuohy needle and re-site the epidural catheter or insert the epidural catheter intrathecally for use as a continuous spinal catheter. Intrathecal catheter is an effective method and produces rapid analgesia and may reduce the incidence and severity of the post-dural puncture headache. Another advantage of intrathecal catheter insertion is the ability to rapidly extend and deepen the block to provide anesthesia for C-Section. We report a pregnant patient who had an intrathecal catheter which later on failed to provide CSF aspiration, which created the clinical dilemma of how to manage this catheter for labor analgesia.

Case One: 27 years old P1 at 38 weeks was admitted for induction of labor with category II tracing requested an epidural and ended up with an intrathecal catheter. Multiple attempts were made to place the epidural catheter because of difficult anatomy, the catheter was found to be intrathecal and CSF was aspirated continuously. The plan was to use this catheter to provide analgesia. The patient remained comfortable for about 4 hours after which she started to complain of worsening contraction pain; cervical balloon had fallen out at this point. Aspiration from the catheter yielded nothing and the patient had a level at about the ankles. Five ml of 0.125% Bupivacaine was administered over the course of 5 minutes. Patient became hypotensive, slightly drowsy, and the baby showed prolonged decelerations. s. Multiple pushes of phenylephrine were given, along with a fluid bolus, and supplemental oxygen. Patient was unable to verbalize but responded to commands. She had weakness in the upper extremities but not complete immobility. Blood pressure responded to phenylephrine boluses and a low dose phenylephrine infusion was started. Fetal heart tracing recovered. After about 20 minutes, the patient started to verbalize feeling better. Labor progressed uneventfully and she had a C-Section several hours later for failed induction. Intrathecal catheter was dosed with 0.75% Bupicvacaine to obtain an adequate level.

Discussion: Discussion: While management of epidural and intrathecal catheters is well known, the gray zone of an intrathecal catheter that migrates can present a challenge for anesthesiologists. We present a case with a questionable catheter in hopes of aiding our understanding of how they can be managed for proper pain relief while also keeping mother and baby safe. It also highlights the important steps to be taken in the event that a high spinal does occur.

References: 1. Anaesthesia 2021; 76, 1111-1121.

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 08

Cerebrospinal Fluid Cutaneous Fistula Following Uncomplicated Neuraxial for Labor Analgesia: A Case Report

Presenting Author: Paulina Blanc, DO

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Co-Authors: Daniel Bingham, MD - UAMS
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Introduction: Cerebrospinal fluid (CSF) leakage is a recognized complication of neuraxial anesthesia, most commonly presenting as post-dural puncture headache. Cutaneous CSF fistula, however, is an exceedingly rare manifestation and has been described only infrequently in literature. Such fistulae may pose diagnostic and management challenges and carry potential risks including infection, debilitating headaches and persistent CSF loss. We report a rare case of a cutaneous CSF fistula developing following neuraxial anesthesia, highlighting its clinical presentation, diagnostic considerations, and management.

Case One: Case: A 25-year-old patient, G2P1, with a history of a prior uncomplicated epidural catheter placement, was admitted at 40 weeks and 2 days for labor induction. She underwent a routine epidural catheter insertion, which was uncomplicated, was placed by a single provider, and no dural puncture was noted at time of placement. The patient reported adequate analgesia from the epidural catheter, during her delivery. The catheter was removed 40 minutes after delivery. One hour later, the patient reported fluid leakage from the puncture site, which she noticed due to soilage of her clothes. The patient denied any headaches, photophobia, or neck stiffness. On physical exam, the nurse and anesthesia resident noted clear fluid leakage from the puncture site. An MRI of her lumbar spine revealed a 14cm subcutaneous fluid collection, likely CSF. After consulting with neurology, and discussing management options with the patient, the decision was made to suture the puncture site and apply a sterile dressing. The patient recovered without complications and was discharged home.

Discussion: Cutaneous cerebrospinal fluid (CSF) fistula is a rare complication of neuraxial anesthesia, with most reported cases occurring after combined spinal-epidural techniques or recognized dural puncture. In contrast, our case occurred following an apparently uncomplicated epidural placement with no documented dural puncture, highlighting that this complication may arise even in the absence of recognized technical difficulty. Similar to previously reported cases, the patient presented with clear fluid leakage from the puncture site and minimal associated symptoms. Imaging confirmed a subcutaneous CSF collection. Management strategies in the literature range from conservative measures to skin suturing or epidural blood patch. In our case, prompt recognition and local wound closure by approximation sutures resulted in complete resolution without neurological or infectious complications. This case reinforces the importance of maintaining a high index of suspicion for CSF cutaneous fistula in

patients with persistent fluid leakage after neuraxial anesthesia and supports skin closure as a possible effective initial management strategy in select patients.

References: 1. Sanha M, Cureus 2022 Dec;14(12):e32895 2. Gordon C, Int J Obstet Anesth 2022 Feb;49:103241

Hyder CSF Fistula MRI Image.pdf

THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges - 09

Pneumocephalus Following Combined Spinal-Epidural for Labor Analgesia

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Introduction: Neuraxial anesthesia is the cornerstone of pain management in laboring patients. (1) The combined spinal-epidural (CSE) technique using loss of resistance to air (LORA) is commonly used for labor analgesia. A rare complication of this technique is pneumocephalus, which is often caused by an inadvertent dural puncture that allows the introduction of air into the intrathecal space. (2)

Case One: We report on the case of a 31-year-old G4P0 woman who presented for external cephalic version (ECV) and induction of labor (IOL) at 39 weeks and 2 days gestation. A CSE was placed using the LORA technique without obvious signs of inadvertent dural puncture. The ECV was deemed successful. A few hours after placement, the patient developed dysphagia, hypoxia, and altered mental status. Computed tomography (CT) exam was concerning for moderate to large volume pneumocephalus, some of which was present in the cavernous sinuses. Neurology and neurosurgery teams were consulted and CSE was determined to be the cause of the patient's presentation. The patient was then started on 100% oxygen via nonrebreather at their recommendation and symptoms improved. She had an uneventful vaginal delivery and endorsed intermittent headache and neck pain that was treated conservatively. She was discharged and presented again 4 days later to the emergency department with severe headaches and hypertension. The patient was admitted to the neurologic intensive care unit (NICU) where she received an epidural blood patch after magnetic resonance imaging (MRI) was concerning for bilateral holohemispheric, thin, nonhemorrhagic subdural collections associated with intracranial hypotension. Patient improved significantly after placement of the epidural blood patch by interventional radiology and was discharged from the NICU after a 3-day hospitalization.

Discussion: This case highlights a potential and rare consequence of utilizing the LORA technique in a routine placement of a CSE. The case also emphasizes the importance of early recognition of post-procedural atypical neurologic symptoms, multidisciplinary involvement and appropriate, image-guided diagnosis of the condition.

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THURS - CR - BS 1 - BR 3B - Chiari and Other Neuraxial Challenges – 10

Pneumocephalus without obvious dural puncture in a laboring patient with prior lumbar discectomy

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Co-Authors: Andrew Gray, MD - University of California, San Francisco
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Introduction: Prior lumbar discectomy in laboring patients is not known to affect efficacy of neuraxial labor analgesia or increase risk for inadvertent dural puncture, but may be associated with more attempts at catheter placement [1, 2]. Pneumocephalus is a rare complication of neuraxial anesthesia, typically associated with loss of resistance to air (LORA) technique with inadvertent dural puncture [3]. We present a case of pneumocephalus without obvious inadvertent dural puncture in a laboring patient with prior lumbar discectomy.

Case One: A 36yo G2P1 with prior L4-5 discectomy presented in active labor. Obstetric history was notable for prior cesarean section under single shot spinal years after spine surgery. During dural puncture epidural (DPE) attempt at L3-4, heme returned from the Tuohy needle after LOR to saline (LORS) at 4cm. The Tuohy needle was repositioned and LORS was again achieved at 4cm without significant fluid return. Catheter aspiration and initial 3mL test dose were negative. Injection of an additional 2mL of test dose resulted in a dense sensory and motor block to T4 level with profound hypotension. Despite initiation of a 2mL/hr 0.25% bupivacaine infusion, the patient did not have appropriate labor analgesia. The catheter was replaced at the L2-3 level with LORA at 5cm. Catheter aspiration was negative but test dose resulted in bilateral sensory and motor block to T8. Thirty minutes after placement, the patient complained of neck discomfort and severe headache on the non-dependent side that was worse when supine. The 0.25% bupivacaine infusion was restarted at 2mL/hr, 15mcg fentanyl was given through the catheter and the patient had an uncomplicated vaginal delivery 3 hours later. Post-partum head CT revealed pneumocephalus (Fig. 1). The headache resolved with conservative management. She did not develop classic signs of post-dural puncture headache.

Case Two:

Discussion: This case describes two neuraxial catheter placements by different providers without CSF flow through Touhy needle or CSF aspiration through catheter but with intrathecal responses to test doses. Pneumocephalus further confirmed communication between epidural and intrathecal spaces. Notably, lumbar spine ultrasound performed after the second epidural was unremarkable with post dural complex clearly seen. Pseudomeningocele or CSF fistula formation after spine surgery is rare, but the majority present asymptomatically and may be important to consider in post-surgical patients undergoing neuraxial procedures [4]. Further investigation of the utility of MRI or more nuanced ultrasound findings in

this patient population may help reduce rare but serious complications.

References: 1. Anesth Analg. 2012 Aug;115(2):348-53. 2. Acta Anaesthesiol Scand. 2011 Sep;55(8):910-7 3. F1000Res. 2014 Jul 22;3:166. 4. Epstein NE. Surg Neurol Int. 2013;4(Suppl 5):S301-

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 01

Reversible Cerebral Vasoconstriction Syndrome Following Methylergonovine Maleate Administration During Cesarean Delivery

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Co-Authors: Nakiyah Knibbs, MD - Mount Sinai Hospital

Introduction: Methylergonovine maleate is an ergot alkaloid that acts directly on uterine smooth muscle to improve uterine tone, commonly used for the prevention and control of postpartum hemorrhage following vaginal or cesarean delivery. In addition to improving uterine tone, it is also a potent vasoconstrictor, and adverse effects may include sudden hypertension, coronary vasospasm, and reversible cerebral vasoconstriction syndrome (RCVS).

Case One: We present a case of a 26-year-old G1P0 at 39 weeks 3 days gestational age with a history of Graves' Disease who presented to L&D for induction of labor for oligohydramnios. An epidural catheter was placed uneventfully for labor analgesia. Approximately 12 hours into her labor course an elective cesarean section was recommended for non-reassuring FHR tracing. Her epidural catheter was loaded with local anesthetic and a T4 level was achieved with stable hemodynamics. The fetus was delivered uneventfully and 0.2 mg of methylergonovine maleate was administered intramuscularly one minute after delivery. Approximately 30 minutes after methylergonovine maleate administration, the patient experienced symptomatic hypotension which was promptly treated with intravenous vasopressors; shortly afterward the patient experienced severe hypertension and endorsed headache, nausea, bilateral upper extremity weakness, difficulty swallowing, and visual changes. Rightward gaze deviation was noted and the patient became unresponsive with witnessed seizure-like activity. Two milligrams of midazolam were administered and the patient was intubated for airway protection. The patient was transported for emergent head CT following surgery completion. CT angiogram showed high-grade narrowing with sudden cut-off of a segment of the right middle cerebral artery (MCA). The patient was emergently taken to interventional radiology for diagnostic angiography and found to have multifocal segmental narrowing involving branches of the right ACA and MCA, characteristic of RCVS, and was treated with 20 mg of intra-arterial verapamil into the right internal carotid artery with improvement in vessel caliber. The patient was admitted to the SICU and extubated without subsequent neurologic deficits. CTA of the head on POD 2 showed resolution of stenosis of affected MCA branches. The patient was discharged on POD 3 with neurology follow-up.

Case Two:

Discussion: Our case highlights the strong vasoconstrictive properties of methylergonovine maleate and possible neurologic sequelae such as reversible cerebral vasoconstriction syndrome. Given such adverse

effects, methylergonovine maleate should be administered judiciously in the appropriate patient population to improve uterine tone following vaginal or cesarean delivery.

References: U.S. FDA Methylergonovine Maleate Injection Label Roth and Deck. Neurovascular Disorders in Pregnancy: A Review. 2019.

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 02

Intravenous Methylergonovine Maleate during Cesarean Section: A Case Series

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Abstract :

Introduction

Postpartum hemorrhage is the leading cause of maternal morbidity and mortality in the world. Uterine atony is the leading cause of postpartum hemorrhage, accounting for around 75% of postpartum hemorrhage cases. Methylergonovine maleate (MM) is a common second line uterotonic agent that is usually administered by intramuscular (IM) injection but is also approved by the FDA for intravenous (IV) administration. Peak plasma levels after IV administration occur almost immediately, while IM doses require about 25 minutes to reach maximum effect. Nevertheless, IV MM is rarely used due to concerns for hypertension secondary to vasoconstriction. We questioned whether IV administration with fractionated dosing may provide adequate uterine tone while minimizing side effects related to hypertension.

Methods

We conducted a descriptive retrospective case series analysis to report on a unique practice approach introduced at our institution. Cases were identified using the Multicenter Perioperative Outcomes Group (MPOG) registry. The search parameters were patients who had a cesarean section at our institution between 2020 and 2025 and who received intraoperative doses of MM, where individual doses were less than 200mcg each. We extracted demographics, case attributes, blood pressure measurements, and perioperative medication data. One MAP value was removed due to clinical implausibility. We assessed average mean arterial pressure (MAP) and highest MAP during the hour post-MM dosing, as well as percentage change from baseline, defined as first measurement in the operating room. The study was approved by the university Institutional Review Board. Practice Context: A unique practice approach was piloted as follows: In the instance of obstetrician request for MM and anesthesia team election of IV route, the piloted practice is to administer incremental boluses of 20-40 mcg with a minimum one-minute interval between each bolus. Obstetricians are queried iteratively regarding uterine tone and further uterotonics are discontinued after collective agreement. Additional bolus doses of MM are also withheld if MAP rises by more than 10%-20% above baseline.

Results

Six cases met our criteria. Baseline MAP ranged from 77 to 130. Average post-MM MAP ranged from 71 to 105 (delta decrease of 3% to 41%). Highest post-MM MAP ranged from 75 to 124 (delta decrease of 3% to delta increase of 12%).

Discussion

The MAP values documented in these cases suggest that a fractionated IV approach to MM administration during a postpartum hemorrhage may preserve hemodynamic stability. Given that IV MM reaches peak plasma concentrations faster than IM, fractionated IV dosing has the potential to decrease morbidity and mortality of patients with uterine atony as well as decrease medication administration and blood transfusions.

References:

Lindeman Hales IV MM Final.pdf

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 03

Is Nitrous Oxide Contraindicated in Patients with MTHFR Gene Mutations?

Presenting Author: Kaylea Gunn, MD

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Co-Authors: Jil Decker, MD - Vanderbilt University Medical Center

Introduction: Methylenetetrahydrofolate reductase (MTHFR) catalyzes the conversion of folate to 5-methyltetrahydrofolate (5-MTHF), which facilitates re-methylation of homocysteine into methionine, an essential amino acid. “MTHFR deficiency” is often referred to as a single entity, but true absence of this enzyme is rare (<.01% of the population) and inherited as autosomal recessive. Common MTHFR polymorphisms, most frequently C677T, are present in 60-70% of the population with approximately 10% being homozygous. Elevated homocysteine levels can cause endothelial injury, leading to hyper-coagulable states and pregnancy complications such as placental disruption, impaired DNA synthesis, pre-eclampsia, fetal growth restriction, and neural tube defects (1-2).

Case One: A 30-year-old G1P0 with Postural Orthostatic Tachycardia Syndrome, Ehlers-Danlos, narcolepsy, and iron deficiency anemia presented in precipitous labor. Nitrous oxide (N2O) was urgently administered to facilitate obstetric laceration repair. Following the procedure, the patient disclosed a known heterozygous polymorphism in the MTHFR gene (C677T). This prompted a multidisciplinary meeting involving obstetric anesthesia, obstetrics, genetics, endocrinology, molecular biology, and informatics with the initial aim of implementing an electronic medical record hard stop before N2O administration in patients with MTHFR variants. After expert review, the team determined that short duration N2O exposure in patients with common MTHFR polymorphisms is unlikely to result in clinically meaningful elevations in homocysteine levels, and such restrictions were deemed unnecessary.

Case Two:

Discussion: N2O is an inhalational anesthetic with NMDA receptor antagonist and GABA agonist effects that is commonly used in obstetric anesthesia. It irreversibly inhibits vitamin B12 in the conversion of homocysteine to methionine, theoretically impairing homocysteine metabolism. Much of the concern regarding use in patients with MTHFR variants comes from a 2003 case of a patient with complete MTHFR deficiency and chronic B12 deficiency who experienced fatal neurologic injury after prolonged, repeated N2O exposure (3). This article contributed to longstanding caution among anesthesiologists around the administration of N2O to patients with MTHFR polymorphisms Current evidence does not support clinically significant homocysteine elevation following short-term N2O exposure in obstetric patients. The timing and duration of N2O during labor and the immediate postpartum period differs from the dangers of chronic hyperhomocysteinuria associated with folate depletion in early pregnancy during crucial organogenesis and placentation periods. This case highlights that although definitive safety data are limited, there is no clear evidence that short-term peripartum N2O use is harmful in individuals with

common MTHFR polymorphisms.

References: 1. PMID 23856660 2. PMID 18580170 3. PMID 12840091

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 04

Perioperative Considerations for an Obstetric Patient with Allergies to Lidocaine and Bupivacaine

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Co-Authors: Lindsey Marshall, MD - University of Michigan Hospitals

Introduction: Allergic reactions to local anesthetics are rarely reported in obstetric anesthesiology(1). The few cases of allergies to amide local anesthetics primarily describe the reactions as maternal and/or fetal hypotension, tachycardia, and flushing(2) or hypersensitivity to the solutions(1). There is a notable gap in literature regarding alternative use of ester local anesthetics as a potential solution to amide-specific reactions. This case describes a patient with unique reactions to both ester and amide local anesthetics.

Case One: A 40-year-old female presented for an elective repeat cesarean delivery with desire for permanent sterilization. She has a history of allergic reactions to lidocaine and bupivacaine with previous procedures. She reported hyperalgesia and paralysis from the waist up during a genicular block as well as hyperalgesia, paralysis, and increased bleeding during a spinal with preservative-free bupivacaine. She declined formal allergy testing to local anesthetics but desired neuraxial as her anesthetic of choice. The decision was made to proceed with a combined spinal-epidural with 1.7mL 3% chloroprocaine, 15mcg fentanyl, 150mcg morphine, and 200mcg epinephrine. The patient had an appropriate bilateral T4 dermatomal level prior to incision. One hour later, she reported frequent and increasing severe pain with surgical manipulation. Physical exam was notable for paralysis of legs and arms and subjective difficulty breathing. Repeated dosing of her epidural with 2mL 3% chloroprocaine did not resolve her symptoms. She ultimately required repeated dosing of 25-50mcg of fentanyl and eventual administration of 1mg hydromorphone and 30mg ketorolac for pain control. The delivery was completed without the need to convert to a general anesthetic but with close observation of respiratory and cardiac function, which were stable for the entirety of the operation. She did not report neurologic symptoms of high spinal or post dural puncture headache postoperatively.

Case Two:

Discussion: This case poses several questions pertaining to true allergic reactions to ester versus amide local anesthetics and the potential for cross-reactivity to both(3). There is limited evidence suggesting alternatives to local anesthetics in neuraxial solutions, but antihistamines have been studied and demonstrated to be effective in patients with these allergies(4). Formal allergy testing may be necessary to establish an anesthetic plan that is safe, effective, and meets the expectation of the laboring mother. This case encourages further discussion of alternative neuraxial solutions and the formation of an

algorithm for navigating patients with unique reactions to local anesthetics. It also highlights the impact of anesthetic care on the emotional wellbeing of obstetric patients(5).

References: 1. Int J Obstet Anesth 2013; 22(3):231-42 2. Acta Obstet Gynecol Scand 1988; 67:184-8 3. Clinic Rev Allerg Immunol 2023; 64:193-205 4. Anesth Prog 2018; 65:119-23 5. Anesth Analg 2017; 124(2):383-5

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 05

Anesthetic Challenges in GLUT-1 Deficiency: A Case Report and Review of Perioperative Considerations

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Introduction: GLUT1 deficiency syndrome (GLUT1-DS) is a rare neurometabolic disorder caused by impaired glucose transport across the blood–brain barrier due to mutations in the SLC2A1 gene, resulting in inadequate cerebral energy metabolism and manifestations including seizures, movement disorders, and acquired microcephaly (1,2). Perioperative management is challenging, as fasting may precipitate seizures and certain anesthetic agents—particularly barbiturates, which worsen cerebral glucose transport—must be avoided. Maintenance of ketosis and prevention of metabolic decompensation are essential to minimize neurologic instability (3).

Case One: A 25-year-old G1P0 woman with GLUT1-DS presented for obstetric anesthesia evaluation. Her seizure disorder was managed exclusively with a ketogenic diet, without antiepileptic medications. Seizures were triggered by fasting or glucose ingestion and occurred without warning. She reported a traumatic childhood lumbar puncture complicated by prolonged headaches and transient hemiparesis, leading to strong aversion to neuraxial anesthesia. Her pregnancy was complicated by obesity (BMI 44), preeclampsia, polyhydramnios, and fetal macrosomia. Her birth plan included continued oral intake, avoidance of neuraxial anesthesia, and refusal of cesarean delivery despite obstetric recommendation. Multidisciplinary counseling addressed competing risks of aspiration, seizure exacerbation, and emergency airway management. An initial plan permitted glucose-free clear liquids, with discussion of limited protein intake if labor progressed without complication; however, the patient elected to continue full oral intake. Despite initial refusal, a labor epidural was placed but subsequently displaced. She later underwent combined spinal-epidural anesthesia for primary cesarean delivery due to arrest of descent and fetal macrosomia. Glucose-containing solutions were avoided perioperatively, and neurologic status remained stable without seizure activity.

Case Two:

Discussion: This case highlights the absence of standardized perioperative fasting and anesthetic guidelines for patients with GLUT1-DS, particularly in obstetric settings. Management is further complicated by patient birth plans that may restrict acceptable interventions and require careful alignment with patient autonomy while maintaining maternal and fetal safety. Prolonged fasting may precipitate seizures, while traditional aspiration-prevention strategies can conflict with the need to maintain ketosis.

Neuraxial anesthesia is not contraindicated, though published experience remains limited. Anesthetic agents must be selected cautiously, as barbiturates may impair cerebral glucose transport and agents that lower seizure threshold warrant caution. Individualized, multidisciplinary planning is essential to balance airway safety, metabolic stability, and patient preferences.

References: 1. Ann Neurol 2005;57:111-118 2. Epilepsy Behav 2019;91:90-93 3. Epilepsy Res 2012;100:272-277

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 06

Gaucher Disease in Pregnancy: Anesthetic and Peripartum Considerations in a High-Risk Parturient

Presenting Author: Jacob Weber, MD

Presenting Author's Institution: University of Alabama at Birmingham - Birmingham, Alabama

Co-Authors: Xiao Lu Zhang, DO, PhD - University of Alabama at Birmingham

Introduction: Gaucher disease (GD) is a rare autosomal recessive lysosomal storage disorder caused by deficiency of glucocerebrosidase, leading to accumulation of glucosylceramide in macrophages. Clinical manifestations include hepatosplenomegaly, anemia, thrombocytopenia, bleeding diathesis, and skeletal disease. Pregnancy may exacerbate these features and is associated with increased risk of postpartum hemorrhage and infection. Evidence guiding anesthetic management in pregnancy is limited.

Case One: A 36-year-old gravida 2 para 1 woman with type 1 GD presented for induction of labor at 40 weeks' gestation. She was diagnosed 16 years earlier and transitioned from substrate reduction therapy to enzyme replacement therapy (ERT) (imiglucerase) prior to conception, which she continued throughout pregnancy. Prenatal ultrasound demonstrated hepatosplenomegaly, and transthoracic echocardiography (TTE) showed no abnormalities. Laboratory evaluation revealed mild anemia (hemoglobin 11 g/dL) with normal platelet count and coagulation studies. She was evaluated in obstetric anesthesia consultation clinic at 33 weeks and deemed a candidate for neuraxial analgesia with recommendation for platelet count within 6 hours of placement and experienced provider placement. Admission laboratories were unchanged. Epidural analgesia was placed without complication. She had an uncomplicated vaginal delivery of a healthy neonate (Apgars 8 and 9) without hemorrhagic or infectious complications.

Case Two:

Discussion: GD-related cytopenias, qualitative platelet dysfunction, and organomegaly increase the risk of obstetric hemorrhage, with reported postpartum hemorrhage rates up to 28% after vaginal delivery and higher with cesarean delivery, even when platelet counts are normal. Impaired neutrophil function may increase postpartum infection risk. Skeletal fragility and rare osteonecrosis may complicate pregnancy. Prenatal evaluation should include serial blood counts, coagulation studies, calcium and vitamin D levels, assessment of organomegaly, and TTE to evaluate for pulmonary hypertension. ERT appears safe in pregnancy and may reduce maternal complications. Vaginal delivery should be favored when feasible. Neuraxial anesthesia may be safely performed when platelet counts are adequate, with close laboratory surveillance. Conclusion: With multidisciplinary planning, continuation of ERT, and careful hematologic assessment, neuraxial analgesia and vaginal delivery can be safely achieved in parturients with GD. Awareness of disease-specific risks is essential to optimize peripartum anesthetic and obstetric

outcomes.

References: 1. Calderón et al. Spanish Consensus on Managing Pregnancy in Women with Gaucher's Disease. Journal of Rare Diseases. 2025 2. Dominik L et al. Navigating gynaecological challenges in Gaucher's disease. Ther Adv Rare Dis. 2025

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 07

Navigating Labor Analgesia in SAPHO Syndrome: A Case of Intrathecal Pump Associated Complexity

Presenting Author: Katrina Kerolus, MD

Presenting Author's Institution: Stony Brook University Hospital - Stony Brook, New York

Co-Authors: Sophia Jacob, MD - Stony Brook University Hospital
Ashley Wang, MD - Stony Brook University Hospital

Introduction: Pain management during labor is inherently complex, requiring careful consideration of maternal comfort, fetal well-being, and the dynamic physiology of pregnancy. These challenges are amplified in parturients with chronic pain syndromes, opioid tolerance, or contraindications to neuraxial anesthesia, where standard labor analgesic strategies may be unavailable or ineffective. SAPHO syndrome is an uncommon autoinflammatory disorder characterized by synovitis, acne, pustulosis, hyperostosis, and osteitis, and is often associated with chronic musculoskeletal pain, spinal involvement, and long-term opioid or intrathecal analgesic use. In laboring patients with SAPHO syndrome and implanted intrathecal drug delivery systems, anesthetic planning must balance the limitations of neuraxial techniques with the need for effective, opioid-sparing analgesia while anticipating emergent operative delivery.

Case One: A 29-year-old G2P1 presented in painful labor requesting a trial of labor after cesarean (TOLAC). Her history was significant for SAPHO syndrome; exercise-induced asthma with rare inhaler use; prior VATS for a right lung abscess without residual pulmonary impairment; chronic back pain treated with oxycodone 15 mg four times daily and an intrathecal pump delivering hydromorphone and bupivacaine. CT imaging demonstrated two intrathecal catheters entering at the L3–L4 and L2–L3 interspaces, with one terminating at the inferior T11 level and the other extending superiorly beyond the field of view. Additional comorbidities included Crohn's disease status post two bowel resections with a triple-lumen Hickman catheter for biologic therapy, a self-limited cardiomyopathy in 2023 (coronary catheterization negative; echocardiogram showing EF 55–60% with normal biventricular and valvular function), and prior cesarean delivery.

Case Two:

Discussion: Given the intrathecal pump, neuraxial anesthesia was contraindicated, and analgesia was further complicated by opioid tolerance. Fentanyl patient controlled analgesia was favored for its rapid onset and short duration, though tolerance was anticipated to limit efficacy and necessitate close respiratory monitoring. Remifentanil PCA was also considered given its rapid onset, ultra–short half-life, and minimal accumulation, though it requires continuous respiratory monitoring. Inhaled nitrous oxide was considered as an adjunct, providing modest analgesia and anxiolysis though with limited effectiveness in

advanced labor and opioid-tolerant patients. In the event of inadequate analgesia or urgent operative intervention, general anesthesia was planned, with bilateral transverse abdominal plane (TAP) blocks and catheters for postoperative pain control and opioid minimization. Early multidisciplinary coordination among obstetric anesthesia, maternal–fetal medicine, and chronic pain specialists was essential to avoid withdrawal and anticipate increased peripartum analgesic requirements.

References: Clin Obstet Gynecol 2017 60(2):350-364

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 08

Withdrawal From Medetomidine-Adulterated Fentanyl During Pregnancy: A Case Report

Presenting Author: Chloe Kern, MD, MAS

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Introduction: Medetomidine (A.K.A. 'rhino tranq'), is an α2-adrenergic agonist racemic mixture of dexmedetomidine and levomedetomidine, only approved for veterinary use. It was first detected in Philadelphia's fentanyl supply in May 2024.[1] Six months later, it was found in 87% of samples.[2] 100–200× more potent than xylazine, it is now being detected across the Midwest. Exposed patients exhibit naloxone-resistant sedation, bradycardia, and paradoxical hypertension. Withdrawal is characterized by severe sympathetic hyperactivity: rapid onset of hypertension with systolic measurements >180 mmHg, tachycardia, vomiting, and agitation/tremor often requiring ICU admission, presenting profound perinatal implications.[1]

Case One: A 32yo G5P3013 with hypertension, MRSA bacteremia, epilepsy, HIV, HCV, HSV, depression, anxiety, four prior cesarean deliveries (CDs), and polysubstance use disorder on methadone, presented at 39w4d with painful contractions. Her last use of fentanyl and xylazine was two hours prior. Obstetrics, anesthesiology, addiction medicine, neonatology, infectious disease, psychiatry, and bioethics services agreed upon a plan for delivery and management of her impending withdrawal from opioids, benzodiazepines, and medetomidine. Details of the medication regimen are in Table 1. Despite the pharmacologic regimen, she became increasingly hypertensive, tachycardic, and developed nausea, vomiting, and chills. The decision was made to proceed more urgently with CD to initiate intravenous (IV) dexmedetomidine infusion to stabilize her hemodynamics. IV hydromorphone boluses were continued and a ketamine infusion was started intraoperatively. A transversus abdominis plane block was performed before extubation and transfer to the ICU. She was discharged on day three postpartum on acetaminophen, ibuprofen, hydroxyzine, polyethylene glycol, trazodone, senna, naloxone spray, Cabenuva®, and gabapentin, with out-patient follow up.

Case Two:

Discussion: This case highlights the impact of the growing medetomidine-adulterated fentanyl on peripartum care and the increasingly complex withdrawal syndromes that may be encountered by

obstetric anesthesiologists. There is limited evidence-based guidance regarding best practices for management. Failure to recognize α2-agonist exposure may result in misdiagnosis and suboptimal management. Withdrawal management includes α2-agonist substitution or bridging therapy, such as dexmedetomidine or clonidine, balanced against risks of hypotension and bradycardia, particularly in the setting of neuraxial anesthesia. Multidisciplinary coordination is essential. Timing and mode of delivery, care location, and withdrawal management must be individualized to optimize maternal and fetal outcomes.

References: 1. J Addict Med. 2025 Aug 1. 2. MMWR Morb Mortal Wkly Rep 2025;74:266–268.

TABLE_Medetomidine Withdrawal.pdf

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 09

Dilutional Danger in Labor: Oxytocin Exacerbation of Severe Peripartum Hyponatremia

Presenting Author: Sophia Wu, MD

Presenting Author's Institution: New York Presbyterian- Weill Cornell - New York, New York

Co-Authors: Sharon A. Abramovitz, MD - New York Presbyterian- Weill Cornell
Connor Singrey, MD - New York Presbyterian- Weill Cornell

Introduction: Peripartum hyponatremia affects 3 in 100,000 pregnancies and is associated with significant maternal morbidity [1]. Oxytocin has intrinsic antidiuretic properties via vasopressin V2 receptor activation, promoting water retention. The syndrome of inappropriate antidiuretic hormone (SIADH) causes euvolemic hypotonic hyponatremia, with oxytocin recognized as a causative agent [2]. Thin basement membrane nephropathy (TBMN) is a glomerular disorder affecting at least 1% of the population, generally considered benign with isolated hematuria, though some patients develop progressive kidney dysfunction [3,4]. The interaction between pre-existing SIADH, TBMN, and oxytocin during labor has not been previously reported.

Case One: A 34-year-old G1P001 with TBMN, hyponatremia, and chronic hypertension was admitted at 39w3d gestation for induction of labor (IOL) with baseline sodium (Na) 127 mmol/L. Labor was induced with oxytocin, and Na declined from 125 to 120 mmol/L. The patient underwent an intrapartum cesarean delivery for failed IOL, with arterial line placement and frequent electrolyte monitoring. Azithromycin in normal saline was administered perioperatively. Delivery was complicated by 1.7 liters postpartum hemorrhage secondary to uterine atony managed with tranexamic acid, carboprost, misoprostol, 2 units pRBC, and JADA placement. Hyponatremia was managed with 2% hypertonic saline, fluid restriction, and avoidance of NSAIDs. Sodium returned to 130 mmol/L by POD 2. Discharge occurred on POD 3.

Case Two:

Discussion: This case demonstrates the complex interplay of multiple risk factors for severe peripartum hyponatremia. Pre-existing SIADH created a baseline vulnerability with chronic Na levels of 127-130 mmol/L. Oxytocin exacerbated hyponatremia through well-documented antidiuretic effects [2]. While TBMN primarily affects glomerular basement membrane structure rather than tubular sodium handling, underlying renal disease may represent additional vulnerability during pregnancy's physiologic stress [3]. Postpartum hemorrhage requiring multiple uterotonics and blood products added complexity to fluid management. Successful management required nephrology consultation, frequent monitoring, arterial access, and judicious 2% hypertonic saline to achieve gradual correction within recommended limits avoiding osmotic demyelination [2]. This case highlights the importance of recognizing high-risk patients with pre-existing SIADH, chronic hyponatremia, or renal disease. Important considerations include

caution with oxytocin administration, avoidance of hypotonic solutions, and early nephrology consultation.

References: 1. Pillai A et al. BJOG. 2025. PMID: 40511476 2. Adrogue H et al. JAMA. 2023. PMID: 37851876 3. Savige J et al. Kidney Int. 2003. PMID: 12969134 4. Uzzo M et al. Nephron. 2023. PMID: 36882005

THURS - CR - BS 1 - BR 3B - Pharmacology Challenges – 10

Peripartum Management of Carbamoyl Phosphate Synthetase I Deficiency: A Case Across Two Pregnancies

Presenting Author: Antanina Voit, MD

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Co-Authors: Goran Ristev, MD - The Ohio State University Wexner Medical Center
Yun Xia, MD - The Ohio State University Wexner Medical Center

Introduction: Adult presentations of errors of nitrogen metabolism are rare but can cause hyperammonemia during periods of catabolism. Carbamoyl phosphate synthetase I (CPS1) deficiency may remain unrecognized until an inciting event precipitates ammonia accumulation and neurologic dysfunction. (1) We report management of CPS1 deficiency across two pregnancies, with pharmacologic strategies to control hyperammonemia.

Case One: Pregnancy 1: A 22 year old G2P0 presented at 34 weeks 2 days gestation with PPROM and underwent cesarean delivery for breech presentation. Postpartum, she developed lethargy and severe hyperammonemia requiring intubation and hemodialysis. She was transferred to a children's hospital for a metabolic evaluation, where plasma amino acid abnormalities were identified. Treatment with intravenous sodium phenylacetate and sodium benzoate resulted in clinical improvement. She was discharged on oral glycerol phenylbutyrate with geneticist follow-up. Molecular testing confirmed heterozygous CPS1 mutations. Pregnancy 2: At age 30, she presented at 37 weeks 3 days gestation for induction of labor. The pregnancy was complicated by intrauterine growth restriction. Admission plasma ammonia was 60 µmol/L and remained between 60-80 µmol/L during 24 hours of labor under epidural analgesia. She underwent repeat cesarean delivery for non-reassuring fetal status complicated by a hemorrhage requiring transfusion. Postpartum ammonia increased to 160 µmol/L. Dextrose-10 infusion and 20% lipid emulsion at 2 g/kg were initiated for 24 hours to promote anabolism. Central venous access was obtained for anticipated intravenous sodium phenylacetate and sodium benzoate and arginine loading; however, ammonia decreased to 79 µmol/L with dextrose alone and nitrogen scavenger therapy was deferred. She continued oral glycerol phenylbutyrate and citrulline. Hyperglycemia occurred without insulin requirement. Electrolytes were closely monitored due to risks of hypokalemia, hypernatremia, and metabolic acidosis. On postpartum day 2, she developed fever concerning for endometritis and received clindamycin and gentamicin. Ammonia levels ranged from 77-148 µmol/L. She remained neurologically intact and was discharged on postpartum day 4 with ammonia of 80 µmol/L on oral glycerol phenylbutyrate and citrulline.

Case Two:

Discussion: This case demonstrates postpartum hyperammonemia as a presenting feature of CPS1 deficiency and highlights improved outcomes with monitoring and anticipatory management. The

postpartum period is highly catabolic due to uterine involution. Complications such as hemorrhage and infection further increase risk of hyperammonemia. Promotion of anabolism with dextrose and lipid supplementation and intravenous nitrogen scavengers are central to management. (2) Lipid emulsion should be avoided in fatty acid oxidation disorders and corticosteroids may precipitate hyperammonemic crises and should be used cautiously.

References: 1. Am J Obstet Gynecol 2010;203:e10–11 2. J Inherit Metab Dis 2019;42:1192–1230

THURS - RA - BS 1 - BR 1 – Recovery: Morbidity, Depression - 01

Association between Severe Perioperative Surgical Morbidity with Cesarean Delivery and Postpartum Readmission

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Olof Stephansson, MD, PhD - Karolinska Institet
Vasiliki Tatsis, MD, MS, MBA - University of California San Francisco

Abstract :

Introduction: Hospital readmission is widely used as a marker of health care quality and is incorporated into federal quality programs,(1) yet the contribution of surgery-specific complications to readmission risk after cesarean delivery remains poorly understood. We evaluated the association between severe perioperative surgical morbidity (SPSM), a newly developed index for classifying surgical complications during cesarean delivery,(2) and postpartum hospital readmission.

Methods: Using linked birth certificate and maternal discharge data, we performed a retrospective cross-sectional study of patients who underwent cesarean delivery in any California hospital between October 2015 and October 2021. SPSM was identified using International Classification of Diseases, Tenth Revision diagnosis and procedure codes for surgical complications. The primary outcome was all-cause postpartum readmission within 42 days of hospital discharge. Secondary outcomes were readmission within 30 and 90 days postpartum. Cumulative readmission rates were quantified for patients with and without SPSM and generalized estimating equations were used to estimate adjusted relative risks (aRR), adjusted risk differences (aRDs) and 95% CIs, accounting for patient- and hospital-level factors. In secondary analyses, the association was assessed separately for prelabor and intrapartum cesarean deliveries.

Results: The study population included 703,079 cesarean deliveries. The cumulative incidence of readmission within 42 days postpartum was higher among those with SPSM compared to those without SPSM (4.7% vs 1.7%). SPSM was associated with a twofold increased risk of readmission within 30 days (aRR: 2.2; 95% CI: 2.0 – 2.4), 42 days (aRR: 2.2; 95% CI: 2.0 - 2.5) and 90 days after hospital discharge (aRR: 2.2; 95% CI: 2.0 – 2.4) (Table). The cumulative incidence and risk of readmission up to 42 days postpartum was higher among patients with SPSM versus without SPSM who underwent intrapartum cesarean delivery (5.3% vs. 2.0%; aRR: 2.35; 95% CI: 2.09 – 2.65) and prelabor cesarean delivery (4.1% vs. 1.5%; aRR: 2.03; 95% CI: 1.72 – 2.40). Wound infection was the most common diagnosis at readmission among patients with and without SPSM (0.78% and 0.4%, respectively).

Conclusion: Nearly 1 in 20 patients who experience SPSM during cesarean delivery undergo readmission and have a twofold increased readmission risk at 30, 42, and 90 days postpartum, respectively. These findings indicate that SPSM is an important marker of increased postpartum risk and may help identify patients who warrant targeted postdischarge follow-up.

References: 1. CMS HRRP. Hospital Readmissions Reduction Program.
2. Butwick A. Obstet Gynecol 2025 [ahead of print]

https://www.cms.gov/medicare/medicare-fee-for-service-payment/acuteinpatientpps/readmissions-reduction-program

Table_SPSM_PPreadm_SOAPattachment.pdf

THURS - RA - BS 1 - BR 1 – Recovery: Morbidity, Depression - 02

Severe Maternal Morbidity and Comorbidity Burden Among Transgender and Gender Nonconforming Birthing Patients

Presenting Author: Jil Decker, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Jeanette Bauchat, MD, MS - None
Holly B. Ende, MD - Vanderbilt University Medical Center
Jerome J. Federspiel, MD, PhD - Duke University
Matthew Fuller, MS - Duke Anesthesiology
Ashraf S. Habib, MMBCh, MSc, MHSc, FRCA - Duke University School of Medicine

Abstract :

Introduction: Transgender and gender nonconforming (TGNC) people are a vulnerable subset of the obstetric population at increased risk for conditions including sexually transmitted infections, mental health distress, and substance use disorders[1]. However, pregnancy-related health risks among TGNC patients remain poorly defined. Studies are mixed, with some demonstrating no increased maternal morbidity and others highlighting disparities in patient-reported outcomes, postpartum mental health, and access to appropriate care[2,3,4]. We sought to describe comorbidities and maternal morbidity outcomes among TGNC birthing patients. We hypothesized that TGNC patients have higher prevalence of cardiovascular disease (CVD) risk factors and maternal morbidity.

Methods: Following IRB exemption, we conducted a retrospective cohort study comparing rates of severe maternal morbidity (SMM) and non-transfusion SMM among TGNC versus non-TGNC birthing patients using the Premier Healthcare Database (2016–2020). TGNC patients were identified using a computable phenotype based on ICD diagnostic codes and medication administrations. Primary outcomes included all Centers for Disease Control and Prevention–defined SMM and non-transfusion SMM. Multivariable logistic regression models estimated associations between TGNC status and outcomes, adjusting for age, payor status, and the Leonard et al. obstetric comorbidity index.

Results: The TGNC computable phenotype identified 661 birthing patients, compared with 4,789,012 non-TGNC patients. TGNC patients had higher prevalences of multiple CVD risk factors and comorbidities, including gestational diabetes (9.8% vs. 8.0%), pre-existing diabetes (3.6% vs. 1.5%), asthma (8.2% vs. 5.0%), chronic hypertension (3.8% vs. 3.4%), substance use disorder (9.2% vs. 6.4%), and mental health disorders (17.9% vs. 7.1%). Rates of SMM were higher among TGNC patients (197 vs. 147 per 10,000 births), as were rates of non-transfusion SMM (91 vs. 39 per 10,000 births). After

adjustment, TGNC status was not significantly associated with non-transfusion SMM (aOR 1.42; 95% CI 0.60–3.33) or overall SMM (aOR 1.04; 95% CI 0.59–1.84).

Discussion: Although adjusted differences in SMM were not statistically significant, TGNC birthing patients exhibited higher rates of cardiovascular and mental health comorbidities, established contributors to adverse perinatal outcomes. As one of the largest studies of TGNC obstetric patients, we demonstrated elevated chronic disease burden in these patients prior to and persisting into pregnancy. Future research should examine mechanisms for this increased cardiometabolic risk, including gender-affirming hormone use, chronic stress, and barriers to accessing gender-affirming care, to seek interventions to improve perinatal and healthcare equity.

References:

1. PMID: 27323919
2. PMID: 35358492
3. PMID: 36198035
4. PMID: 37166818

	TGNB Patients (n=661)	Other patients (n=4789012)
Non-transfusion SMM	6 (91)	18546 (39)
All SMM	13 (197)	70592 (147)
Individual SMM Elements		
Acute myocardial infarction	0 (0)	155 (0)
Dissection (not aneurysm)	0 (0)	11 (0)
Acute renal failure	4 (61)	3867 (8)
Acute respiratory distress syndrome	2 (30)	3590 (7)
Amniotic fluid embolism	0 (0)	209 (0)
Cardiac arrest	0 (0)	411 (1)
Ventricular fibrillation	0 (0)	60 (0)
Conversion of cardiac rhythm	0 (0)	440 (1)
Disseminated intravascular coagulation	2 (30)	5722 (12)
Heart failure or arrest during surgery or procedure	0 (0)	48 (0)
Puerperal cerebrovascular disorders	0 (0)	454 (1)
Pulmonary edema	1 (15)	1035 (2)
Acute heart failure	1 (15)	910 (2)
Severe anesthesia complications	0 (0)	244 (1)
Sepsis	1 (15)	2620 (5)
Shock	3 (45)	2986 (6)
Sickle cell disease with crisis	1 (15)	89 (0)
Air and thrombotic embolism	0 (0)	843 (2)
Temporary tracheostomy	1 (15)	113 (0)
Ventilation	1 (15)	2772 (6)
Eclampsia	0 (0)	4050 (8)
Hysterectomy	2 (30)	5898 (12)
Transfusion	9 (136)	56359 (118)
	Odds ratio (95% CI)	**p-value**
Non-transfusion SMM	1.42 (0.60, 3.33)	0.427
All SMM	1.04 (0.59, 1.84)	0.881

THURS - RA - BS 1 - BR 1 – Recovery: Morbidity, Depression - 03

Hospital Variation in Severe Perioperative Surgical Morbidity Associated with Cesarean Delivery

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Vasiliki Tatsis, MD, MS, MBA - University of California San Francisco

Abstract :

Introduction: Marked variation in rates of obstetric complications rates across US hospitals has been reported, highlighting the ongoing need for quality improvement in obstetric care.(1) However, it remains unclear whether rates of severe perioperative surgical morbidity (SPSM), a composite index capturing major surgical complications in cesarean delivery (CD), vary between US hospitals.(2) Therefore, we sought to examine hospital-level variation in the prevalence of SPSM in California.

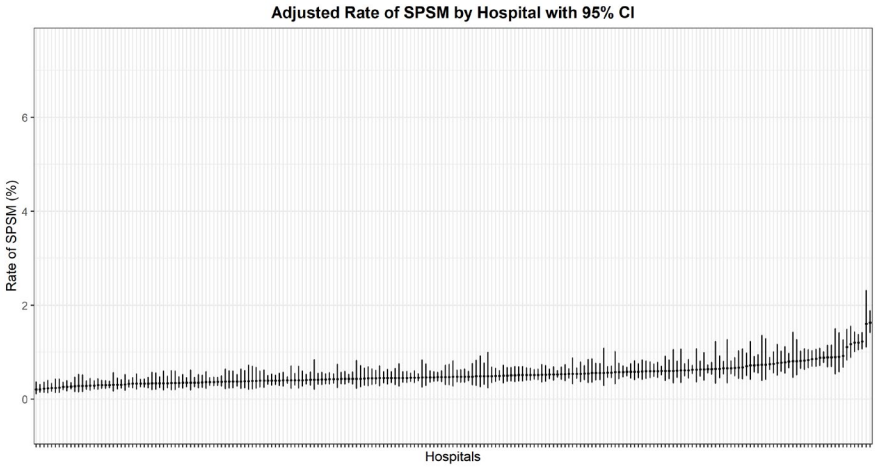
Methods: We conducted a retrospective cross-sectional study analyzing data from 668,282 patients with singleton pregnancies who underwent CD at 217 California hospitals from 2016 to 2021. The primary exposure was the delivery hospital. Data were analyzed using logistic mixed-effects regression with SPSM as the outcome, after adjustment for patient and hospital factors. Hospitals were ranked according to their risk-adjusted SPSM prevalence. Median odds ratios (MOR) and intraclass coefficients (ICC) were used to quantify between hospital variability.

Results: Among 668,282 CDs, 9,751 (1.46%) were associated with SPSM. The median SPSM prevalence across hospitals was 1.27% (IQR=0.83%-1.81%). The distribution of adjusted SPSM prevalence across hospitals is presented in rank order in Figure 1. The lowest and highest adjusted hospital prevalence of SPSM were 0.20% and 1.63%, respectively. The adjusted MOR was 1.48 (95% CI: 1.41-1.55) indicating higher odds of SPSM if a patient were to move from a hospital with lower odds to one with higher odds. The hospital accounted for only a small proportion of the overall SPSM variability (ICC: 4.9%; 95% CI: 3.7 – 6.1%).

Discussion: We observed moderate variability in SPSM prevalence across California hospitals that was unexplained by patient or hospital factors. These findings highlight opportunities to identify perioperative practices and care processes that may contribute to variation in SPSM across hospitals and inform targeted hospital-based quality improvement initiatives.

References:

(1) Glance. Health Affairs 2014; 33: 1330–6; (2) Butwick. Obstet Gynecol; Aug 21, 2025 epub.



Association Between Postoperative Opioid Exposure and Postpartum Depressive Symptoms Following Cesarean Section

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Co-Authors: Skye Bakker, MD - Creighton University School of Medicine
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Abstract :

Introduction:

Postpartum depression (PPD) continues to be prevalent in the United States.[1] Prior research has demonstrated an association between positive screenings for antepartum depressive symptoms and increased opioid use following delivery, but the relationship between postpartum inpatient and outpatient opioid analgesia and PPD has not been well-studied.[2] In 2019, our hospital introduced standardized postoperative order sets to reduce opioid exposure in c-section patients. This preliminary study examined whether there was an association between presence and amount of opioid administration and PPD symptom severity.

Methods:

This was a single center retrospective study examining c-section surgeries at an urban, academic hospital in 2018 and 2023. Milligram Morphine Equivalents (MMEs) were calculated using standard conversions.[3] Edinburgh Postnatal Depression Scale (EPDS) scores from discharge, 2-weeks postpartum, and 6-weeks postpartum were used to assess depressive symptoms. EPDS scores across postpartum follow-up were evaluated using a linear mixed model with random intercepts to account for the correlation of repeated observations by patients. Fixed-effect predictors for either inpatient administration MMEs or outpatient prescription MMEs (separate models), and order set implementation (2018 vs 2023) were estimated. Covariates included follow-up time (discharge, 2-wk, 6-wk), any history of depression, ethnicity (Hispanic vs non-Hispanic), age, BMI, and median household income associated with patient zip code.

Results:

Approximately half of the patients (47.4%) had at least one EPDS screening recorded, providing a total of 991 observations (median = 2 observations per patient). Adjusted models show that a single oxycodone

dose (7.5 MMEs) increase was associated with a 0.08 (inpatient dose) and 0.04 (outpatient dose) increase in expected EPDS score ($p < .001$; Table 1). Additionally, history of depression (both models $p < 0.001$) was associated with a significant increase in EPDS score, while median household income (inpatient $p=0.020$, outpatient $p=0.011$) and time of screening (both models $p < .001$) have significant negative relationship with EPDS scores. Age, BMI, Hispanic ethnicity, and order set implementation show no significant effects on EPDS scores.

Conclusions:

Although the associated risk increase in EPDS scores is clinically concerning, the observed relationship between opioids and EPDS scores was modest in magnitude. Additionally, EPDS scores for many patients were unavailable due to lack of available records for follow-up. A prospective study standardizing documentation of EPDS scores and QI projects aimed at and increasing adherence to postpartum appointments are needed to address these limitations.

References:

1. MMWR Morb Mortal Wkly Rep 2020;69:575–581

2. *Am J Obstet Gynecol MFM* 2023;5(8):101009

3. MMWR Recomm Rep 2022;71(No. RR-3):1–95

Table 1.pdf

THURS - RA - BS 1 - BR 1 – Recovery: Morbidity, Depression - 05

Association of Perinatal Mood and Anxiety Disorders With Anesthesia-Related Complications in Cesarean Delivery Hospitalizations

Presenting Author: Anna C. St. Denis

Presenting Author's Institution: McGovern Medical School - Bellaire, Texas

Co-Authors: David A. Hundley, DO - UT Health Science Center at Houston

Abstract :

Background: Perinatal mood and anxiety disorders (PMAD) are associated with worse maternal outcomes, including severe maternal morbidity and mortality, longer hospitalization, and higher delivery-related costs. Whether PMAD are associated with anesthesia-related complication (ARC) codes during cesarean delivery hospitalizations has not been evaluated.

Methods: We conducted a cross-sectional study using the National Inpatient Sample (NIS), 2016 - 2022. Cesarean delivery hospitalizations among patients aged 15 - 49 years were identified using ICD-10-CM/PCS algorithms. The exposure was PMAD. The primary outcome was a composite of ARC diagnosis codes during the delivery hospitalization spanning neuraxial, airway, and cardiopulmonary complications. We estimated annual PMAD weighted prevalence and evaluated the association between PMAD and ARC codes using survey-weighted logistic regression adjusting for patient and hospital characteristics and obstetric comorbidities.

Results: Among an estimated 8,087,376 weighted cesarean delivery hospitalizations, PMAD codes were present in 9.7% overall and increased from 6.1% (2016) to 13.3% (2022). In the complete-case cohort, excluding hospitalizations with missing covariates (7,765,786 weighted hospitalizations), an ARC code was present in 0.47% overall (0.63% with PMAD vs 0.46% without PMAD). PMAD was associated with higher odds of ARC codes in unadjusted analyses (OR 1.39, 95% CI 1.29–1.50) and remained significant

after adjustment (aOR 1.10, 95% CI 1.02–1.19; p = 0.01). Spinal/epidural headache was the most frequently coded complication.

Conclusions: In a large, nationally representative cohort of cesarean delivery hospitalizations, PMAD was associated with modestly higher odds of ARC codes. Although administrative data cannot establish causality, these findings highlight maternal mental health as a relevant factor for peripartum anesthetic communication and multidisciplinary care coordination.

References: BMC Womens Health 2020;20:150
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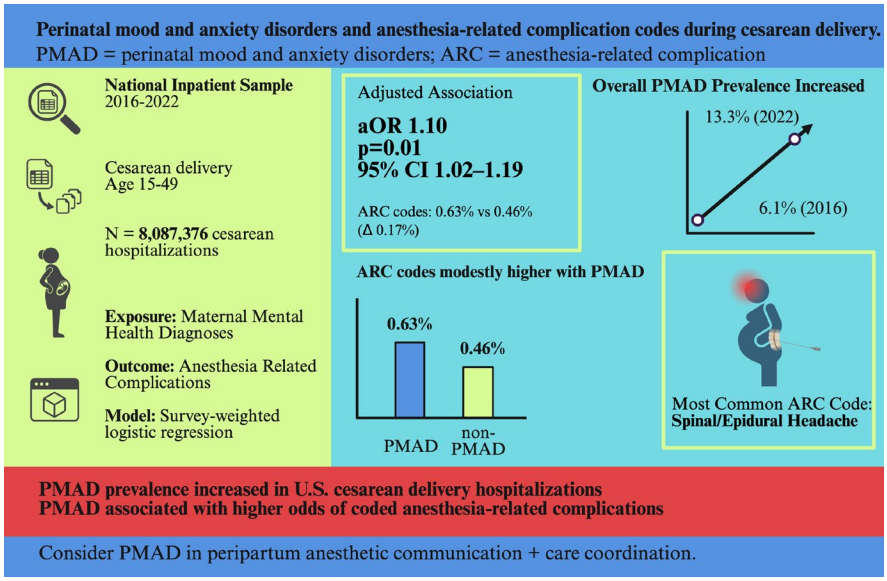

THURS - RA - BS 1 - BR 1 – Recovery: Morbidity, Depression - 06

Outcomes after positive postpartum depression screening at 4–8 weeks: a single US center retrospective cohort study

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Danielle M. Panelli, MD, MS - Stanford University

Abstract :

Introduction: Postpartum depression affects approximately 15% of postpartum individuals in the United States (U.S.) and has serious maternal and infant consequences.[1, 2, 3] While routine screening is recommended, screening only improves outcomes if it can ensure patients have access to timely follow-up care. [4] Large-scale U.S. data describing downstream referrals, treatment, and serious events after a positive Edinburgh Postnatal Depression Scale (EPDS) screen remains limited. We evaluated maternal and infant outcomes following a postpartum EPDS screen.

Methods: We performed a retrospective cohort study at a single U.S. center from 2014 to 2023 using Electronic Health Record (EHR). We included adults (≥18 years) who delivered a live or non-viable infant at gestational age >20 weeks gestational age via any delivery mode who had completed all EPDS items at the obstetric follow-up clinic between 4–8 weeks postpartum. Positive screening was defined as EPDS ≥10. Outcomes were assessed from the EPDS completion date through 1 year postpartum. Primary outcomes were EHR-documented referrals to social work and medical psychiatry specialties. Secondary outcomes included mental health ICD-10 diagnoses (overall and puerperium-associated F53 - Mental and behavioral disorders associated with the puerperium), psychiatric medication initiation, psychiatric referral/consult/visit, and infant hospital admission or new disease diagnosis up to 1 year. Groups were compared using chi-square/Fisher's exact tests and ANOVA/Mann–Whitney U tests, as appropriate.

Results: Of 41,790 deliveries, 8,155 patients had a complete EPDS at 4–8 weeks; 13.6% (n=1,107) screened positive (EPDS ≥10). Median EPDS scores were 13 [IQR 11–16] for positive screens and 3 [IQR 1–5] for negative screens. Results are shown in Table 1. Within 1 year, compared with EPDS < 10, EPDS ≥10 was associated with higher rates of social work and psychiatry referral/consult/visit (both p< 0.001); however, only 7.2% of positively screened patients had an EHR-documented psychiatry

referral/consult/visit. EPDS ≥10 was also associated with higher rates of any psychiatric diagnosis, F53 diagnosis, psychiatric medication initiation, and infant hospital admission/new disease diagnosis (all p≤0.05).

Conclusions: A positive postpartum EPDS screen within a 1 year of childbirth was associated with higher rates of psychiatric diagnoses, referral, consultation and visits, increased social worker referrals and increased infant healthcare utilization. Despite this elevated risk, fewer than 1 in 9 screen-positive patients had an EHR-documented psychiatry referral order, suggesting an actionable gap between screening and connection to specialty care. These findings support development of standardized, integrated postpartum mental health pathways following positive screening.

References:

1. Arch Gen Psychiatry 2008, 65:805
2. JAMA 2006, 296:2616
3. Lancet 2014, 384:1800
4. JAMA 2016, 315:388

Table 1: Outcomes following EPDS screening between 4 – 8 weeks postpartum

	Screen Negative (EPDS 0–9) N=7048	Screen Positive (EPDS score ≥10) N=1107	p
Social Worker Referral	47 (0.7%)	92 (8.3%)	<0.001
Medical Psychiatry Referral/consultation/visits	75 (1.1%)	80 (7.2%)	<0.001
Psychiatry diagnosis All Only F53*	 479 (6.8%) 92 (1.3%)	 339 (30.6%) 201 (18.2%)	 <0.001 <0.001
Psychiatric Medication	139 (2.0%)	33 (3.0%)	0.030
Child hospital admission after discharge or disease	744 (10.6%)	133 (12.0%)	0.021

*F53 = ICD-10 code for mental and behavioral disorders associated with the puerperium, not elsewhere classified

THURS - RA - BS 1 - BR 1 – Recovery: Morbidity, Depression - 07

Association of Patient Anxiety and Time of Delivery with Duration of Urinary Catheterization Following Cesarean Delivery Under Neuraxial Anesthesia: A Prospective Cohort Study

Presenting Author: Aislynn L. Sharrock, BA (Hons), MScR Candidate

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Kaitlin Nelson, BSc, MSc - Women's Health Research Institute, BC Women's Hospital, University of British Columbia
Maisa Samiee, BSc - BC Women's Hospital, Department of Anesthesia
Marianne Vidler, PhD - Department of Obstetrics and Gynecology, University of British Columbia

Abstract :

Background: SOAP ERAC guidelines recommend urinary catheter removal within 6-12 hours postpartum.[1] In a prior retrospective study at our institution, catheter removal was substantially delayed (mean 19.1 hours), with only 2% removed within 12 hours.[2] That analysis suggested patient anxiety and time of delivery as potential contributors. Building on these findings, we conducted a prospective study to evaluate the association between patient anxiety, time of delivery, and catheter duration. We hypothesized that higher patient anxiety would be associated with prolonged postpartum urinary catheterization.

Methods: Following ethics approval and informed consent, patients undergoing scheduled or unscheduled cesarean delivery under neuraxial anesthesia and their postpartum nurses were prospectively recruited. All patients received neuraxial morphine. Patient anxiety was assessed using the validated State-Trait Anxiety Inventory (STAI-S). Pain scores were recorded at 24 hours postpartum. Nurses completed questionnaires identifying decisions to catheter removal. The primary outcome was the association between STAI-S score and catheter duration analyzed by multivariable linear regression adjusting for pre-specified patient characteristics, anesthetic technique and dosing, and postoperative pain and recovery metrics. Secondary outcomes included temporal distribution of catheter removal times.

Results: Data from 258 patients were analyzed. Mean (SD) catheter removal time was 21.2 (7.1) hours. Higher STAI-S scores were associated with longer catheter duration in unadjusted analysis (β=0.17; p=0.006), but not after multivariable adjustment (β=0.02; p=0.77). The strongest predictors were time to first ambulation (β=0.32, $p < 0.001$), time to motor recovery (β=0.46, $p< 0.001$), and time of delivery. Compared with morning (6am-11:59am) deliveries, afternoon, evening, and overnight deliveries were associated with significantly shorter catheter durations. Catheter removal times clustered around nursing shift changes, with 64.9% of all removals occurring within 2 hours of 7am or 7pm and only 8.4% occurring overnight (9pm-5am) (Fig 1).

Conclusions: Patient anxiety was not an independent predictor of prolonged postpartum urinary catheterization. Instead, we found catheter duration was primarily driven by delayed motor block regression, delayed ambulation,

and system-level workflow patterns. Clustering of catheter removal times around nursing shift changes disproportionately affected morning deliveries; these patients were ready for removal in the evening or overnight but were deferred until the next shift change. Meaningful reductions in catheter duration will therefore require strategies to promote early ambulation, coupled with engagement of nursing teams to redesign workflows that prioritize patient-ready catheter removal within recommended ERAC timeframes.

References:

1. Bollag et al. A&A 2021
2. Sharrock et al. SOAP 2024 Abstract

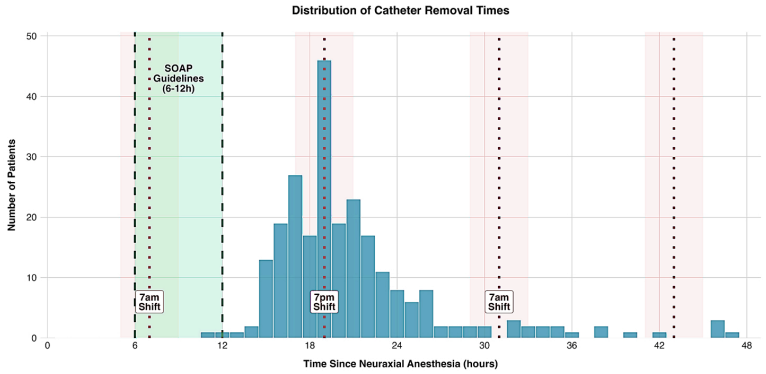

Figure 1. Distribution of postpartum urinary catheter removal times following cesarean delivery. Histogram showing time from neuraxial anesthesia (time=0) to urinary catheter removal. The green shaded region indicates the SOAP ERAC–recommended removal window of 6–12 hours. Vertical dashed lines denote nursing shift changes at 7:00 am and 7:00 pm. Catheter removal times demonstrate marked clustering around shift changes, with the majority of removals occurring within two hours of 7:00 am or 7:00 pm and relatively few removals overnight. This clustering suggests that catheter removal is strongly influenced by unit workflow rather than patient readiness alone, disproportionately prolonging catheterization for patients delivering in the morning who become clinically ready for removal in the evening or overnight but have removal deferred until the next shift change.

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 01

Inherited Bleeding Disorders Carry a High Hemorrhage Burden: A Retrospective Cohort Study in a Large Healthcare System (2015-2025)

Presenting Author: Yalda Toofan, MS, MD

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

Co-Authors: Kathryn J. Gray, MD, PhD - University of Washington \\
Ricardo Kleinlein, PhD - Brigham and Women's Hospital/Harvard Medical School
Sol Schulman, MD, PhD - Beth Israel Deaconess Medical Center
Nolan K. Wheeler, BS - Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA

Abstract :

Background:

Patients with inherited bleeding disorders (BD) are at increased risk for postpartum hemorrhage (PPH). Risk estimates are strongest for von Willebrand disease (VWD) but remain limited for other BD due to small cohorts and code-based definitions that incompletely capture hemorrhage severity[1]. We used scalable phenotyping of electronic health records (EHR) integrating blood loss (BL), transfusion, and escalation procedures.

Methods:

In this retrospective cohort study, we included all deliveries (2015–2025) in a large health system. We identified clinician-documented BD using natural language processing (NLP) term search[2] of admission history and physical notes based on an ISTH-derived disorder list and classified deliveries as VWD, non-VWD BD (e.g. Factor 2, 5, 7, 8, 9, 10, fibrinogen deficiency and other rare conditions), or reference (no BD identified). Any PPH was defined as BL ≥1000 mL or blood transfusion within 24 hours. Severe PPH was defined as BL ≥1500 mL, transfusion within 24 hours, or hemorrhage escalation (uterine tamponade balloon/Bakri, compression sutures, embolization, or hysterectomy) identified using structured procedure data and NLP. Delivery was the unit of analysis; standard errors were clustered by patient. We estimated associations using multivariable logistic regression adjusting for maternal age, parity, prior cesarean, delivery mode, and major obstetric hemorrhage risk factors. Sensitivity analyses excluded patients with known pre-delivery coagulopathy.

Results:

Among 165,393 deliveries (121,915 patients), 315 deliveries (217 patients) were VWD and 200 deliveries (138 patients) were non-VWD BD; 164,878 deliveries were reference. PPH occurred in 9.9% of reference deliveries versus 14.6% (VWD) and 19.5% (non-VWD); severe PPH occurred in 4.0% versus 6.7% and 16.0%, respectively. Transfusion ≤24 hours postpartum occurred in 1.2% versus 1.9% and 12.0%; hemorrhage escalation occurred in 1.1% versus 1.3% and 3.5%. After adjustment, nonVWD BD was associated with higher odds of any PPH (OR 2.46, 95% CI 1.59–3.80) and especially severe PPH (OR 5.29, 95% CI 3.27–8.57). For VWD, effect estimates were

elevated (any PPH OR 1.47, 95% CI 0.98–2.20; severe PPH OR 1.69, 95% CI 0.97–2.95). Findings were consistent in sensitivity analyses.

Conclusions:

In this large EHR cohort using validated hemorrhage phenotypes and NLP-identified BD, non-VWD disorders were associated with substantially higher risk-adjusted odds of PPH and severe PPH. These data support proactive multidisciplinary planning and obstetric anesthesia readiness for patients with less common BD.

References: 1. J Thromb Haemot 5:1165–69
2. medRxiv, https://doi.org/10.1101/2025.07.25.25332130.

Bleeding Disorder Table.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 02

Optimizing hemodynamics and analgesia for patients undergoing caesarean delivery with spinal anesthesia in a limited resource setting.

Presenting Author: Kimberly Mendoza, MD, PhD, MPH

Presenting Author's Institution: Stanford University - Menlo Park, California

Co-Authors: Cristina Wood, MD MS - University of Colorado School of Medicine

Abstract :

Cesarean delivery (CD) is one of the most commonly performed major surgical procedures and can be associated with significant postoperative pain. Up to 33% of patients undergoing CD experience intraoperative pain and up to 20% of patients experience severe acute postoperative pain, which can lead to significant psychological impact and can increase the likelihood of developing chronic pain and long-term opioid use. Furthermore, severe pain is linked to an increase in mental health disorders such as three-fold increase in depression and negatively impacts breastfeeding and mother-infant bonding. Neuraxial anesthesia (NA) is the preferred primary anesthetic for CD due to its safety profile for both the pregnant patient and fetus when compared to general anesthesia (GA). The addition of neuraxial opioids has been shown to improve intraoperative and postoperative analgesia due to their analgesic efficacy and favorable safety profile. In the United States, NA is utilized in over 95% of elective and 80% of emergent CD. However, in many limited resource settings, these adjuncts to improve intraoperative and postoperative analgesia are not widely used. At the Hospital Nacional de Coatepeque (HNC) in Guatemala, approximately 65% of all deliveries occur by CD. For CD, spinal anesthesia is frequently utilized, but other standards found in the United States such as long-acting intrathecal opiates or truncal blocks to improve postoperative pain and left uterine displacement (LUD) to reduce supine hypotension are not utilized.

This single center prospective implementation study took place at HNC with three specific aims: standardize NA for CD to include the use of a long-acting opiate use for intraoperative and postoperative analgesia, standardize LUD to reduce maternal hypotension intraoperatively and standardize the use of truncal blocks for postoperative analgesia when CD is performed with GA. All pregnant patients undergoing CD received a standard neuraxial intrathecal dose consisting of fentanyl 25 mcg, morphine 100 mcg and bupivacaine 0.5% 10 mg. After reclining supine, a 1L crystalloid bag was placed under the right hip to laterally displace the gravid uterus to the left to optimize venous return and hemodynamics. Patients who were ineligible to receive NA for CD, received regional anesthesia with a transverse abdominal plane (TAP) block with bupivacaine 0.25% 15 mL per side.

A half-day academic conference covering topics including, intrathecal morphine, LAST, LUD, TAP blocks and patient safety and monitoring post CD was held for the obstetrics and anesthesia faculty. An analysis

at 10 months post standardization showed routine use of intrathecal opioids and LUD in CD with positive patient feedback.

References:

1. Pain. 2008;140:87–94.
2. Anesthesiology 2025 Jul 1; 143(1): 156-167
3. Acta Clin Croat. 2019 Jun;58(Suppl 1):90-95.
4. Anesthesiology 1999; 91:1919
5. Chestnut's Obstetric Anesthesia, 6th Ed. Elsevier; 2019: Chap 26.
6. Anesth Analg. Jun 2016;122(6):1939-46.

Protocolo Estandarizado de Analgesia Postcesárea (PEAP)

Kimberly Mendoza, MD, PhD, MPH

Kenny Wise, MD

Parto Cesárea con Espinal (Cobertura dermatoma T4)			
Narcotico	Bupivacaína		
	Concentracion	Dosis	Volume
Fentanilo 25 mcg Morfina 100 mcg (0.1 mg)	0.5 % (hiperbarica)	10 mg	2 mL

Parto Cesárea con Anesthesia General (entubado)			
Bloqueo TAP	Bupivacaína		
	Concentracion	Dosis	Volume
	0.25%	Máximo 2.5 mg/kg	20 mL (cada lado)

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 03

Anesthetic Perspectives and Practices Toward Procedural Abortion: A Survey of Society for Obstetric Anesthesia and Perinatology Members

Presenting Author: John C. Markley, MD, PhD

Presenting Author's Institution: ZSFG/UCSF - San Francisco, California

Co-Authors: Alexander Butwick, MBBS, FRCA, MS - University of California San Francisco
David R. Gambling, MB, BS, DRCOG, FRCPC - Kaiser Permanente San Diego Medical Center
Allison Lee, MD, MS - Hospital of the University of Pennsylvania
Robert S. White, MD, MS - New York Presbyterian - Weill Cornell Medicine
Cristina Wood, MD, MS - University of Colorado School of Medicine

Abstract :

Background
Anesthesiologists and other anesthesia professionals often participate in the provision of anesthesia for procedural abortion.[1,2] Little is known about the extent to which anesthesia professionals participate in abortion-related care or their reasons for non-participation.[3-6] Understanding current practice and perspectives should help guide educational programing, research, and guidance for patient care.

Methods
The primary aim of this study sought to determine via an IRB-approved, anonymous web-based survey (Qualtrics) the attitudes and perspectives of non-trainee SOAP members related to their anesthesia practices for various abortion and abortion-related procedures such as labor epidural analgesia for induction termination, anesthesia for feticidal injection, and in the care of patients experiencing rare complications of abortions such as post-abortion hemorrhage and sepsis. For SOAP members who did not provide or supervise anesthesia for abortion or abortion-related procedures, we evaluated reasons for non-participation. Procedural abortion was defined to include: uterine aspiration, D&C, aspiration curettage, suction curettage, manual vacuum aspiration, menstrual extraction, sharp curettage, and D&E. Not included in the definition of procedural abortion were: medication abortion, ectopic pregnancy, IUFD, miscarriage, and PPROM.

Results

The survey response rate was 19% (159/856). Most survey respondents provided and/or supervised anesthesia for first (64%) and second (67%) trimester procedural abortion, abortion for fetal anomalies/abnormal genetics (69%), labor epidural for induction termination (72%), and procedures for post-abortion complications (86%). A lower proportion of respondents provided/supervised anesthesia for third trimester procedural abortion (30%) and feticidal injection procedures (24%) (Table). Of those that did not provide/supervise anesthesia for first, second, or third trimester procedural abortion, the most

frequent reasons cited were prohibitive institutional policy (24-36%), current or impending local (state) legal restrictions (27-41%), and personal opposition (16-25%). Concerns about personal legal liability did not factor prominently as a reason for not providing/supervising anesthesia procedural abortion (5-8%).

Conclusion

Despite a low survey response rate, we observed that most respondents participated in procedural abortion and many abortion related procedures. Concern about legal liability was not a prominent reason for not participating in anesthesia care. These findings can inform targeted education initiatives, workforce planning, and institutional guidance to ensure safe, equitable access to anesthesia care for abortion and abortion-related interventions.

References:

1. Contraception 2008; 78:492
2. Contraception 2018; 98:95
3. Int J Obstet Anesth 2022; 49:103239
4. Contraception 2023; 124:110058
5. Anesthesiology 2024; 141:849
6. Anesthesiol Clin 2024; 42:539

Table.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 04

Results from the Making Every Baby Count Initiative in Four Regional Hospitals in Ghana

Presenting Author: Medge Owen, MD

Presenting Author's Institution: Wake Forest School of Medicine of Wake Forest Baptist Medical Center - Winston Salem, North Carolina

Co-Authors: Lawrence Fordjour, MD - SUNY Downstate Medical Caenter
Adeyemi Olufolabi, MD - Duke University Medical Center

Abstract :

Introduction:

Neonatal mortality remains a predominant global challenge. In sub Saharan Africa, neonatal mortality is related to limited access to quality healthcare and the prevalence of preterm birth complications, birth asphyxia, and infection. Achieving the Sustainable Development Goals requires strengthening the quality of advanced newborn care at high volume facilities which care for small and sick newborns, and where neonatal mortality is increasingly concentrated. In Ghana, Kybele lead the Making Every Baby Count Initiative 2.0 (MEBCI 2.0), a four year, multi-disciplinary intervention aimed at reducing institutional perinatal mortality by 15% in four regional referral hospitals through clinical, operational and leadership capacity building and to establish an intervention package suitable for scale to other high volume facilities.

Methods:

At baseline, structured observations of clinical care and operational practices were conducted across the continuum from maternal admission to discharge. Findings facilitated development of an evidence-based, context specific intervention package designed to address clinical and system-level deficiencies. Clinical training modules, aligned with global best practices, encompassed antepartum management of anticipated preterm birth, advanced neonatal resuscitation and transport, operating and recovery room care optimization, postnatal newborn surveillance, and specialized care for neonates admitted to NICU. Multilevel quality improvement (QI) training was conducted to empower local teams to identify performance gaps and implement data-driven solutions. Process innovations related to accelerated cesarean delivery care and supported newborn transport were introduced. Post training optimization included supportive supervision and mentoring, augmented with peer review to assess implementation. Mortality was measured from routine facility reports.

Results:

From 2020-2024, MEBCI created and deployed 10 clinical and operational modules, training 2,867 clinicians who demonstrated a cumulative 21% knowledge gain across modules (pretest 63%; posttest 84%). MEBCI deployed 982 pieces of major (e.g. CPAP) and 1,392 pieces of minor (e.g. dopplers) equipment, conducting training on equipment use among clinicians and biomedical technicians. Local clinicians initiated 101 QI projects based on identified gaps. Advocacy led to the development of 11 national newborn clinical care guidelines with governmental approval. Eighty clinical indicators were monitored via peer review; implementation increased from 44% (round 1), to 61% (round 2), to 78% (round 3) over 19 months. The program reached 89,764 newborns and the facilities saw a 35% reduction in stillbirths and 14% reduction in neonatal mortality.

Conclusion:

MEBCI 2.0 successfully reduced neonatal mortality in four regional referral hospital in Ghana. It is supported by the government as a model for scale up and has been instrumental in shaping the neonatal health agenda.

References:

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 05

Long-Acting Intrathecal Opioids Decrease Postoperative Opioid Requirements following Scheduled Cesarean Hysterectomy for Placenta Accreta Spectrum

Presenting Author: Damon Wallace, MD

Presenting Author's Institution: University of Michigan - Ann Arbor, Michigan

Co-Authors: AnneMarie Opipari, MD - University of Michigan
Aimee Rolston, MD, MS - Michigan Medicine
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Abstract :

Background:

Placenta Accreta Spectrum (PAS) currently affects 1/588 pregnancies in the US and is associated with significant morbidity.[1] Anesthetic management for Cesarean hysterectomy (C-hyst) varies with no clear evidence for the superiority of a given technique. Up to 40% of patients report poor pain control after C-hyst.[2] While limited retrospective data suggest that neuraxial anesthesia, with or without conversion to general anesthesia, is associated with decreased postoperative pain,[2,3] there are no data on optimal postoperative analgesia following C-hyst for PAS. We began offering intrathecal (IT) opioid for scheduled Cesarean hysterectomy for PAS in January 2024, with variable adoption of this practice due to patient and provider preferences. As part of our ongoing improvement efforts, we compared the effect of pre-induction IT opioids on postoperative opioid administration in patients receiving GA without neuraxial anesthesia for scheduled C-hyst for PAS.

Methods:

We retrospectively analyzed the effects of long-acting IT opioid (morphine or hydromorphone) on postoperative opioid requirements, defined as oral morphine equivalents (OMEs) prior to discharge, for all scheduled C-hysts for PAS at our institution between 1/2024 and 11/2025 performed solely under GA. We excluded patients who received neuraxial anesthesia with planned conversion to general anesthesia after delivery. The primary outcome was postoperative OMEs. Mean values were analyzed using an unpaired t-test.

Results:

17 cases met inclusion criteria. 10 patients received IT opioid (150-200 mcg IT morphine – 9 cases; 75 mcg IT hydromorphone – 1 case) and 7 did not. Patients who received IT opioids required significantly less postoperative opioids prior to discharge compared to patients who did not receive IT opioids

(67.8±78.0 OMEs vs 179.3±150.6 OMEs; p=0.047). 3/10 patients who received IT opioid did not require any additional opioids prior to discharge; all (7/7) patients who did not receive IT opioid required postoperative opioids. Additional data on length of stay, intraoperative, and postoperative analgesics are included in the table.

Conclusion:

The optimal analgesic regimen following C-hyst has not been defined. Our findings suggest that pre-induction IT opioids may result in less postoperative opioid requirements following C-hyst for PAS performed under general anesthesia. Our findings are limited by our study design and small sample size, but they are consistent with the established benefits of neuraxial opioids for postoperative analgesia. Our analysis reinforced our current practice and we continue to offer pre-induction long-acting IT opioids for postoperative analgesia for patients who receive general anesthesia for C-hyst for PAS.

References: 1. Einerson, BD. et al. Obstet Gynecol 2023; 142(1):31-50
2. Warrick, CM. et al. Anesth Analg 2022; 135(1):191-197
3. Panjeton, GD. et al. IJOA 2022; 49:1-5

Table 1.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 06

Analgesic efficacy of transversalis fascia plane block for post-caesarean pain management. A systematic review and meta-analysis.

Presenting Author: Jocelyn Wang

Presenting Author's Institution: Schulich School of Medicine and Dentistry - london, Ontario

Co-Authors: Cheng Lin, FRCPC - Western University

Abstract :

Background: Pain following cesarean section delivery is a complex experience and can cause fear, anxiety, and frustration, as the mother is unable to care for her newborn, which can inhibit bonding and safe breastfeeding. Currently, there is no single best option for post-cesarean section pain management. Multimodal analgesic strategies, including neuraxial opioids, nonopioid analgesics, and regional blocks, have shown promise in optimizing pain relief while minimizing side effects. Truncal nerve blocks, such as the Transversalis Fascia Plane (TFP) block has emerged as a promising technique for post-cesarean pain management.

Objective: To determine the efficacy and safety of the TFP block in reducing pain after cesarean section.

Methods: This review was registered on PROSPERO (CRD42024542046). We searched MEDLINE, EMBASE, and unpublished sources from inception to May 2024. We included all randomized controlled trials (RCTs) investigating TFP block versus any comparator for post- cesarean pain management. We performed random effects meta-analysis, a risk of bias assessment, and rated the quality of evidence.

Results: We included 8 eligible RCTs (n=641). Compared to control, the TFP block decreased postoperative opioid consumption at 24 hours [mean difference [MD] -13.03 mg IV morphine equivalent, 95% confidence interval [CI] – 20.49, -5.57, p=0.002, moderate certainty], post-operative pain on movement at 12 hours [mean difference [MD] -0.79, 95% CI – 1.20, -0.38, p=0.0002, low certainty], time to rescue analgesia [mean difference [MD] 8.36 hour, 95% CI 3.45, 13.27, p=0.0008, moderate certainty], and the need for rescue analgesia (risk ratio [RR] 0.44, 95% CI 0.22, 0.99, p=0.0464, very low certainty). There was no difference in time to rescue analgesia between the TFP block and the transversalis abdominous plane (TAP) or quadratus lumborum block. The TFP block has an uncertain impact on postoperative opioid consumption at any other timepoint, pain at rest and during movement at any other time point, quality of recovery, patient satisfaction and postoperative NSAID needs versus any other comparator.

Conclusion: The TFP block improved postoperative opioid consumption at 24 hours, pain on movement at 12 hours, time to rescue analgesia, and need for rescue analgesia compared to control. There was no difference in time to rescue analgesia compared to the TAP or quadratus lumborum block. More RCTs

that evaluate the impact of TFP blocks versus other truncal nerve blocks on other important clinical outcomes are needed.

References:

THURS - RA - BS 1 - BR 1 - Potpourri 1 - 07

Apgar score according to neonates' race and associations with skin-to-skin initiation and resuscitative interventions

Presenting Author: Charlotte Thompson, BA

Presenting Author's Institution: Columbia Department of Anesthesiology - New York, New York

Co-Authors: James Conwell, DO - Columbia University
Jean R. Guglielminotti, MD, PhD - Columbia University Irving Medical Center;
Sandy Kim, MD - Columbia University

Abstract :

Background

Research shows that Black neonates have lower Apgar scores[1,2] and higher NICU admission rates[3] compared to non-Black neonates. Artificially low Apgar scores given to neonates with darker skin is suggested to explain these disparities. We hypothesized that Black neonates have lower Apgar scores, delayed skin-to-skin initiation (important for maternal-infant bonding and breastfeeding) and more resuscitative interventions than White and Hispanic neonates.

Methods

This was an observational cross-sectional study among neonates born via cesarean delivery (CD) between Nov 2023 and Nov 2025. Exposure was neonate race (Black, White, Hispanic); neonates with "other" were not included in the analysis. Primary outcome was Apgar score at 1 min. Secondary outcomes were skin-to-skin initiation time and resuscitative interventions (composite of O_2 blowby, CPAP, positive pressure ventilation, intubation and NICU admission). Statistical comparisons were made using Kruskal-Wallis with post-hoc analysis Dunn test and Chi-square tests with post-hoc pairwise comparisons and Bonferroni correction.

Results

There were 804 neonates included (91 Black, 165 white, and 548 Hispanic) in the analysis. Apgar score at 1 min was 9 in 33% of Black vs. 53% of Hispanic neonates (p= 0.004); this difference driven by Appearance score of 0 in 62% of Black neonates vs. 40% of Hispanic neonates (p=0.0002) (Table 1). Black neonates had delayed skin-to-skin initiation time (87.2 ± 33.6 min) vs. Hispanic neonates (74.1 ± 30.6 min; P=0.02) but no higher utilization of resuscitative interventions. Differences between Black and White neonates were not observed for Apgar score, skin-to-skin initiation time, and resuscitative interventions. Lower Apgar and Appearance scores correlated with delayed skin-to-skin initiation and higher use of interventions, with significant differences observed between scores of 8 vs. 9 and 0 vs. 1, respectively.

Conclusions: Our analysis showed that black neonates had lower Appearance, and therefore Apgar, scores at 1 min of life and delayed skin to skin initiation times but no significant increase in resuscitative interventions. It is possible that an Apgar score of 8 in a black neonate is implicitly treated equivalently to an Apgar score of 9 in other neonates or, more likely, that resuscitative measures are not initiated based on Apgar score, but rather clinical indicators, making the Apgar score less relevant. Future analyses assessing the effects of the Apgar score, without the Appearance component, on resuscitative interventions and delayed skin to skin time are warranted.

References:

1. Population Research and Policy Review, 2003:41-64.
2. J Perinat Med, 2023. 51: 628-33
3. Am J Obstet Gynecol, 2023. 228:229 e1-229 e9.

RL SK Apgar race Table 1 v5 - submission.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 01

INCIDENCE OF POSTPARTUM HEMORRHAGE AND RELATED RISK FACTORS: A RETROSPECTIVE STUDY

Presenting Author: Monica S. Siaulys, PhD, MD

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Alecio Fonseca Leite, MD - Faculdade Santa Joana
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Marcelo Oliveira Pessoa, MD - Faculdade Santa Joana

Abstract :

Background: Postpartum hemorrhage (PPH) remains one of the leading causes of maternal morbidity and mortality worldwide. Although extensively studied in public health seLngs, data from private high-risk maternity hospitals in Brazil remain scarce, limiNng a comprehensive understanding of hemorrhagic paOerns and associated clinical characterisNcs in this context. ObjecDve: To analyze the incidence, clinical profile, and factors associated with postpartum hemorrhage in a private high-risk maternity hospital in southeastern Brazil. Methods: A retrospecNve observaNonal study was conducted including all women diagnosed with PPH who underwent vaginal delivery, intrapartum cesarean secNon or cesarean secNon at a private maternity hospital between April 1, 2022, and April 1, 2023. PPH was defined as blood loss ≥1000 mL within the first 24 hours postpartum. Sociodemographic, obstetric, clinical, and neonatal variables were extracted from electronic medical records. StaNsNcal significance was set at $p< 0.05$. Results: A total of 644 women with PPH were included. Most paNents were aged ≥35 years (59.7%) and presented overweight or obesity (82.1%). Cesarean secNon was the predominant mode of delivery (91.0%). Median blood loss was 1352.5 mL (IQR 1145–1870 mL), with 61.0% presenNng losses between 1000 and 1499 mL. Transfusion was required in 7.0% of cases, and hysterectomy was performed in 5.1%, with no maternal deaths observed. Blood loss also differed according to mode of delivery ($p=0.017$), with paNents undergoing vaginal delivery

presenNng a higher volume of bleeding. Higher blood loss volumes were significantly associated with gestaNonal age < 37 weeks, maternal age ≥35 years, assisted reproducNve techniques, hypertensive disorders of pregnancy, twin gestaNon, and inclusion in the insNtuNonal hemorrhage protocol (all p< 0.001). Blood loss also differed according to mode of delivery (p=0.017). Conclusions: In this cohort of women with postpartum hemorrhage managed in a private high-risk maternity seLng, greater blood loss was associated with advanced maternal age, prematurity, hypertensive disorders, assisted reproducNon, and twin gestaNon. These findings highlight the importance of early risk straNficaNon and protocol-based management to miNgate hemorrhagic severity and improve maternal outcomes in private obstetric care seLngs.

References:

Surinder T; Lambert G; Bonhomme V. An update on post-partum hemorrhage. Acta Anaesth Bel. 2025;76(2):95-116.

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 02

A single-center retrospective analysis of inadequate neuraxial anesthesia for postpartum tubal ligation

Presenting Author: Mindy Kim, BS

Presenting Author's Institution: Duke University School of Medicine - Durham, North Carolina

Co-Authors: Matthew Fuller, MS - Duke Anesthesiology

Abstract :

Introduction:

Anesthesia for postpartum tubal ligation (PPTL) is typically achieved by reactivation of a pre-existing epidural catheter or de novo spinal anesthesia.[1] Prior studies report high failure rates with epidural reactivation (up to 35%) and de novo spinal anesthesia (15-20%),[2, 3] potentially related to prolonged intervals between delivery and epidural reactivation or inadequate spinal dosing. We previously performed all PPTLs under spinal anesthesia but recently have been using higher intrathecal bupivacaine doses than those used for cesarean delivery and attempting epidural reactivation of well-functioning epidural catheters for PPTLs performed within 4 hours of delivery. Here, we report on the incidence of inadequate block in patients undergoing PPTL with spinal anesthesia according to intrathecal bupivacaine dose and following epidural catheter reactivation.

Methods:

We included patients who underwent PPTL between October 1, 2003 and October 1, 2025 with either spinal anesthesia with hyperbaric bupivacaine or epidural reactivation. Spinal anesthesia was grouped by bupivacaine dose: low (7.5-9.75 mg), middle (10.5-12 mg), and high (>13.5 mg). The primary outcome was inadequate surgical block, defined as the need for IV analgesic/sedative supplementation (morphine, hydromorphone, propofol, ketamine, fentanyl >100µg, dexmedetomidine > 20µg, or midazolam > 2mg), or failed block requiring repeat neuraxial block or conversion to general anesthesia. We analyzed data using Kruskal-Wallis and Fisher's exact tests, and multivariable logistic regression to adjust for confounders.

Results:

A total of 594 patients received spinal anesthesia (low dose n=14 (2.4%), middle dose n=336 (56.6%), high dose n=244 (41.1%)) and 41 underwent epidural catheter reactivation. Overall, 19.4% (n=115) of spinal anesthesia patients experienced an inadequate block and 5.2% (n=31) had a failed block. Patient demographics and outcomes are summarized in the table. In the multivariable model, inadequate block was less likely with >13.5 mg bupivacaine dose compared to the 10.5-12 mg dose (OR 0.38, 95% CI (0.23, 0.63), p< 0.001), and with years since the start of the study (0.95 (0.9, 1), p =0.029), while increase in surgical duration in minutes was associated

with increased risk (1.03 (1.01,1.04), p< 0.001). Of the 41 patients who underwent epidural catheter reactivation, 5 (12.2%) experienced inadequate blocks.

Conclusions:

Higher bupivacaine doses were associated with significantly lower rates of inadequate blocks for PPTL than the doses typically used for cesarean delivery in our practice, supporting recent practice changes favoring higher doses. Epidural catheter reactivation demonstrated comparable rates of inadequate blocks as the high dose spinal group, suggesting it is an acceptable strategy, though larger studies are needed for definitive conclusions.

References:

1. Anesth Analg 2016; 122:1939
2. F1000Res 2018; 7:1557
3. Int J Obstet Anesth 2024, 58:103974

A single-center retrospective analysis of inadequate neuraxial anesthesia for postpartum tubal ligation.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 03

Association of patient and clinical characteristics with successful external cephalic version: a single-center retrospective study

Presenting Author: Danielle Sader, MD

Presenting Author's Institution: Baylor Scott & White Medical Center-Temple - Temple, Texas

Co-Authors: Jessica Ehrig, MD - Baylor Scott & White Medical Center-Temple
Belinda Kohl-Thomas, MD - Baylor Scott & White Medical Center-Temple
Jacqueline Schuster, MD - Baylor Scott & White Medical Center-Temple
Emily E. Sharpe, MD - Mayo Clinic - Rochester
Diana Villazana-Kretzer, DO - Baylor Scott & White Medical Center-Temple

Abstract :

Objective

The primary aim of our study was to identify patient and clinical characteristics that were associated with successful external cephalic version (ECV) at our hospital.

Methods

We used a retrospective observational study design. Patients at our hospital who underwent ECV from February 1, 2014 to December 31, 2024 and had complete body mass index (BMI) data were included in the study. We performed a bivariate analysis between patients who did and did not have successful ECV. We then performed a multivariate logistic regression with variables of interest to determine which variables were independently associated with successful ECV.

Results

There were 255 patients who had ECV performed during the study period and 247 patients had complete BMI data and were included in the final analysis. Patients who had successful ECV had a higher gravidity and parity, were more likely to have neuraxial analgesia or anesthesia (NA), and had fewer ECV attempts compared to patients who had unsuccessful ECV. Complete data for the cohorts are presented in *Table 1*. A multivariate logistic regression determined that NA (aOR 2.10; 95% CI 1.07-4.14; p=0.03) and number of ECV attempts (aOR 0.39; 95% CI 0.29-0.54; p< 0.001) were independently associated with successful ECV. Age (aOR 1.02; 95% CI 0.75-1.38; p=0.90), BMI (aOR 0.95; 95% CI 0.88-1.03; p=0.25), parity (aOR 1.27; 95% CI 0.99-1.62; p=0.06), and anterior placenta (aOR 0.66; 95% CI 0.30-4.45; p=0.30) were not associated with successful ECV. The c-statistic for the multivariate logistic regression was 0.81.

Discussion

Patients who received NA were twice as likely to have successful ECV compared to patients who did not receive neuraxial anesthesia, and each additional attempt at ECV was associated with a 60% decrease in the chance of successful ECV. Our multivariate logistic regression c-statistic of 0.81 indicates good predictability. Limitations of our study included small sample size and evolving clinical practice over 11 years. An additional limitation was that we did not have complete data on the experience of the attending obstetrician who performed the ECV. Results from this study can potentially inform clinicians of the best practices for successful ECV at our hospital.

References:

Table 1. ECV.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 04

Two doses of antepartum betamethasone reduces airway complications in neonates compared to 1 dose in 32-36 week population.

Presenting Author: Andrew Warburton, MD

Presenting Author's Institution: Icahn School of Medicine at Mount Sinai - New York, New York

Co-Authors: Angela Bianco, MD - Icahn School of Medicine at Mount Sinai
Sara Edwards, MD - Icahn School of Medicine at Mount Sinai

Abstract :

Antenatal betamethasone reduces neonatal respiratory morbidity in preterm birth; however, the incremental benefit of one versus two doses and the role of dose-to-delivery timing remain incompletely defined. The objective of this study was to characterize neonatal outcomes associated with a second dose of betamethasone using a dose–timing framework to identify clinically meaningful exposure phenotypes.

We conducted a retrospective cohort study of pregnancies delivering at Mount Sinai Hospital between 2013 and 2023 that received antenatal betamethasone prior to preterm delivery (< 37 weeks). The primary outcome was a composite of neonatal respiratory morbidity, including transient tachypnea, respiratory distress syndrome, prolonged respiratory support, intubation, or surfactant use. The secondary outcome was a composite of severe neonatal morbidity, including intraventricular hemorrhage, periventricular leukomalacia, retinopathy of prematurity, necrotizing enterocolitis, bronchopulmonary dysplasia, or sepsis. Exposure was defined as time from the most recent betamethasone dose to delivery. Logistic regression with restricted cubic splines modeled nonlinear dose–timing interactions, adjusting for gestational age, birthweight, neonatal sex, preterm labor, preterm premature rupture of membranes, and chorioamnionitis. Marginal risks and risk differences (RDs) comparing one versus two doses were estimated at prespecified time points, with uncertainty assessed using bootstrap resampling.

A total of 2,086 mother–neonate dyads were analyzed, including 873 who received one dose and 1,213 who received two doses of betamethasone. For the primary outcome, inclusion of a dose–timing interaction significantly improved model fit ($p < 0.0001$). Compared with one dose, two doses were associated with lower respiratory morbidity when delivery occurred shortly after exposure (RD12h −11.3%, RD24h −7.3%), with attenuation and reversal at longer intervals (RD48h +1.1%, RD72h +6.6%, RD >72h +10.2%; all $p < 0.05$). No significant dose–timing interaction was observed for severe neonatal morbidity ($p=0.68$). Landmark analysis identified gestational age–specific effects, prompting a focused analysis of deliveries between 32 and 36 weeks (n=1,493). In this subgroup, two doses were consistently associated with lower respiratory morbidity across all exposure intervals, with absolute risk reductions of approximately 14–16% ($p < 0.001$). Adjustment for maternal clinical factors did not materially alter these associations.

Betamethasone demonstrates distinct dose–timing phenotypes. Overall, benefit from a second dose is greatest when delivery occurs soon after exposure, while late-preterm pregnancies (32–36 weeks) derive sustained

respiratory benefit from two doses across exposure intervals, supporting gestational age–specific optimization of antenatal corticosteroid therapy.

References: *New England Journal of Medicine*. 2016;374(14):1311-1320.

SOAP Figures.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 05

Prevalence of Peripartum Anemia and Iron Deficiency Anemia at Delivery in a Large Urban Safety-Net Cohort

Presenting Author: Jean-Paul Russo, MPH

Presenting Author's Institution: University of Miami Miller School of Medicine - Miami, Florida

Co-Authors: Jennifer M. Banayan, MD - Northwestern University

Abstract :

Introduction:

Peripartum anemia remains a major health challenge, increasing risks of severe morbidity, blood transfusion, and mortality. Iron deficiency anemia (IDA) is the predominant cause in high resource settings and independently contributes to adverse outcomes. A structured trimester-based anemia screening and management protocol was implemented in our clinics in March 2024. The objective of this study was to determine the prevalence of anemia and IDA at delivery in women giving birth at a large urban safety-net hospital serving a high-risk, diverse population.

Methods

This IRB-approved retrospective cohort study included all deliveries at our institution from 3/1/2024 to 2/28/2025. Patients without an admission hemoglobin (Hb) or unknown gestational age were excluded. Anemia was defined according to American College of Obstetricians and Gynecologists (ACOG) guidelines: Hb < 10.5 g/dL for second-trimester deliveries and < 11.0 g/dL for third-trimester or post-term deliveries. Iron deficiency was defined by ferritin < 30 ng/mL, consistent with WHO and ACOG recommendations. Admission Hb and ferritin values, along with patient demographics were abstracted from the medical record. Patients managed at our institutional obstetric clinic were compared to those managed at outside clinics. Between-group comparisons were performed using chi-square or Fisher's exact tests for categorical variables, and Mann-Whitney U tests for continuous variables, with significance at $p< 0.05$.

Results

Of 4713 deliveries, 4671 were included in the analysis after exclusions (n=42). Anemia was present in 32.9% of women, with median pre-delivery hemoglobin of 11.5 g/dL (IQR 10.6–12.4). Ferritin levels were available for 2426 patients, with median ferritin 17.1 ng/mL (IQR 10.5–32.0). Iron deficiency was present in 72.5%, and IDA in 28.5% of patients. Differences in anemia and IDA were observed across age groups and race/ethnicity groupings. Women receiving prenatal care at our institutional obstetric clinic had lower IDA prevalence (24.9%) compared with those followed by outside providers (29.5%). Median quantified blood loss was modestly higher in anemic versus non-anemic women.

Discussion

In this large, urban safety-net cohort, nearly one-third of women presented with anemia at delivery, and over 70% had laboratory evidence of iron deficiency, with IDA rates among the highest reported in recent high-resource settings. A secondary finding was the lower prevalence of IDA among women receiving prenatal care within our institution's clinic compared with those followed by outside providers. These findings highlight the persistent, under-recognized burden of peripartum iron deficiency in underserved populations and support the implementation of earlier identification and screening for IDA, proactive standardized iron management protocols to potentially decrease the incidence of IDA and optimize maternal and neonatal outcomes.

Funding

Anesthesia Patient Safety Foundation

References:

Prevalence of Peripartum Anemia and Iron Deficiency Anemia at Delivery in a Large Urban Safety-Net Cohor.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 06

Failure Mode and Effects Analysis of Iron Deficiency Anemia Management in Pregnancy: Identifying High-Priority Risks for Obstetric and Perinatal Care

Presenting Author: Jean-Paul Russo, MPH

Presenting Author's Institution: University of Miami Miller School of Medicine - Miami, Florida

Co-Authors: Jennifer M. Banayan, MD - Northwestern University
Julia McAleavy - University of Miami Miller School of Medicine

Abstract :

Introduction

Iron deficiency anemia complicates nearly 40% of pregnancies worldwide and is linked to preterm birth, low birth weight, postpartum hemorrhage (PPH), and maternal morbidity. Inconsistent screening, diagnosis, treatment, and follow-up contribute to persistent anemia at delivery, heightening peripartum risks. Failure Mode and Effects Analysis (FMEA), a proactive quality improvement tool, systematically identifies and prioritizes process vulnerabilities to guide targeted interventions.

Methods

Our multidisciplinary team conducted an FMEA on the management of iron deficiency anemia during pregnancy. The care process was mapped across key steps including initial assessment, screening, diagnosis confirmation, treatment selection/initiation, patient counseling and adherence, intravenous (IV) iron administration, monitoring/follow-up, escalation for failure, and peripartum/postpartum care. Potential failure modes were identified and scored using institution-adapted scales:

- Severity (S): 1–10 (no effect to catastrophic fetal/maternal impact)
- Occurrence (O): 1–10 (remote to near certainty)
- Detection (D): 1–10 (certain to no detection)
- Risk Priority Number (RPN = S × O × D) ranked failure modes. Scores reflected literature, clinical experience, and local practice patterns.

Higher risk priority numbers indicate a greater risk and interventions for higher RPNs should be prioritized for corrective action.

Results

Forty-seven failure modes were evaluated (Table 1). The highest RPNs centered on adherence, timing/escalation, and systems barriers. The highest RPNs were for: patient non-adherence due to side effects, failure to address GI intolerance, inadequate education on side effects, IV iron scheduling/insurance delays, lack of late-trimester

screening, delayed escalation to IV iron after oral failure, and no postpartum iron continuation. Other notable modes included missing isolated iron deficiency, underlying non-response causes ignored, and inadequate PPH readiness in anemic patients. Adherence-related failures and late-gestation/timing issues predominated.

Discussion

This FMEA identified critical, preventable gaps in peripartum iron deficiency anemia management, stemming from patient-centered barriers (poor counseling, GI intolerance, non-adherence) and systems issues (IV iron delays, inadequate follow-up, peripartum communication). These gaps increase the risk of severe anemia at delivery, complicating anesthetic management and raising PPH risk. Prioritizing interventions based on high RPN scores, such as structured education with multilingual materials, alternate-day oral dosing, streamlined IV iron protocols, and routine postpartum continuation, may substantially improve detection, treatment efficacy, and peripartum safety. FMEA provides a reproducible framework for obstetric anesthesiologists and peripartum clinicians to enhance IDA management and reduce maternal and neonatal morbidity.

Funding

Anesthesia Patient Safety Foundation

References:

Failure Mode and Effects Analysis of Iron Deficiency Anemia Management in Pregnancy- Identifying High-Priority Risks for Obstetric and Perinatal Care.pdf

THURS - RA - BS 1 - BR 1 - Potpourri 2 - 07

Impact of Postpartum Hemorrhage on Quality of Recovery After Vaginal Delivery

Presenting Author: Jeroen De Haes, MD, EDAIC, EDIC

Presenting Author's Institution: Mount Sinai Hospital, University of Toronto - Toronto, Ontario

Co-Authors: Mrinalini Balki, MD - University of Toronto
Kristi Downey, MSc - Mount Sinai Hospital, University of Toronto
Naveed T. Siddiqui, MD, MSC - Mount Sinai Hospital, University of Toronto

Abstract :

Background: Postpartum hemorrhage (PPH) is a major contributor to maternal morbidity and is increasingly recognized to affect both physical and psychological recovery after childbirth.[1] While standardized outcome measures for PPH emphasize clinical endpoints, patient-centered recovery outcomes remain underrepresented.[2] The Obstetric Quality of Recovery-10 (Obs-QoR-10) is a validated measure of postpartum recovery; however, its performance in patients experiencing PPH following vaginal delivery has not been well characterized.. We hypothesize that patients experiencing PPH will have significantly lower Obs-QoR-10 scores compared with matched controls. Understanding recovery trajectories in this population may inform more comprehensive postpartum care

Objective: To evaluate postpartum recovery using the Obs-QoR-10 in patients with and without PPH following vaginal delivery.

Methods: This prospective matched case–control study includes adult patients undergoing vaginal delivery. Patients experiencing PPH are matched 1:1 with controls without PPH based on age, parity, gestational age, and delivery date. PPH is defined as quantitative blood loss ≥1000 mL, blood transfusion, ICU-level care, or major hemorrhage intervention. Control patients require quantitative blood loss ≤500 mL. The Obs-QoR-10 is administered between 24 and 72 hours postpartum. Enrolment is ongoing, and interim analyses are planned.

Results: Recruitment is ongoing, with 70% of the target sample enrolled. Interim analysis includes 46 patients (23 PPH cases and 23 matched controls). Successful 1:1 matching was achieved, with no clinically meaningful differences in age, parity, gestational age, mode of vaginal delivery, or baseline obstetric characteristics. Mean quantitative blood loss was higher in PPH cases compared with controls (1,414 mL vs 247 mL). All blood transfusions to date (n=4) occurred in the PPH group. Final analyses are expected to be completed prior to SOAP 2026.

Conclusions: This study examines postpartum recovery following vaginal delivery in patients with and without . Our findings may inform early postpartum screening, resource allocation, and patient-centered follow-up strategies after PPH and may inform future patient-centered care.

References: 1. Lancet. Glob Health 2014;323-33
2. BJOG 2019;83-93

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 01

The Effect of Painful Contractions on Time Perception during Epidural Placement for Labor Analgesia

Presenting Author: Katherine Hatter, MD

Presenting Author's Institution: Medical University of South Carolina - Charleston, South Carolina

Co-Authors: Courtney Condon, BS - Medical University of South Carolina
Haley Nitchie, MHA - Medical University of South Carolina
Jessica Stockinger, MD - Medical University of South Carolina

Abstract :

Background: Time perception, defined as the subjective passage of time, is not analogous with physical time and is influenced by multiple variables including acute pain. Previous studies using *experimental* acute pain have demonstrated the dilation of time with pain. This study examined the impact of *clinical* real-time pain on retrospective time perception in the setting of labor pain and epidural placement to determine whether labor pain can distort subjective time and its effect on the perceived duration of external events. The primary hypothesis was that patient reported pain score during epidural placement is associated with patient reported time to placement.

Methods: The study was a prospective cohort study of laboring patients who received an epidural. Patients were blinded to the intent of the study. Time to successful epidural placement was determined from insertion of the needle for local infiltration to removal of the sterile drape. Patients' perceived time to epidural placement and pain scores during placement were documented. Distortion of patient perceived time to placement was measured as the percent difference between the patient reported time and the actual time to placement. An a priori power calculation found a sample size of 300 subjects provides 80% power to detect an increase in R^2 of 0.02 attributed to patient reported pain with and without contractions using an F-Test with a significance level $\alpha = 0.05$. The association between patient reported time was evaluated using a linear regression approach. All analyses were conducted in SAS v. 9.4.

Results: The final patient population included 295 participants. The mean observed time to placement was 12.5±8.9 minutes. The mean perceived time for all patients was 10.6 ±8.6 minutes, among those without a contraction was 9.3 ± 7.3 minutes, and among those with a contraction was 11.1 ± 9.0 minutes. Neither pain score nor contraction status was associated with patient perceived time to placement after controlling for other variables. Only observed time to placement and having a prior epidural was associated with perceived time. Specifically, a 5-minute increase in observed placement time was associated with a 3.1-minute increase in perceived time to placement, ($P < 0.001$). Having a prior epidural was associated with a 2-minute increase in perceived time to placement, ($P = 0.0140$).

Conclusion: These findings suggest that in laboring patients subjective passage of time as it relates to external events is not distorted. The level of pain during labor epidural placement with or without labor contraction is not associated with altered perception of time.

References: 1. Trends Cogn Sci 2007;11:504–513
2. Atten Percept Psychophys 2004;66:1171–1189
3. Behav Process 2015;120:135–140
4. Emotion 2019;19:1148–1161
5. Sci Rep 2017;7:15682
6. J Vis 2022;22:3217
7. Learn Behav 2023;51:321–331
8. Int J Obstet Anesth 2015;24:111–116

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 02

Impact of a Spring-Loaded Epidural Syringe on the Learning Curve of Labor Epidural Placement in Anesthesia Residents: A Quasi-Randomized Controlled Trial

Presenting Author: Noor A. Raheel, MD, MPH

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

Co-Authors: Saranya Lertkovit, MD - Department of anesthesiology, Siriraj Hospital, Mahidol University, Bangkok. Thailand

Abstract :

Introduction: Proficiency of labor epidural analgesia is a core competency for residents on the obstetric anesthesia rotation, yet the learning curve is variable and may be associated with procedural failure and complications. Spring-loaded loss-of-resistance epidural syringes (SLES) may enhance the epidural technique, but their effect on trainee learning curves and rate of complications have not been well characterized. We hypothesize that the use of a SLES may expedite the learning curve and lower complication rates for epidural placements among novice residents on their first obstetric anesthesia rotation.

Methods: Anesthesiology residents on their first obstetric anesthesia rotation with < 5 prior labor epidural placement experience were recruited. In this quasi-randomized one month on/one month off trial, residents were randomized to 1 of 2 groups: (1) use of a SLES or (2) use of a traditional glass syringe (control) for 20 sequential epidural placement attempts with the assigned syringe, per resident enrolled. A composite outcome for success was defined as: not requiring assistance from fellow or attending, pain score < 3/10 at 30 minutes, no epidural replacement, no inadvertent dural puncture (IDP), and no postdural puncture headache (PDPH). At study completion, learning curves will be compared between groups based on changes in the composite success rate over sequential epidural attempts. Residents provided voluntary feedback on their experience by anonymous post-study survey.

Results: To date, 29 residents have been enrolled (16 of 17 residents with 323 epidural placements (control) and 13 of 17 residents with 261 epidural placements (SLES). Enrollment is near completion; preliminary results are in the Table. Composite success occurred in 153 of 323 control placements (47.4%) vs 157 or 261 SLES placements (60.2%). Rate of IDP was 11/323 control (3.4%) vs. 4/261 SLES (1.5%), and rate of PDPH was 5/323 control (1.5%) vs 3/261 SLES (1.10%) SLES, respectively. Resident feedback about SLES was positive: “All in all, I greatly enjoyed using (SLES) and feel that it is a superior way to learn how to do epidurals because the feedback that you are in the epidural space is obvious and visual.”

Conclusions: Our preliminary findings suggest a higher composite success and lower rate of IDP and PDPH with the use of an SLES syringe compared to the standard glass syringe for labor epidural techniques attempted by novice anesthesia residents early in training. Pending completion, confirmation of our findings and learning curve analysis may inform a training mechanism for neuraxial techniques that lowers clinically important complications of IDP and PDPH. Impact of the SLES among anesthesiologists of various training levels and expertise are also warranted.

References: 1. Carabuena JM et al. Anesth Analg 2013
2. Scorzoni M et al. Anesth Res Pract 2022

Epidural Placement Outcomes by Syringe Type

Outcome	SLES (n = 261)	Glass Syringe (n = 323)
Fellow/attending assistance	76 (29%)	137 (42%)
Inadvertent dural puncture	4 (1.5%)	11 (3.4%)
NRS ≤3/10 at 30 minutes	213 (81.6%)	267 (82%)
Post–dural puncture headache (PDPH)	3 (1.1%)	5 (1.5%)
Catheter replacement	6 (2.3%)	10 (3.1 %)
Composite Success	157 (60%)	153 (47%)

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 03

Association between opiate use disorder and physician provided epidural boluses for labor analgesia

Presenting Author: Amnon A. Berger, MD, PhD

Presenting Author's Institution: Beth Israel Deaconess Medical Center / Harvard Medical School - Boston, Massachusetts

Co-Authors: Yunping Li, MD - Beth Israel Deaconess Medical Center / Harvard Medical School

Abstract :

Background: Opioid use disorder (OUD) may affect the success of labor analgesia, due to differential experience of pain, opioid-induced tolerance and hyperalgesia, or reduction in endogenous opioid peptides.[1,2] Limited evidence suggests that parturients with OUD are more likely to use epidural analgesia and require higher concentration of local anesthetics or more frequent dosing;[1,3] the largest study included only 91 opioid-using patients of whom only half were receiving replacement therapy.[4]

Objective: To determine whether OUD is associated with increased analgesic requirements, evident by increased number of physician-provided epidural boluses for labor analgesia.

Methods: A retrospective, single-center cohort study at a tertiary academic center. A database of all deliveries from 01/2017 to 06/2024 was augmented using administrative records. Laboring patients, regardless of mode of delivery, were identified, and categorized as opioid-naïve vs. those receiving opioids at the time of delivery, including either methadone or buprenorphine, or those identified with ICD10 codes for OUD. Optimal 3:1 propensity-score matching was used to compare OUD with opioid-naïve patients. All patients received patient-controlled epidural analgesia with a low-concentration bupivacaine with fentanyl using PCEA. The primary outcome was the requirement for two or more physician-provided epidural boluses during labor. A secondary outcome was the absolute number of boluses. Univariable and multivariable analyses were performed. $P< 0.05$ was considered significant.

Results: Records from 29,075 laboring women were available after removing records with missing data, of which 132 met criteria for OUD. Table 1a compares the demographics of patients with and without OUD. Parturients with OUD were more likely to require two or more physician epidural boluses (18% vs 11%, P=0.004), and required more epidural boluses on average (0.73±1.19 vs 0.48±0.94 per delivery, P=0.006). There were no significant difference in the use of epidural analgesia (84% vs 83%, P=0.79) or epidural failure/replacement rates (5.3% vs 3.5%, P=0.20). In multivariable analysis, adjusted odds ratio (aOR) for 2 or more epidural boluses by OUD patients was 2.30 (95%CI 1.31-3.91, P=0.003); patients with OUD required 36% more boluses (95%CI 11%-66%, P=0.003). In a matched cohort, univariable analyses resulted with significant association with two or more boluses (P=0.010) and mean number of boluses (P=0.011). Multivariable analyses of matched cohorts retained a significant association between

OUD and 2 or more boluses (aOR 2.64, 95%CI 1.10-6.10, P=0.025), but not with the mean number of boluses administered (P=0.29).

Conclusion: Neuraxial analgesia appeared to be effective in OUD patients, as measured by epidural use and catheter failure rates. An increased requirement for physician-provided epidural boluses may be needed.

References:

1. PMID: 39504271
2. PMID: 36371258
3. PMID: 36135926
4. PMID: 15282000

OUD - SOAP 2026 Abstract - Tables.pdf

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 04

Making Labor Epidural Analgesia Better: A Quality Improvement Project: Part 3

Presenting Author: Wei Ni Zhou, BA

Presenting Author's Institution: Boston Medical Center, Boston, MA - Roxbury, Massachusetts

Co-Authors: Rachel A. Achu-Lopes, MD - Boston University Chobanian & Avedisian School of Medicine
Erin Dienes, PhD - Boston Medical Center, Boston, MA

Abstract :

Background: PIEB is a well established method for delivering epidural medications. Controlled studies have examined how variations in bolus volume, injection interval, and injection rate affect PIEB efficacy, but we lack pragmatic data on how altering these variables performs clinically. This QI project evaluated different PIEB settings in our practice.
Methods: This QI project occurred at an urban safety net hospital. Upon patient request, epidural, DPE, or CSE labor analgesia was induced per anesthesiologist preference. CADD Infusion pumps delivered 0.0625% bupivacaine with 2 mcg/mL fentanyl at various PIEB + PCEA settings. Between 2023 and 2025, PIEB settings were systematically adjusted. Optional PCEA settings were 8 mL q 15 min in Groups A & D, and 10 mL q 20 min in Groups B & C. We extracted data from electronic records. The primary outcome was time to first provider intervention or vaginal delivery. Secondary outcomes included infusion adjustments, catheter replacement, and delivery or rescue bolus by 8 hours. Hypotension requiring vasopressors and neck/back pain were also recorded. Competing risk survival analysis using the Fine–Gray sub-distribution hazards model accounted for competing events, including vaginal delivery and cesarean section.

Results: 1214 patients were in this analysis. 38.2% required at least 1 rescue bolus and 26.2% delivered by C-Section. 59.8% of patients in Group A gave birth without receiving a rescue bolus compared to 57.7% of the patients in Group B, 69.9% of patients in Group C, and 72.8% of patients in Group D. In the Fine–Gray model, high infusion rates were associated with a significantly lower need for rescue bolus (Table 1). Patients receiving the higher infusion rate were more likely to experience “excessive anesthesia” (a composite of vasopressor use, neck/back pain and decreased infusion rate).

Table 1: Results

Fine-Gray Hazards Model	**Hazards Ratio**	**(95% Confidence Interval)**	**p-value**
Group A (8 mL q 30min @ 40 mL/h)	-	-	-
Group B (10 mL q 40min @ 40 mL/h)	1.07	(0.84, 1.36)	0.600
Group C (10 mL q 40min @ 250 mL/h)	0.68	(0.51, 0.90)	0.008
Group D (8 mL q 30min @ 250 mL/h)	0.62	(0.46, 0.83)	0.002

	Group A (n = 256)	**Group B (n = 423)**	**Group C (n = 278)**	**Group D (n = 257)**	**p-value**
Outcomes, n (%)					
Neck/Back Pain	0 (0.0)	8 (1.9)	9 (3.2)	4 (1.6)	0.102
Epidural Replacement	15 (5.9)	26 (6.1)	21 (7.6)	17 (6.6)	0.862
Inc. Infusion Concentration	17 (6.6)	8 (1.9)	6 (2.2)	6 (2.3)	0.003
Excessive Anesthesia	7 (2.7)	36 (8.5)	31 (11.2)	33 (12.8)	< 0.001
Cumulative Incidence Function, % (95% CI)					
Rescue Bolus at 8 Hours	33% (27%, 39%)	35% (30%, 39%)	22% (17%, 27%)	23% (18%, 28%)	< 0.001

Conclusion: At our institution, changing bolus volume and interval did not improve PIEB efficacy. Increasing the infusion rate to 250 mL/h was associated with significantly improved analgesic efficacy.

References:

Making Labor Epidural Analgesia Better: A Quality Improvement Project: Part 3 .pdf

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 05

Reducing Labor Epidural Failure Through Targeted Interventions: A Quality Improvement Initiative

Presenting Author: BETH A. CLAYTON, DNP, CRNA

Presenting Author's Institution: University of Cincinnati Medical Center - Mason, Ohio

Co-Authors: Andrea Girnius, MD - UCCOM

Abstract :

Purpose

Minimizing failed epidural analgesia (FEA) is essential, as high failure rates lead to prolonged labor pain and maternal dissatisfaction, while increasing the risk of inadequate epidural for cesarean delivery. Our baseline failed epidural analgesia (FEA) rate was 15%, surpassing the reported national average of 8-12%.[1] We sought to reduce FEA for labor by identifying local risk factors and implementing targeted practice change using quality improvement methodology.

Setting

This project was conducted at an 800-bed academic Level IV Maternal Care Center with over 3,000 deliveries per year. The center serves a demographically diverse, high-risk obstetric population and is supported by a multidisciplinary anesthesia team.

Methods

This quality improvement project compared pre- and post-intervention data through retrospective chart reviews to evaluate and improve labor epidural performance. Failure of epidural analgesia (FEA) was defined as catheters needing replacement during labor. To understand local risk factors and context 200 labor epidural cases from 2023–2024 were reviewed to identify predictors of epidural failure and help develop targeted interventions. Based on findings from this review, several strategies were tested using iterative PDSA cycles, including provider education, the use of dural puncture epidural technique (DPE) for higher-risk patients (e.g., obesity, difficult anatomy), performing selective pre-procedural neuraxial ultrasound, employing a structured EMR template to standardize reassessment, and applying a replacement protocol involving catheter adjustment and/or replacement after 2–3 ineffective boluses. After these changes, a second retrospective review of 118 cases was conducted to evaluate their effectiveness. Descriptive statistics, Chi-square tests, and Fisher's exact tests ($\alpha = .05$) were used to assess associations and outcomes.

Results

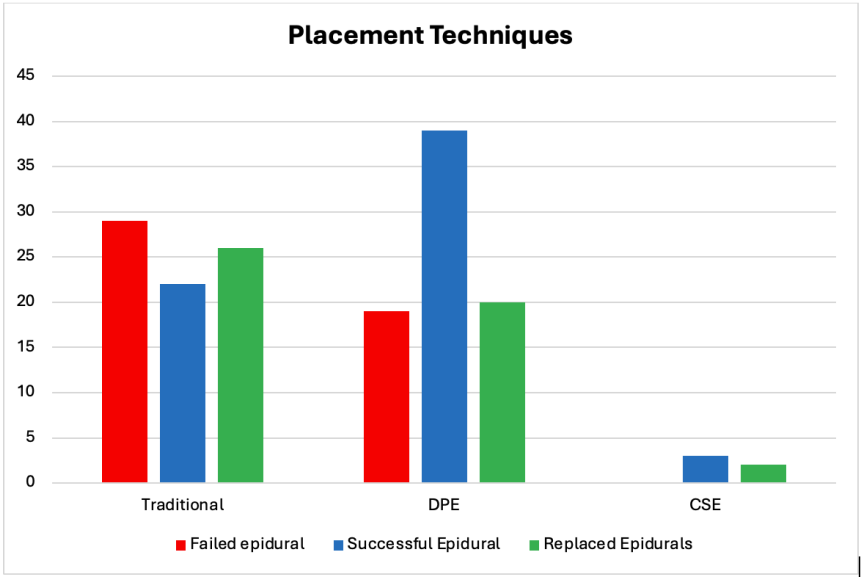
Initial chart review identified obesity (BMI > 35 kg/m²), chorioamnionitis, gestational hypertension, and frequent epidural boluses as significant predictors of FEA ($p < .05$). After implementing the DPE technique and the reassessment/documentation bundle in Cycle 2, DPE use was associated with lower epidural failure rates ($p = .0217$), and the overall FEA rate decreased to 7.3%. EMR-driven reassessment

and documentation completeness improved. Neuraxial ultrasound adoption was limited by equipment downtime but appeared beneficial for anticipated difficult placements.

Conclusion

A structured QI approach that integrates DPE and standardized EMR-guided reassessment can effectively reduce FEA in a high-risk obstetric unit. Future steps include increasing ultrasound availability, strengthening the replacement protocol, and continuing PDSA cycles to maintain and expand improvements.

References: Ibrahim, M., & Vadhera, R. (2023). Inadequate labor epidural analgesia. *Regional Anesthesia and Acute Pain Medicine: A Problem-Based Learning Approach*. Oxford University Press.



THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 06

Prepare to Fail? The impact of developing an institutional protocol on improving confidence in the management of the failing epidural.

Presenting Author: Darragh O'Reilly, MBBS, MSc, FCAI

Presenting Author's Institution: BC Women's Hospital, University of British Columbia - Vancouver, British Columbia

Co-Authors: Jonathan P. Collins, BM BCh, MA (Oxon), FRCA, FRCPC - BC Women's Hospital, University of British Columbia
Kaitlin Nelson, BSc, MSc - Women's Health Research Institute, BC Women's Hospital, University of British Columbia

Abstract :

Introduction

Epidural analgesia is the gold standard for pain relief in labour, used by 73% of 2.5 million parturients.[1] Failure rates can reach 25%[2]; this increases the risk of failed epidural extension and pain during cesarean delivery.[3] Management of a failing epidural has traditionally relied on guidance from review articles, expert opinion, and clinical experience.[4,5] Whilst this can result in safe and effective management from an expert, the lack of a structured approach can prove challenging to a less experienced provider. The European Society of Anaesthesia and Intensive Care (ESAIC) recently published guidelines recommending institution-specific protocols for managing failing labor analgesia including an example algorithm.[2]

Methods

This is a pre/post-intervention study assessing a new institutional protocol for managing the failing epidural based on ESAIC guidelines, local practice, and expert consultation. A 21-question survey assessed confidence in managing inadequate analgesia on a 5-point Likert scale. The questions were grouped into troubleshooting scenarios and non-technical factors. Residents were grouped by training level. Baseline confidence was assessed by survey. An educational intervention focused on a locally developed algorithm for managing failing epidurals. A post-intervention survey was administered. Descriptive analysis compared means and frequency distribution changes pre vs. post intervention.

Results

Post intervention, the full cohort (n=36 vs. n=25; pre vs. post intervention) showed improved confidence in all domains bar one neutral result (managing low block; with pre- and post-intervention means 4.08/5). The

full cohort demonstrated increased awareness of the availability of training resources with a mean improvement of 1.22/5 (pre-intervention mean 2.74, SD 1.07 and post-intervention mean 3.96, SD 0.89).

In subgroup analysis, the junior group improved (n=18) across most domains including management of unilateral block (mean 0.72/5). The greatest improvement in the senior cohort was in managing sacral sparing (mean increase 1.21/5), with confidence rated as 'very' or 'extremely' confident rising from 50% pre intervention to 100% post.

Discussion

We show the utility of targeted education to improve residents' confidence in managing failing epidurals. Prior to the ESAIC guidelines, management presented a challenge for residents, demonstrated by their lack of awareness of available resources. The difference in improvement between groups is explained by the senior group's increased clinical experience and informal bedside teaching. Our study supports the integration of institution-specific structured, algorithmic teaching to enhance residents' ability to manage failing epidurals, which we hope will improve quality of epidural analgesia.

References:

1. Butwick AJ et al . JAMA Netw Open 2018
2. Brogly N et al. EJA. 2025
3. Bauer ME er al. IJOA. 2012
4. Guasch E et al. Minerva Anestesiol 2017
5. Hermanides J et al. BJA 2012

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 07

Pain with Labor Epidural Analgesia (PLEA): A Scoping Review

Presenting Author: Christine Ha, MD

Presenting Author's Institution: Columbia University - New York, New York

Abstract :

Introduction

The phenomenon of excruciating neck, shoulder, or interscapular pain upon injection of a solution via an epidural catheter was first described in 1972 in the setting of an epidural infusion for dural puncture headache prophylaxis[1], and then in 1984 during labor epidural analgesia[2]. Since then, several reports have hypothesized possible mechanisms and proposed mitigating strategies. The term Pain with Labor Epidural Analgesia (PLEA) was coined in 2024[3]. Due to increased awareness and several complex cases in our institution, we decided to conduct a scoping review of publications on PLEA to summarize the commonly described themes and identify areas for further investigation.

Methods

Utilizing PRISMA-ScR guidelines, we searched PubMed and Embase in Dec 2025-Jan 2026 for publications describing PLEA in neck, shoulder, and interscapular areas in obstetric patients. A data chart with 4 categories describing the article and 6 categories summarizing the topic was created.

Results

Our search yielded 13 publications and 2 abstracts (11 case reports or series; 3 case-control studies, the largest reporting 64 cases) from 1972 to 2024, describing a total of 216 cases (Table 1). The reported incidence was 0.46-1.2%. Only one case had spine imaging. Associated factors of PLEA included young age, high BMI, nulliparity, prolonged epidural analgesia, and cesarean delivery (CD). PLEA was reported with continuous epidural infusion (CEI; n=60) and programmed intermittent epidural bolus (PIEB; n=37) administration. The most frequently proposed etiology was elevated pressure in the epidural space causing traction or irritation of upper thoracic nerve roots. Suggested therapies include epidural clonidine or fentanyl, reducing the infusion volume, increasing infusion concentration, or epidural replacement.

Discussion

The literature on PLEA includes 13 articles since 1972 that describe cases, suggest therapies and analyze associated factors. Because this phenomenon is rare and etiology still unclear, associated factors (age, parity, BMI, duration of epidural analgesia, and CD) might be confounding factors of prolonged labor with epidural analgesia rather than true risk factors for developing PLEA. PLEA may be

an indicator of dystocia explaining the high association with CD, or an independent risk factor for CD. While PLEA has been described with both CEI and PIEB, a proposed mitigating strategy is to reduce administration of large volume boluses, and consider CEI over PIEB. We did not find recommendations for safe extension of epidural analgesia for intrapartum CD anesthesia, which may be an issue when rapidly administering a large volume solution is necessary. Identifying PLEA early and providing management is crucial for continuing to provide adequate epidural labor analgesia and conversion to surgical anesthesia.

References:

1. Br J Anaesth 1972; 44(6):598-602

2. Anaesthesia 1984; 39(2):194

3. Int J Obstet Anesth 2024; 60:104255

FINAL PLEA Table 1 .pdf

THURS - RA - BS 1 - BR 2 - Making Epidurals Better - 08

Factors Associated with Unintended Dural Puncture (UDP) and Failed Neuraxial Anesthesia in Obstetric Anesthesia: Targeting Anesthesia Residency Quality Improvement

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Abstract :

Introduction

Failure rates for spinal anesthesia (1.7–9.1%) and epidural anesthesia (10–24%) increase risks for conversion to general anesthesia, procedural delays, and patient dissatisfaction [1]. Additionally, unintended dural puncture (UDP) occurs in approximately 1% of obstetric epidural placements and can result in post-dural puncture headache (PDPH) with significant morbidity [2]. Factors such as clinician experience, multiple attempts, anatomical variation, and technical difficulty are modifiable areas for quality improvement. We aim to identify specific factors associated with UDP and failed neuraxial anesthesia at our institution.

Methods:

A one-year (July 2024-July 2025) retrospective de-identified control group (n=126) EMR analysis of UDP (n=41) and failed neuraxial (n= 38) quality improvement registered (QIPR) study. Factors analyzed included demographic data (age, height, weight, BMI, gravidity, parity, gestation) ASA status, trial of labor, anesthesia type (spinal, epidural, CSE, DPE, general), intrathecal catheter placement, conversion to general anesthesia, preeclampsia diagnosis, block attempts, provider status (resident, CRNA, attending), failed neuraxial anesthetic, and PDPH. Interval data was analyzed using t-test, nominal data with Chi-square including Odds Ratios. $P < 0.05$ is significant.

Results:

Over this one-year period, 1,429 obstetrical cases were performed, with a UDP rate of 2.9% and failed neuraxial rate of 2.7% (Table).

Factors significant for UDP included older age (P = 0.0002), higher BMI (P = 0.03), anesthesia type (P = 0.02), provider status (P = 0.0002), block attempts (P < 0.0001), intrathecal catheter placement (P = 0.0002), preeclampsia diagnosis (P = 0.04) and PDPH (P = 0.01) (Table).

Factors significant for failed neuraxial included older age (P = 0.0007), lower gestation (P = 0.002), trial of labor (P < 0.0001), anesthesia type (P < 0.0001), block attempts (P = 0.01), Cesarean section (P < 0.0001), general anesthesia conversion (P < 0.0001), and preeclampsia diagnosis (P = 0.02) (Table).

Discussion:

Older age, anesthesia technique, multiple block attempts, and preeclampsia were commonly observed among patients experiencing both UDP and failed neuraxial. Based on these findings, focusing on procedural standardization, closer resident supervision, limiting block attempts, and expanded use of simulation-based training as key areas for resident quality improvement in labor and delivery.

Conclusion:

Our analysis identifies older maternal age, higher BMI, preeclampsia, multiple block attempts, and provider experience as key risk factors for UDP and failed neuraxial, highlighting modifiable residency training targets to improve obstetric anesthetic outcomes.

References:

1. Int J Obstet Anesth. 2004 Oct;13(4):227-33.
2. J Clin Anesth. 2015 May;27(3):201-206.

Table.pdf

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 01

Burden of chronic postsurgical pain after caesarean delivery on maternal quality of life: a systematic review

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Presenting Author's Institution: Charles E Schmidt College of Medicine at Florida Atlantic University - Boca Raton, Florida

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Payton Marshall, MD, PhD - Department of Anesthesia, Perioperative, and Pain Medicine, Stanford University School of Medicine
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Abstract :

Chronic postsurgical pain after caesarean delivery (CPSP-CD) affects up to one in six women, yet its clinical significance is often judged by pain incidence or intensity alone [1]. Evidence suggests that pain-related interference with functioning, mood, sleep, and activity may better reflect patient burden, but these outcomes have not been comprehensively synthesised [2]. We aimed to evaluate the impact of CPSP-CD on maternal health-related quality of life (HRQoL), including how pain-related interference across functional domains is reported at different postpartum timepoints.

We conducted a PROSPERO-registered systematic review (CRD420251060859). Seven databases were searched from inception to November 2025. Eligible studies included women assessed ≥3 months after caesarean delivery with persistent pain and at least one HRQoL outcome. Two reviewers independently screened studies, extracted data, and assessed risk of bias using RoB-2 and ROBINS tools. Due to heterogeneity in CPSP definitions, HRQoL measures, and follow-up intervals, results were synthesised narratively by postpartum timepoint and functional domain.

Thirty studies involving over 25,000 women were included. CPSP-CD was consistently associated with clinically meaningful interference across HRQoL domains, including daily activities, sleep, mood, fatigue, and sexual wellbeing. At 3 months postpartum, activity, mood, and sleep interference affected approximately 30–40% of women with CPSP-CD in cohorts using the Brief Pain Inventory (Figure 1). Interference partially attenuated between 3 and 6 months, followed by persistence or re-emergence at 12 months, particularly across physical, sleep, and affective domains, with mood-related interference prominent. Fatigue showed minimal improvement in several longitudinal studies. Depressive symptoms and postpartum fatigue were consistently associated with CPSP-CD, while anxiety showed less

consistent relationships. Although pain intensity generally declined, pain interference frequently persisted, highlighting a dissociation between severity and functional burden.

CPSP-CD is a multidimensional condition associated with sustained impairment in maternal quality of life beyond pain intensity alone. Pain-related interference across physical, sleep and psychosocial domains may persist for months to years after surgery. These findings support routine assessment of pain interference and psychosocial outcomes, and a move toward holistic, patient-cantered postpartum recovery assessment.

References:

1. Ciechanowicz S, Joy RR, Kasmirski J, Blake L, Carvalho B, Sultan P. Incidence, Severity, and Interference of Chronic Postsurgical Pain After Cesarean Delivery: A Systematic Review and Meta-analysis. J Clin Anesth. 2025;104:111832. doi:10.1016/j.jclinane.2025.111832

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Figure1_Burden of chronic postsurgical pain after caesarean delivery on maternal quality of life.pdf

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 02

Chronic Pain in Pregnancy: Implications for Labour Outcomes and Peripartum Anesthetic Management

Presenting Author: Manuela Morgan

Presenting Author's Institution: Michael G. DeGroote School of Medicine - Kitchener, Ontario

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Abstract :

Introduction

Pregnancy-related and non-obstetric chronic pain syndromes are common and present challenges for peripartum anesthetic care.[1] Chronic pain may amplify labour pain and alter analgesic requirements, yet underlying mechanisms remain poorly understood and clinical guidance is limited. This review examines the impact of chronic pain in pregnancy on delivery mode, peripartum analgesia use, and anesthetic complications. We hypothesize that chronic pain in pregnancy increases emergency cesarean section (CS), complicates neuraxial anesthesia, and increases peripartum analgesic requirements.

Methods

A systematic search of Ovid, PubMed, Embase, and Cochrane (Jan 2000-Dec 2025) identified 3,550 records. Two reviewers independently screened studies, including fully published human studies reporting persistent pain ≥3 months during pregnancy with labour or delivery outcomes. Non-English, animal, and acute pain studies were excluded. References were screened, and 39 studies were included (n >106,412). Data extracted included pain type, delivery mode, analgesia route and challenges, and postpartum pain management. Findings were synthesized thematically, considering study design and quality.

Results

6 observational studies associated chronic pain with increased emergency CS (OR 1.11, 95% CI: 1.05–1.16), attributed to patient preference, limited positioning due to poor pain control, and concern for neurological deterioration in those with spinal pathology.[1] Altered spinal anatomy or instrumentation contributed to clinician reluctance for neuraxial placement; however, 1 systematic review reported neuraxial anesthesia was feasible in 88% of cases with low failure rates and adverse events, especially when using imaging to guide planning.[2] 3 studies suggested increased intrapartum analgesic requirements, though findings were inconsistent.[3] Difficult postpartum pain control was reported, particularly among patients on opioid maintenance therapy, with inadequate

analgesia linked to withdrawal or relapse.[1] Multimodal strategies, including PCA, were most effective for refractory postpartum pain.[4]

Discussion

Chronic pain in pregnancy may complicate labour management through higher emergency CS rates, neuraxial technical challenges, and increased analgesic requirements. Findings varied by chronic pain subtype, and limited stratified data precluded condition-specific conclusions. Despite this, findings support proactive, individualized assessment of neuraxial feasibility and peripartum pain management through a multidisciplinary approach. This may improve analgesic outcomes and reduce factors associated with emergency CS.

References: 1. Techniques in Regional Anesthesia and Pain Management 2014;18:166
2. International Journal of Women's Health 2018;10:153
3. Z Geburtshilfe Neonatologie 2021;226:e38
4. Journal of Clinical Medicine 2024;13:3814

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 03

Prevalence and Association of Postpartum Pain According to the Anesthetic Technique Used: a Retrospective Study

Presenting Author: Monica S. Siaulys, PhD, MD

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Abstract : Background: Postpartum pain is a highly prevalent condition that may negatively affect maternal recovery, breastfeeding, mother–infant bonding, and overall quality of life. Although both cesarean delivery and vaginal birth are associated with postpartum pain, differences in pain intensity and contributing factors according to delivery mode and anesthetic technique remain insufficiently explored in large cohorts. Objectives: to compare the prevalence and intensity of immediate postpartum pain between cesarean delivery and vaginal birth, and to evaluate associations between pain severity and obstetric factors (episiotomy and perineal lacerations) in vaginal deliveries. Methods: this retrospective observational study analyzed medical records of women aged ≥18 years who underwent term vaginal delivery or cesarean section under neuraxial anesthesia or labor analgesia between January 2022 and January 2023 at a tertiary private maternity hospital. Pain intensity was assessed using the numeric rating scale (nrs, 0–10) during the first postpartum ward evaluation and categorized as none, mild (1–3), moderate (4–6), or severe (7–10). Demographic, obstetric, and clinical variables were collected. Comparative analyses between delivery modes and obstetric factors were performed using non parametric tests, with a significance level of $p< 0.05$. Results: a total of 8,061 women were included (6,117 cesarean deliveries and 1,944 vaginal births). Overall postpartum pain prevalence was 94.5%, with no significant difference in pain incidence between cesarean and vaginal delivery (95.3% vs. 94.4%, $p=0.08$). However, pain intensity distribution differed significantly between groups ($p< 0.0001$). After cesarean delivery, the proportions of patients reporting no pain, mild, moderate, and severe pain were 4.6%, 15.5%, 64.2%, and 15.6%, respectively, whereas after vaginal birth the corresponding proportions were 5.6%, 25.7%, 49.1%, and 19.6%. Among vaginal deliveries, perineal lacerations were strongly associated with increased pain severity, demonstrating a clear dose–response relationship according to laceration degree ($p< 0.0001$). Episiotomy was not significantly associated with increased pain intensity. Conclusions: postpartum pain is highly prevalent regardless of delivery mode, but its intensity profile differs significantly between cesarean and vaginal births. Multimodal neuraxial analgesia appears effective in reducing severe pain after cesarean delivery, whereas perineal trauma is the main determinant of severe pain following vaginal birth. These findings highlight the need for individualized postpartum analgesic strategies, particularly for women with significant perineal injury, to improve maternal recovery and quality of life.

References:

: American Society of Anesthesiologists Task Force on Obstetric Anesthesia. Practice Guidelines for Obstetric Anesthesia. *Anesthesiology*. 2022;136(1):31-75. doi:10.1097/ALN.0000000000004001.

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 04

A systematic review and meta-analysis to determine the minimal clinically significant difference for Obstetric Quality of Recovery 10 scores

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Abstract :

Introduction

Obstetric Quality of Recovery 10 (ObsQoR10) is widely used as a patient-reported outcome measure for evaluating inpatient postpartum recovery. However, the minimal clinically important difference (MCID) for ObsQoR10 remains unknown, limiting clinical interpretability and use in research settings.[1] The primary aim of this study was to estimate MCID of ObsQoR10 through a systematic review and meta-analysis of studies evaluating its psychometric properties.

Methods

We conducted a systematic review and meta-analysis of studies published up to February 2025 (PROSPERO ID CRD420250646561). PubMed/MEDLINE, Embase, Web of Science, Scopus, CINAHL and PsycINFO, were searched without date or language limiters using key words related to "Obstetric Quality of Recovery." Observational and interventional studies were eligible, and studies reporting >1 psychometric property (validity, reliability or responsiveness as defined by COSMIN[2]) of ObsQoR10 were included. Studies using ObsQoR11 or outpatient studies were excluded. Two reviewers independently screened and evaluated study quality using the COSMIN Risk of Bias Checklist.[2] MCID was estimated through triangulation of: (i) anchor-based (differences in score between cesarean delivery (CD) and vaginal delivery (VD), and between planned and unplanned CD), and (ii) distribution-based (0.5 of standard deviation (SD) of scores [3]) methods.

Results

Eleven studies, including 1692 participants across 11 countries were included. Mean ObsQoR10 scores ranged from 48.0±16.3 (CD) to 89.1±9.3 (VD). Anchor-based MCID estimates ranged from 6.1 to 16.2, while distribution-based estimates ranged from 6.5 to 8.7 (Table 1). Most studies (7/8, 87.5%) reported statistically significant differences in scores between delivery modes. Overall, ObsQoR10 demonstrated

moderate to excellent validity, reliability, responsiveness and acceptability across inpatient postpartum patients.

Conclusion

The findings suggest that the MCID for ObsQoR10 is approximately between 6.1 and 6.5, representing the smallest clinically meaningful difference supported by both anchor- and distribution-based methods. The similarity in estimates across both approaches strengthens the evidence supporting this MCID. This can help to guide clinical decisions and interpret findings from studies that utilize ObsQoR10 as an outcome measure.

References: 1. Sultan et al. Anesthesiology 2022;137(2):201-211
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3. Mouelhi et al. Health Qual ife Outcomes 2020;18(1):136

SOAP abstract table 1.pdf

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 05

Association between Sleep Duration and Vagal Activity during the Postpartum Period: Insights from Wearable Digital Health

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Co-Authors: Alana Davidson, BS - Duke University School of Medicine
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Abstract : Sleep disturbance is highly prevalent during the postpartum period and is a contributor to adverse cardiovascular and autonomic outcomes.[1,2] Although poor sleep is linked to hyperarousal and reduced vagal activity in non-pregnant populations, the associations between sleep quantity and quality and heart rate variability (HRV) during postpartum remain poorly understood.[3,4] Objective sleep assessment during this critical physiological transition can provide insight into vagal regulation following childbirth. We aim to examine relationships between postpartum sleep parameters and HRV in postpartum people. We hypothesize that poorer sleep quality and greater sleep fragmentation would correspond to lower HRV.

After IRB approval, a prospective observational cohort study of forty postpartum people was performed between February 2025 and January 2026. Objective sleep monitoring was conducted using an Oura Ring, a wearable device, for 2 weeks following delivery. Sleep metrics obtained included total sleep time (TST), sleep efficiency (SE; percentage of time asleep while in bed), wake after sleep onset (WASO; total time awake after initiating sleep and before final awakening), and sleep onset latency (SOL; time it takes to fall asleep). Sleep data were averaged weekly and participants with less than two cumulative hours of recorded sleep per week were excluded. Vagal activity was assessed using weekly averages of HRV, and Spearman correlations were used to examine associations between HRV and each sleep parameter.

In the overall postpartum cohort, TST, a measure of sleep quantity, was moderately and positively associated with HRV (rho=0.44, p=0.006), indicating higher vagal activity with longer sleep duration. In contrast, objective measures of sleep quality were not significantly associated with HRV during this period: SE (rho=0.20, p=0.228), SOL (rho=-0.19, p=0.240) and WASO (rho=-0.04, p=0.852).

These findings suggest that in the postpartum period, longer total sleep duration was linked to greater vagal activity, whereas measures of sleep continuity and fragmentation were not correlated to autonomic function. This highlights sleep duration as a potential important and modifiable target for supporting postpartum autonomic and cardiovascular health. Future directions should evaluate whether these associations differ when stratifying participants by cardiovascular disease risk and should explore sleep-HRV relationships during other critical windows, such as late pregnancy.

References: 1. Bogdan, et al, Life, 2024.
2. Chen, et al, BJA, 1999.
3. Fink, et al, Clinical Autonomic Research, 2018.
4. Montgomery-Downs, American Journal of Obstetrics and Gynecology, 2010.

Spearman Correlations.pdf

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 06

Development of adapted postpartum PROMIS sleep disturbance (PROMIS+PP-SD) and sleep-related impairment (PROMIS+PP-SRI) item banks

Presenting Author: Moe K. Takenoshita, BSc, MBBChir, MRCS

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Abstract :

Background: Postpartum sleep is a unique construct, and existing sleep patient-reported outcome measures (PROMs) do not adequately assess some of its fundamental domains such as infant related awakenings. We aimed to develop postpartum-specific PROMIS Sleep Disturbance (SD) and Sleep Related Impairment (SRI) measures.

Methodology: Systematic review and qualitative interviews with patients, partners and experts from diverse specialties were used to identify postpartum sleep domains. Based on these findings, new postpartum-specific PROMIS items were developed to be used in conjunction with existing PROMIS SD and SRI items. Through a modified Delphi process involving a panel of 21 stakeholders including experts in obstetrics, sleep, psychiatry, patients and partner representatives, the proposed items were iteratively adapted and selected until consensus was reached. The items achieving strong consensus (≥70% stakeholder agreement) were further refined through recorded cognitive debriefing interviews with postpartum individuals until no further suggestions were generated in 5 consecutive interviews.

Results: Nine new postpartum SD items, and 4 new SRI items were added to the existing PROMIS SD and SRI measures (Table 1). They covered 6 domains (sleep interference, disruption, feeding of neonate, psychological, medical, and social factors), and 10 subdomains (worry, post-traumatic stress symptoms,

maternal-neonatal bonding, activities of daily living, pain, neonatal awakenings, maternal awakenings, latency, social support, infant feeding) of postpartum sleep. The readability of the finalized postpartum PROMIS SD and SRI measure was Flesch-Kincaid Grade Level 2.4 and 3.1 respectively (below the desired 8th grade level).

Conclusions: We developed postpartum-specific PROMIS SD and SRI measures using the National Institute of Health PROMIS framework. Next steps include clinical validation of the new measures, evaluation of their psychometric properties, and to establish clinical utility for screening for sleep disorders.

References:

SOAP abstract submission table 1 1.7.26.pdf

THURS - RA - BS 1 - BR 2 – Recovery: Pain, Sleep, Anxiety - 07

Predictors of delayed urinary catheter removal following enhanced recovery after cesarean delivery: a retrospective cohort study

Presenting Author: Sunti Barahi, MD, FRCPC

Presenting Author's Institution: Mount Sinai Hospital, University of Toronto - Bedford, Nova Scotia

Co-Authors: Ronald B B. George, MD FRCPC - Mount Sinai Hospital, University of Toronto
Aswini Kuberan, MBBS, MD - University of Toronto
Xiang Y. Ye, MSc - Senior Biostatistician

Abstract :

INTRODUCTION

Enhanced Recovery After Cesarean (ERAC) pathways, including SOAP consensus guidelines recommend urinary catheter removal within 6–12 hours postpartum to promote mobilization and reduce catheter-associated urinary tract infections (CAUTI).[1-3] Despite an established ERAC program at our institution, recent audits show a 30–40% implementation gap where patients are discharged from the PACU with a catheter in situ. Prolonged catheterization delays ambulation and impairs patient experience. This study identifies clinical and process-of-care factors associated with delayed urinary catheter removal (>360 minutes) after cesarean delivery.

METHODS

This retrospective cohort study at a high-volume tertiary obstetric center screened all cesarean deliveries over 12 months. Data on demographics, anesthetic technique, neuraxial doses, intraoperative fluids, and PACU motor block (Bromage scale) were collected. The primary outcome was delayed removal (>360 minutes) or recatheterization. Multivariable logistic regression identified independent predictors ($p < 0.10$ on univariable analysis).

RESULTS

Of 337 patients enrolled, delayed removal occurred in 151 (44.8%). In the multivariable model, independent predictors of delay were PACU motor block density, removal location, intraoperative fluid volume, and time to motor recovery. Compared with complete block, partial recovery (Bromage 1–2) was associated with lower odds of delay (OR 0.20 [95% CI 0.08–0.51] and 0.44 [0.20–0.95]). Removal in PACU significantly reduced delay (OR 0.13 [0.05–0.33]). Each 1200-mL increase in fluids tripled the odds of delay (OR 3.12 [1.53–6.35]). Longer times to motor assessment also increased risk. Patient demographics and urgency were not significant predictors.

CONCLUSION

Nearly half of patients experienced delayed catheter removal despite ERAC protocols. Our findings highlight modifiable factors; fluid stewardship, PACU-based removal protocols, and standardized Bromage-guided assessments, that influence catheter duration. Process-of-care changes targeting workflow and motor recovery, rather than patient demographics, are likely to enhance adherence to SOAP ERAC recommendations and reduce CAUTI risk.

References:

1. Wilson RD, et al. Am J Obstet Gynecol. 2018;219:523.e1–15.
2. Bollag LA, et al. Society for Obstetric Anesthesia and Perinatology (SOAP) ERAC Consensus. Anesth Analg. 2021;132:1362–77.
3. Enhanced Recovery Canada. Clinical Pathway for Cesarean Delivery. 2022.

THURS - RA - BS 1 - BR 2 – Leadership: Operations and Research - 01

Fate of Survey Research Presented at the Society for Obstetric Anesthesia and Perinatology Annual Meetings (2015–2019)

Presenting Author: Markus Gulilat, MD, PhD

Presenting Author's Institution: Department of Anesthesiology, Pharmacology & Therapeutics, University of British Columbia - Vancouver, British Columbia

Co-Authors: Ruthi Landau, MD - Columbia University
Jill M. Mhyre, MD - Department of Anesthesiology, University of Arkansas for Medical Sciences
Kaitlin Nelson, BSc, MSc - Women's Health Research Institute, BC Women's Hospital, University of British Columbia
Paloma Toledo, MD MPH - Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami

Abstract :

Introduction: The SOAP Research Committee recently restructured the survey process to encourage well-designed studies addressing compelling research questions, recognizing that surveys remain essential for investigating outcomes that cannot be addressed using other methodologies.[1] However, survey research is often perceived as methodologically less robust, leading some to question the value of obstetric anesthesia survey studies. We aimed to evaluate the publication rate and characteristics of survey research abstracts presented at SOAP between 2015 and 2019.

Methods: All abstracts submitted that used survey methodology as the primary research design were identified from the SOAP meeting syllabi (2015-2019). We excluded Delphi studies and quality-improvement studies employing iterative plan-do-study-act cycles. Subsequent peer-reviewed publications were identified using a systematic search strategy, including PubMed searches, Google searches of abstract titles, focused searches of first and senior author publication histories, and an artificial intelligence–assisted search (Google Gemini). The primary outcome was publication rate. Secondary outcomes included sample size in published vs. nonpublished abstracts analyzed by Wilcoxon test, time to publication, research topic, journals of publication, and survey response rate.

Results: Of 1,818 total abstracts presented between 2015 and 2019, 89 (4.9%) met the criteria as survey research. Of these, 33 (37.1%) were subsequently published in peer-reviewed journals. Median survey sample size was significantly lower in unpublished compared to published abstracts (65 vs 115 respondents, $p< 0.001$). Among published surveys, the median [IQR] time to publication was 17 [12–29] months, with 90.9% published within 5 years. The most common survey topics among published ones were labor analgesia (7/33, 21.2%), obstetric hemorrhage (6/33, 18.1%), and education and simulation (5/33, 15.2%). One abstract was published in non-indexed journal. The median [IQR] survey response

rate was 58.3% [43.0–88.2%] among the 54 non-published surveys (58.7%) reporting sufficient data for calculation, and 67.6% [47.7–89.0%] among those that were published.

Conclusion: The publication rate for survey abstracts presented at SOAP annual meetings was 35.9%, comparable to the 37.3% abstract-to-publication rate reported in a 2018 Cochrane Review.[2] Published surveys had larger sample sizes (>100) and generally higher response rates (>50%). Many abstracts lacked sufficient data to calculate response rates, highlighting gaps in abstract-level reporting. Although reasons for non-publication and unaccepted submissions were unknown, the findings here demonstrate substantial post-conference attrition and highlight opportunities to strengthen the reporting and support structures of survey research in obstetric anesthesia to improve successful publication.

References:

1. Story DA et al., Anesthesiology. 2019
2. Scherer R et al., Cochrane Database Syst Rev 2018

Table 1_Fate of Survey Research Abstracts Submitted to Society for Obstetric Anesthesia and Perinatology Annual Meetings[2].pdf

THURS - RA - BS 1 - BR 2 – Leadership: Operations and Research - 02

Cost awareness of common neuraxial anesthesia medications and materials among obstetric anesthesia providers: A cross-sectional survey-based pilot study

Presenting Author: Leah Han

Presenting Author's Institution: Boston College - Salt Lake City, Utah

Co-Authors: Jordan A. Francke, MD, MPH - Columbia University Medical Center
Noor A. Raheel, MD, MPH - Brigham and Women's Hospital

Abstract :

Background

The costs of various medications and disposable materials used for neuraxial techniques remain frequently opaque to clinicians.[1,2] We hypothesized that in a high-volume labor and delivery unit, medication and material costs would be underestimated by obstetric anesthesia providers, and knowledge gained could inform cost- and environment- friendly changes. Here we present a survey-based study designed to evaluate cost knowledge among obstetric anesthesiologists and fellows, identify perception gaps, and collect suggestions for feasible practice change.

Methods

After Institutional Review Board exemption, we created an inventory of 46 materials and medications used for neuraxial procedures at our institution. Hospital costs were obtained from the Materials Management and Pharmacy services, respectively. A REDCap anonymous visual survey including materials and medication photos and their cost was distributed to all obstetric anesthesiologists and obstetric anesthesiology fellows. Respondents were asked about each item's cost ("higher than I thought," "about what I thought," or "lower than I thought") and to report frequency of use ("every time," "sometimes," "never"). Suggestions were elicited.

Results

Twenty-three of 25 respondents completed the survey (92%; 18 faculty, 5 fellows). Of 1,058 responses (46 questions among 23 participants), 27% underestimated cost (i.e., thought the item was cheaper than actual); and 52% overestimated cost. Commonly underestimated item costs included a 17G Weiss epidural needle (83%), ephedrine and phenylephrine syringes (78%, 74% respectively), epidural filter (78%), chlorhexidine skin preparation (70%), and lidocaine 1.5% with epinephrine 1:200,000 (57%). Conversely, respondents overestimated the cost of a spinal anesthesia kit (65%), a 22G 1.5" needle (63%), a 3 mL syringe with 25G needle (57%), and gauze pads and disposable towels (54%). Providers suggested several low-burden interventions including antiseptic substitution (povidone-iodine for chlorhexidine) and eliminating rarely used epidural kit contents to create a streamlined kit.

Conclusions

Substantial variability of cost awareness exists among experienced obstetric anesthesia providers. Conducting this survey initiated valuable education on everyday material and medication costs. Provider-driven, low-risk interventions (transparent pricing, kit redesign, and antiseptic choice) are feasible next steps. Iterative testing can quantify cost savings; impact on the environment, safety and workflow; and generalizability to other hospitals. By enhancing provider cost awareness, our study may facilitate low-risk behavioral changes and kit redesign that produce meaningful institutional savings without compromising safety.

References:

1. Desai V et al Public Health. 2023
2. Lehut T et al Eur J Health Econ. 2024
3. Embrett M. et al Health Res Policy Syst. 2018
4. Jakob SM et al StatPearls 2024
5. Knowles M et al Journal of Vascular Surgery 2020

Cost awareness of common neuraxial anesthesia medications and materials among obstetric anesthesia providers: A cross-sectional survey-based pilot study.pdf

THURS - RA - BS 1 - BR 2 - Leadership - Operations and Research - 03

Health System Resilience During the COVID-19 Pandemic: A Multicenter Analysis of Cesarean Delivery Efficiency

Presenting Author: Sherry Wu, BA

Presenting Author's Institution: Brigham and Woman's Hospital - Rochester, New York

Co-Authors: Lucy Niu, BS - Brigham and Woman's Hospital
Audrey Yu - Brigham and Woman's Hospital
Menggang Yu, PhD - Brigham and Woman's Hospital
Qianqian Zhao, MS - Brigham and Woman's Hospital
Ivy Zhou, BSN, BS - Brigham and Women's Hospital, Harvard Medical School

Abstract :

Background
Perioperative efficiency is critical to safety, throughput, and resource utilization in obstetric care. The COVID-19 pandemic imposed unprecedented infection control requirements, staffing constraints, and resource limitations on operating rooms. We hypothesized that these pressures would decrease perioperative efficiency for cesarean delivery, with gradual recovery as the pandemic resolved.

Methods
We performed a retrospective multicenter analysis of cesarean deliveries from January 2019 through April 2025 across three hospitals. Cases were categorized into four periods: Pre-COVID (2019), Early COVID (Jan–Mar 2020), Late COVID (Apr 2020–Dec 2021), and Post-COVID (Jan 2022–Apr 2025). Outcomes included hospital length of stay (LOS) and five perioperative intervals: anesthesia start-to-incision, incision-to-procedure end (surgical time), procedure end-to-out of room, out of room-to-anesthesia stop, and anesthesia stop-to-discharge (recovery). Multivariable negative binomial regression was used to estimate adjusted means, controlling for hospital site, ASA class, and cesarean delivery type.

Results
33,562 cesarean deliveries were included. There was a significant overall effect of COVID period on hospital length of stay (LOS) (period effect $p< 0.0001$), with adjusted mean LOS of 7231 min (5.02 d; 95% CI 6729–7771) in Pre-COVID, 7144 min (4.96 d; 95% CI 6624–7705) in Early COVID, 6460 min (4.49 d; 95% CI 6010–6943) in Late COVID, and 6730 min (4.67 d; 95% CI 6265–7229) in Post-COVID. The reduction in LOS was driven primarily by changes in recovery time, which also varied significantly by period ($p< 0.0001$), decreasing from 5853 min (4.06 d; 95% CI 5592–6126) pre-COVID to 5203 min (3.61 d; 95% CI 4971–5447) in Late COVID and 5440 min (3.78 d; 95% CI 5199–5692) in Post-COVID. In contrast, surgical duration did not differ significantly across periods ($p=0.29$), remaining stable at approximately 64–65 min. Several perioperative transition intervals showed statistically significant but small increases over time, including anesthesia start-to-incision (period effect $p< 0.0001$; 71 min [95% CI

63–81] Pre vs 76 min [95% CI 67–86] Post), procedure end-to-out of room (p=0.0008; 16 min [95% CI 15–18] Pre vs 17 min [95% CI 15–18] Post), and out of room-to-anesthesia stop (p< 0.0001; 9 min [95% CI 8–10] Pre vs 10 min [95% CI 9–12] Post).

Conclusions

Although pandemic-related stressors were associated with modest increases in certain perioperative transition intervals, including anesthesia preparation and post-procedure transport times, overall perioperative efficiency for cesarean delivery did not deteriorate. Instead, system-level throughput improved due to sustained reductions in postoperative recovery time, resulting in shorter hospital length of stay despite unchanged surgical duration. These findings suggest substantial resilience and adaptive capacity of perioperative systems even under prolonged operational stress.

References:

THURS - RA - BS 1 - BR 2 - Leadership - Operations and Research - 04

Reducing practice variability in obstetric anesthesia in a private hospital through a structured, team-based implementation of SOAP Centers of Excellence recommendations

Presenting Author: Eliane C. Soares, MD

Presenting Author's Institution: Grupo SAM / Serviços de Anestesiologia e Medicina - Faculdade de Ciências Médicas de Minas Gerais - Nova Lima, Minas Gerais

Co-Authors: Fabiano S. Carneiro, MD - Serviços de Anestesiologia e Medicina (Grupo SAM)
Paulo C. Figueiredo, MD - Serviços de Anestesiologia e Medicina (Grupo SAM)

Abstract :

Background

Practice variability in obstetric anesthesia is common and may contribute to clinical unpredictability and inconsistent care. Evidence-informed standardization may reduce variability, but implementation requires structured engagement. Using SOAP Centers of Excellence (SOAPCOE) submission form as framework, we developed a team process to standardize practice in a private hospital. We describe the development and implementation of a team-based pocket guide and evaluated changes in obstetric anesthesia care over 10 months.

Methods

In our newly inaugurated labor and delivery unit, the team includes 21 anesthesiologists. In Feb 2025, we initiated 30-min weekly online meetings to address topics with high practice variability. Using SOAPCOE recommendations as a guide, team members led topic-focused discussions. Debate was encouraged until consensus on clinical practice was reached, and decisions were documented in a pocket guide. Informal discussions between meetings supported practice change. Education on PIEB+PCEA included in situ training and a joint meeting with the obstetric team. After 11 months, practice changes were assessed with an anonymous electronic survey evaluating knowledge of the recommendations and self-reported practice before and after meetings (Jan and Dec 2025)

Results

Team's demographic data is mean age 39.8y (26–73), 11 men and 10 women, mean anesthesia experience 9.6y (3–45), and mean obstetric anesthesia experience 8.5y. Survey response rate was 76.2%, and all respondents correctly identified agreed recommendations. Use of 27G pencil-point spinal needle increased from 87.5% to 100%, eliminating cutting-edge needles. PIEB+PCEA use rose from 6.7 to 93.8%, with universal adoption of ropivacaine 0.15% + fentanyl 50mcg for induction. Occasional resistance from obstetricians was reported by 3 anesthesiologists, and 1 reported not using PIEB due to low

confidence. Three anesthesiologists previously omitted fentanyl in epidural maintenance; after meetings, 100% adopted 0.1% ropivacaine + fentanyl 2mcg/mL. Before meetings, 1 anesthesiologist used fentanyl alone and 3 did not add fentanyl as adjuvant for spinal anesthesia in c-sections,; afterward, all adopted intrathecal morphine plus fentanyl. Vasopressor use shifted in 81.3% of cases from rescue boluses of ephedrine, phenylephrine, metaraminol, or norepinephrine to prophylactic norepinephrine infusion.

Discussion

Change of practice required structured, concise and participatory meetings, resulting in pocket guide that reduced practice variability in obstetric anesthesia. The SOAPCOE framework enhanced scientific credibility and facilitated consensus. Behavioral change was reinforced by ongoing discussions. Next steps include auditing medical records to objectively assess adherence and applying the same implementation model to remaining SOAPCOE topics.

References:

SOAP Centers of Excellence - Defining excellence in obstetric anesthesia care

THURS - RA - BS 1 - BR 2 - Leadership - Operations and Research - 05

Workplace-related Reproductive Hazards, Exposures and Mitigation Strategies for Anesthesiologists who are Pregnant and/or Conceiving: A Scoping Review

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Co-Authors: Anthony Chau - St. Paul's Hospital / Department of Anaesthesia, BC Women's Hospital
Stephanie Quon - University of British Columbia
Pervez Sultan, MD - Stanford University School of Medicine
Michael Wong - Pain Management, and Perioperative Medicine, Dalhousie University
Martin Yu - University of British Columbia

Abstract :

Background

Anesthesiologists are routinely exposed to occupational hazards that may adversely affect fertility, pregnancy, and maternal–fetal health. As females comprise an increasing proportion of the anesthesiology workforce, there is a need to synthesize evidence on reproductive risks and workplace protections during conception and pregnancy.

Methods

We conducted a scoping review following Joanna Briggs Institute methodology and PRISMA-ScR guidelines. MEDLINE, Embase, CINAHL, Web of Science, the Cochrane Central Register of Controlled Trials, and grey literature were searched from January 2000 to June 2025. Eligible studies included peer-reviewed and grey literature addressing occupational hazards and exposures with any risk mitigation strategies relevant to anesthesiologists or trainees who were pregnant or attempting conception. Two reviewers independently screened studies and extracted data. Thematic analyses were performed, and mitigation strategies were mapped to the hierarchy of controls. Occupational hazards were categorized as chemical, physical, biological, ergonomic, or psychosocial, and mitigation strategies were mapped to the hierarchy of controls.

Results

Of 6,792 records screened, 33 studies met inclusion criteria. Physical (n=22) and chemical (n=20) hazards were most frequently reported, followed by ergonomic (n=15), psychosocial (n=13), and biological (n=11) exposures. Commonly described hazards included ionizing radiation, waste anesthetic gases, manual handling, long work hours, night shifts, and workplace stress. The most frequently

reported adverse outcomes were miscarriage (n=19), congenital anomalies (n=13), and preterm birth (n=13). Evidence quality was generally low, with substantial heterogeneity in exposure and outcome definitions and no randomized studies identified. Mitigation strategies primarily involved personal protective equipment, engineering controls such as scavenging systems, and administrative measures including duty modification and scheduling changes. Higher-order controls such as elimination and substitution were infrequently described. Common barriers to implementation included limited exposure monitoring, inconsistent institutional policies, inadequate access to protective resources, and workplace stigma around pregnancy disclosure and accommodation.

Conclusion

Anesthesiologists who are pregnant or conceiving face multiple occupational reproductive hazards, with important gaps between recommended and implemented protections. While definitive causal evidence is limited, the potential for harm supports a precautionary approach emphasizing standardized mitigation protocols, improved institutional policies, and supportive workplace cultures. Further high-quality research is needed to better quantify exposure risks and evaluate the effectiveness of mitigation strategies.

Additional authors are Yilin Zhang, Hugh W. Davies, Terri Ser, Lindsay Blake, Andrea Henkel, Terri Sun, & Kathryn Sparrow.

References:

THURS - RA - BS 1 - BR 2 - Leadership - Operations and Research - 06

IJOA at a Glance: a digital information tool to enhance engagement and rapid knowledge dissemination for obstetric anesthesiologists

Presenting Author: Eliane C. Soares, MD

Presenting Author's Institution: Grupo SAM / Serviços de Anestesiologia e Medicina - Faculdade de Ciências Médicas de Minas Gerais - Nova Lima, Minas Gerais

Co-Authors: Ciara Luke, MD - The National Maternity Hospital
Miodrag Mitric, PharmD, PhD - Elsevier / Innsbruck Medical University

Abstract :

Background

Social media has emerged as a powerful channel for rapid dissemination of scientific knowledge. In February 2025, the International Journal of Obstetric Anesthesia (IJOA) Editorial Fellowship launched structured Instagram initiatives, including descriptive article posts and infographic carousels ("IJOA at a Glance"), aimed at increasing professional engagement and promoting published research

Objective

To evaluate the impact of Instagram-based promotion on social media engagement and full-text article downloads on the IJOA website

Methods

Articles for IJOA at a Glance were curated by fellows, reviewed by Editor-in-Chief and authors, with posts linking full citations and abstracts. Using Journal Branded Solutions (JBS), a platform-specific journal landing page, we identified the number of full text downloads of IJOA articles in 2025. Article usage metrics were analyzed for 11 featured articles vs. 20 matched non-featured controls (similar types). Pre/post growth and ranks were compared (Mann-Whitney); Spearman correlation assessed Glance vs. total PDF downloads

Results

Eleven IJOA at a Glance posts drove Instagram follower growth from 79 to 880. Glance-featured articles showed higher median PDF download growth versus controls: +450% (IQR 169-1102%) vs. +90% organic (IQR 36-277%; $p < 0.01$). Temporal peaks occurred 1-3 months post-Glance publication dates (Mar-June 2025). Ten of eleven featured articles demonstrated marked increases, with Glance articles dominating top download ranks overall (positive correlation $r_s=0.45$).

Top Instagram-liked Glance posts ("Assisted reproductive technology and the anaesthesiologist: a narrative review" and "Intravenous dexmedetomidine use in obstetric anesthesia: a focused review") also exhibited highest PDF downloads among featured articles (~1,235+ total JBS/SD), confirming alignment between social media engagement and article access.

Conclusion

IJOA at a Glance features were associated with top-ranked PDF downloads, substantial growth rates versus controls, and positive correlation between Instagram likes and usage metrics. Top-liked posts drove highest downloads, supporting infographic dissemination for obstetric anesthesiology research visibility. Future randomized studies should confirm causality and assess long-term citation/clinical impacts

References:

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Acad Radiol. 2021 May;28(5):711–717.

J Am Acad Orthop Surg. 2022;30(14):648–657.

Physiol & Behav 2020;227:113172.

THURS - RA - BS 1 - BR 2 - Leadership - Operations and Research - 07

Publication Rate of Research Abstracts Selected for Oral Presentations at the Society of Obstetric Anesthesia and Perinatology Annual Meetings (2015-2019)

Presenting Author: Kaitlin Nelson, BSc, MSc

Presenting Author's Institution: Women's Health Research Institute, BC Women's Hospital, University of British Columbia - Vancouver, British Columbia

Co-Authors: Markus Gulilat, MD, PhD - Department of Anesthesiology, Pharmacology & Therapeutics, University of British Columbia
Ruthi Landau, MD - Columbia University
Jill M. Mhyre, MD - Department of Anesthesiology, University of Arkansas for Medical Sciences
Paloma Toledo, MD MPH - Department of Anesthesiology, Perioperative Medicine and Pain Management, University of Miami

Abstract :

Introduction: SOAP's Annual Meeting is a major forum for dissemination of new research, with oral presentations representing abstracts judged to have the greatest potential impact. However, conference presentation alone does not ensure subsequent dissemination through the peer-reviewed literature. Gerlach *et al.*[1] reported that only 26.8% of SOAP abstracts presented between 2010–2014 were ultimately published, with higher publication rates for oral presentations (47.8%), We conducted a follow-up study to evaluate publication outcomes of oral presentations, representing the top 10% of submitted abstracts selected for presentation at the 2015–2019 SOAP Annual Meetings.

Methods: Oral presentations were identified from SOAP meeting syllabi (2015-2019). Subsequent peer-reviewed publications were identified using PubMed searches, Google searches of abstract titles, focused searches of first and senior author publication histories, and an artificial-intelligence-assisted search (Google Gemini). The primary outcome was publication rate. Secondary outcomes included time to publication, journals, presenting and senior author gender, research type (clinical vs. basic science), study design, and study outcome (positive vs. negative findings). Factors associated with publication were analyzed using multivariable logistic regression.

Results: Of the 81 oral presentations, 68 (84.0%) were subsequently published in peer-reviewed journals. Of those, 61 (90%) were clinical and 7 (10%) were basic science. Publication rates were similarly high among randomized controlled trials (31/35, 88.6%) and Gertie Marx Research Competition abstracts (26/29, 89.7%). The median [IQR] time to publication was 19 months [11.3 - 28.0], with 92.6% published within 5 years. There were no significant associations between publication status, research type, study design, or study outcome. (Table 1)

Conclusion: Publication rates following oral presentation of research abstracts at SOAP Annual Meetings have nearly doubled compared with earlier reporting, reaching 84%. This finding likely reflects an effective oral abstract selection process that identifies studies with high publication potential, reinforced by proactive editorial solicitation and the availability of time-limited fast-track review pathways introduced during the study period. These measures likely helped overcome common barriers to publication such as competing time demands and loss of post-meeting

momentum rather than limitation in scientific quality. Further studies could evaluate other strategies, such as incorporating publication readiness into oral abstract selection, increasing structured mentorship, or recognitions for abstracts published within 24 months to further strengthen and sustain this positive trend.

References:

1. Gerlach, et al. A&A 2017

Table 1. PubRate Study Oral Abstract[2].pdf

Uterotonic Practices During Cesarean Delivery – A Survey of the Society for Obstetric Anesthesia and Perinatology Centers of Excellence

Presenting Author: Alva Powell, MD

Presenting Author's Institution: McGaw Medical Center of Northwestern University - Chicago, Illinois

Co-Authors: Michaela K. Farber, MD, MS - Mass General Brigham
Feyce Peralta, MD, FASA, Professor of Anesthesiology - Northwestern University Feinberg School of Medicine

Abstract :

Background: Postpartum hemorrhage is a leading contributor of preventable maternal morbidity, with uterine atony responsible for most cases. Oxytocin remains the first-line pharmacologic therapy for the treatment of uterine atony during cesarean delivery (CD). While research on optimal dosing strategies has informed both national and international consensus recommendations,[1,2] the extent of national implementation of these recommendations remains unclear. We hypothesize that heterogeneity persists in oxytocin administration practices in the United States, even at Society for Obstetric Anesthesiology and Perinatology (SOAP) Centers of Excellence (COE). This study sought to characterize uterotonic administration practices among SOAP COEs and identify implementation barriers.

Methods: A cross-sectional survey was distributed to obstetric anesthesiology division leaders at U.S.-based SOAP COEs. The survey assessed institutional characteristics, oxytocin dosing protocols for CD, second-line uterotonic preferences, and barriers to guideline implementation.

Results: Of 70 eligible division leaders, 25 completed the survey (35.7% response rate), predominantly from academic centers (80%). Notably, 50% of respondents reported oxytocin protocols inconsistent with SOAP ERAC guidelines. The most frequently cited barriers to implementation included resistance from obstetrical and/or nursing stakeholders (42%) and disagreement with recommendations (33%). Significant heterogeneity of CD oxytocin dosing regimens was reported. For both elective and intrapartum CD, a bolus-plus-infusion strategy was most common. In elective CD, initial oxytocin bolus doses of 1IU and 3IU were chosen by 29% and 47% of respondents, respectively. In intrapartum CD, an initial 3 IU bolus predominated (71%), while the remaining respondents reported wide variability, with bolus doses ranging from 2IU (12%) and 8-10IU (12%). Infusion rates also varied considerably between 2.5 and 15 IU/hr. Most respondents (71%) reported no adjustment of oxytocin dose for high-risk patients. Methergine was selected as the preferred second line uterotonic (95%), and calcium chloride was used by 42% of respondents for persistent atony, with 1000mg the most common dose. Respondents identified knowledge gaps and opportunities for future research.

Discussion: Among SOAP COEs, substantial variability in uterotonic administration practices persist, with limited adoption of evidence-based guidelines.[2] Key barriers include disagreement with recommended practices and organizational resistance, underscoring the need for further comparative research and implementation strategies. Collectively, these findings highlight quality improvement

opportunities that aim to overcome implementation barriers and adopt evidence-based protocols for oxytocin administration. Impact of further oxytocin standardization on PPH warrants further study.

References:

1. PMID 3134715

2. PMID: 33177330

THURS - RA - BS 1 - BR 3 - Uterotonics and TXA – 02

Effect of Sequential Tranexamic Acid Timing Strategies on Postpartum Hemorrhage After Cesarean Delivery: A Multi-Phase Quality Improvement Evaluation

Presenting Author: Ruhi Patil, BS

Presenting Author's Institution: Boston University Chobanian & Avedisian School of Medicine - Shrewsbury, Massachusetts

Co-Authors: Erin Dienes, PhD - Boston Medical Center, Boston, MA
Xuan A. He, PhD - Boston University Chobanian & Avedisian School of Medicine
Celina Nguyen, n/a - Boston University Chobanian & Avedisian School of Medicine
Mark Norris, MD - Boston Medical Center, Boston, MA
Kerwin Wang, n/a - Boston University Chobanian & Avedisian School of Medicine

Abstract :

Background

Postpartum hemorrhage (PPH) remains a leading cause of pregnancy-related morbidity and mortality1. Prophylactic tranexamic acid (TXA) has demonstrated inconsistent benefit when administered at cord clamp2. As part of a multi-year quality improvement initiative, our institution implemented universal TXA dosing at cord clamp in 2021; Phase 1, previously presented at the Society for Obstetric Anesthesia and Perinatology, demonstrated no meaningful reduction in hemorrhage or transfusion. Based on emerging evidence supporting earlier antifibrinolytic exposure3, our department transitioned to pre-incision TXA dosing in March 2025. This analysis represents Phase 2 of the initiative.

Methods

We conducted a single-center retrospective analysis of cesarean deliveries from January 2020 to September 2025 across three sequential practice periods: no routine TXA, TXA administered at umbilical cord clamp, and TXA administered 10–15 minutes prior to skin incision. All TXA doses were 1 g IV. Primary outcomes were median quantitative blood loss (QBL) and postpartum hemorrhage (PPH; QBL >1000 mL). Secondary outcomes included additional uterotonic use, red blood cell transfusion, and ICU admission. Continuous variables were compared using ANOVA with Tukey post hoc testing, and categorical variables using chi-square or Fisher’s exact tests.

Results

Among 5,454 cesarean deliveries, 1,819 (33%) received no TXA, 3,150 (58%) received TXA at cord clamp (TCC), and 485 (9%) received TXA before incision (TBI). Median QBL differed modestly across groups (832 mL [IQR 593–1158] no TXA; 866 mL [617–1217] TCC; 833 mL [587–1163] TBI; p=0.022), driven by slightly higher blood loss in the TCC group. Rates of PPH were similar (34.8%, 38.2%, and

35.5%, respectively; p=0.056). Additional uterotonic use differed significantly, with higher utilization in the TCC group and lower utilization in the TBI group (25.5%, 32.8%, and 14.6%, respectively; p< 0.001). Red blood cell transfusion by postoperative day two and overall transfusion rates were higher in TXA groups compared with no TXA (p=0.016 and p=0.013), although mean units transfused did not differ (p=0.462). ICU admission rates were low and similar across groups (p=0.166).

Conclusion

Consistent with Phase 1, advancing TXA administration from cord clamp to pre-incision was not associated with meaningful reductions in QBL or PPH in this early Phase 2 analysis. Observed differences likely reflect underlying patient risk and surgical complexity rather than treatment effect. These findings support a risk-stratified rather than universal approach to prophylactic TXA use in cesarean delivery.

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THURS - RA - BS 1 - BR 3 - Uterotonics and TXA – 03

Optimizing Oxytocin Delivery: Comparing IV and IM routes in cesarean delivery

Presenting Author: Philip A. Feinberg, MD, PhD

Presenting Author's Institution: Umass Anesthesia - Worcester, Massachusetts

Co-Authors: Huy L. Doan, DO - Umass Memorial Medical Center

Abstract : Oxytocin (Pitocin) is widely used as the first-line uterotonic agent for the prevention of postpartum hemorrhage (PPH) following labor and delivery. In vaginal births, intravenous (IV) oxytocin has been shown to reduce both the incidence of PPH and the need for blood transfusion more effectively than intramuscular (IM) administration. However, evidence comparing these routes of administration during cesarean delivery remains limited. In the recent context of the nation wide IV fluid shortages in late 2024, IM oxytocin was increasingly adopted as an alternative during cesarean sections. In this retrospective chart review, maternal outcomes were compared between patients receiving IM versus IV oxytocin at the time of cesarean delivery. No significant differences were observed between groups in quantitative blood loss, transfusion rates, use of tranexamic acid, or the need for additional uterotonic agents such as methylergonovine or carboprost. Additionally, no patients in the IM group required intrauterine hemorrhage control devices. These findings suggest that IM oxytocin may provide a clinically comparable alternative to IV administration for atonic hemorrhage prophylaxis during cesarean delivery, particularly in settings where IV fluid administration is restricted, such as in patients with cardiovascular diseases or in resource-limited environments.

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Optimizing Oxytocin Delivery Comparing IV and IM routes in cesarean delivery.pdf

THURS - RA - BS 1 - BR 3 - Uterotonics and TXA – 04

The Origin Sites for Uterine Contractions in Pregnant Mice.

Presenting Author: David J. Combs, MD, PhD

Presenting Author's Institution: Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital; Harvard Medical School - Boston, Massachusetts

Co-Authors: Sarah K. England, PhD - Department of Obstetrics and Gynecology, Center for Reproductive Health Sciences, WashU Medicine

Abstract :

Introduction: Prior maps of uterine electrical excitation have failed to identify consistent sites of origin, with activity patterns appearing highly variable and discontinuous (1). To address this limitation, we adapted a previously developed wide-area uterine calcium imaging platform to map organ-scale calcium dynamics during late pregnancy and labor in a murine model (2).

Methods: The genetically encoded calcium indicator GCaMP6s was expressed using a transgenic mouse line (3, 4). Expression patterns were validated by immunofluorescence and confocal microscopy. Calcium activity was imaged antepartum (18.2–19.4 days post coitus, dpc) and intrapartum (between delivery of the first and last pup) using an open surgical preparation and an ultra-widefield imaging system (25.5 × 17.4 mm field of view).

Results: GCaMP6s expression was uniform throughout fixed uterine tissue sections. Mice (n = 7) had a mean gestational length of 18.9 ± 0.2 dpc and an average litter size of 8.4 ± 0.9 pups (mean ± SD throughout). In antepartum and laboring animals (n = 12), calcium activity preferentially initiated at the ovarian end of the uterine horn and within the mesometrium—a muscular structure connecting the uterus to its supporting ligaments—accounting for 38 ± 5% and 38 ± 6% of events, respectively. These frequencies significantly exceeded predictions based on fractional uterine area (pooled Z scores: 21.6 and 8.8). Calcium events activated discrete spatial territories: the most active 25% of pixels accounted for 70–99% of total activity, whereas the least active 30% pixels were nearly silent. Calcium events lasted 30.0 ± 3.3 s and spread at a mean front velocity of 0.53 ± 0.38 mm/s to cover areas of 22.4 ± 2.5 mm². Calcium signals formed plateau-like responses that were either smooth or highly oscillatory (38% of events). Oscillations occurred at 0.42 ± 0.01 Hz and were significantly enriched in the mesometrium (16.0 ± 5.1% absolute increase; $p < 0.02$).

Conclusions: During late gestation and labor, uterine calcium activity preferentially originates near the oviduct and within the mesometrium. These events form compact, reproducible spatial patterns and frequently include oscillatory dynamics, a prominent feature of mesometrial smooth muscle. Ongoing studies aim to define the molecular and cellular mechanisms that generate and regulate these patterns.

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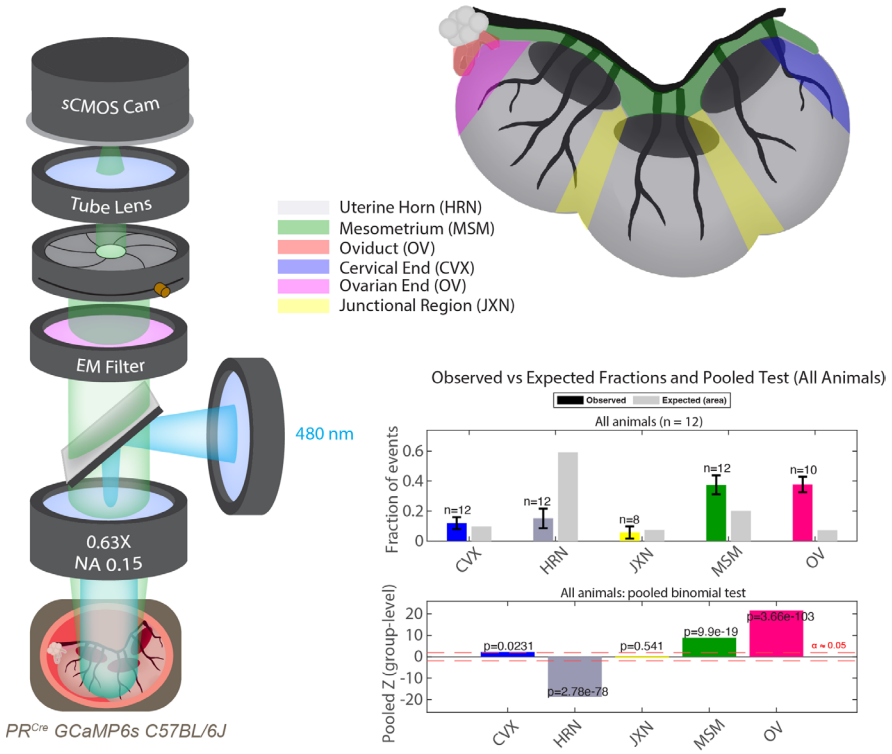

THURS - RA - BS 1 - BR 3 - Uterotonics and TXA – 05

"Can a tablet do the job? The effect of oral calcium on maternal plasma concentration"

Presenting Author: Lauren Blake, MD, MHS

Presenting Author's Institution: Stanford Healthcare - Palo Alto, California

Co-Authors: Jordan Abrams, MD - Northern Westchester Hospital
Brendan Carvalho, MD - Stanford Department of Anesthesiology, Perioperative and Pain Medicine (Obstetrics) and, by courtesy, OBGYN (MFM)
Guillermina Michel, B.S. - Stanford University
Chloe Stanwyck, MD, MS - Stanford University School of Medicine

Abstract :

Background: Postpartum hemorrhage (PPH) remains the leading global cause of maternal mortality, with uterine atony accounting for up to 80% of cases (1). Emerging evidence suggests intravenous (IV) calcium may reduce PPH due to uterine atony; however, IV access is often limited in low resource settings where PPH morbidity and mortality are highest (2). Oral calcium is inexpensive, shelf-stable, and widely available. We previously defined the population pharmacokinetics of intravenous calcium formulations in parturients (3,4). This study aimed to determine whether the package insert maximum dose of commonly available oral calcium formulations could achieve ionized calcium plasma levels that optimize uterine myometrial contraction.

Methods: In this IRB-approved interventional study, laboring patients 18-45 years of age with term pregnancy were enrolled between March and October 2025. Patients with weight less than 55 kg or greater than 100 kg, severe range blood pressure, renal dysfunction, and congenital or acquired cardiac disease were excluded. Consenting participants underwent five blood draw samples to measure ionized calcium, one baseline and four over several hours post-ingestion for planned population pharmacokinetic analysis. The initial cohort received 1200 mg (2 tablets) of oral calcium carbonate. Following interim analysis demonstrating minimal effect, the protocol was amended to calcium citrate of equivalent dosing (1250 mg/2 tablets) given its higher bioavailability. Participants also completed surveys pertaining to oral calcium tolerability.

Results: Twelve laboring patients received oral calcium carbonate. We found minimal to no increase in serum ionized calcium even hours after ingestion. Calcium citrate similarly failed to produce a reliable increase in ionized calcium at measured timepoints amongst eight additional patients (Figure 1). Both formulations were well tolerated without gastrointestinal or other adverse side effects.

Conclusion: In this study, the package insert "maximum" dose of two formulations of oral calcium failed to increase serum ionized calcium in laboring patients. Prior randomized control trials suggest efficacy of IV calcium as a uterotonic agent (3,5). The lack of effect with oral calcium likely reflects insufficient dosing

in the setting of limited gastrointestinal absorption during labor. Future studies will likely require significantly higher or repeated oral dosing, and our findings may inform additional investigations leveraging higher doses. Until an effective oral dosing strategy is identified, randomized trials should continue to prioritize intravenous calcium formulations.

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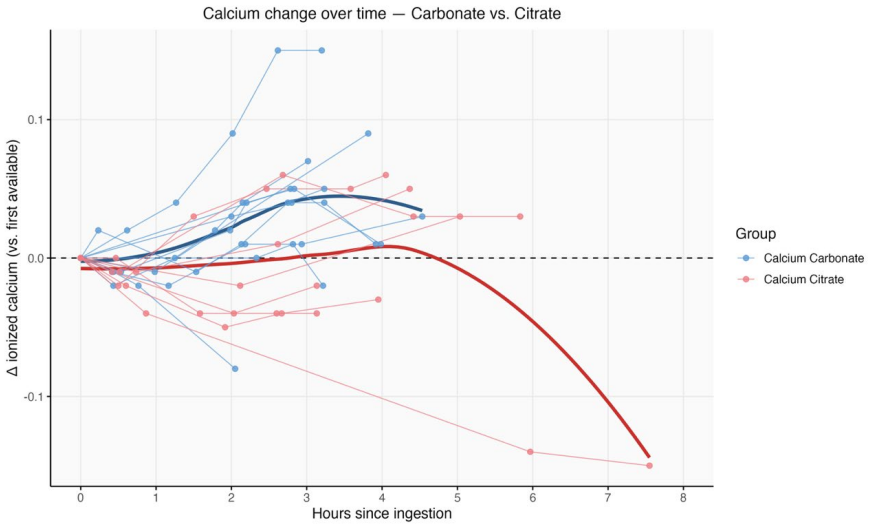

THURS - RA - BS 1 - BR 3 - Uterotonics and TXA – 06

Prophylactic vs Therapeutic Tranexamic Acid for Cesarean Delivery with PPH and Hemorrhage Outcomes: A Multicenter Retrospective Cohort Study

Presenting Author: Lillian Liao, MD, MS

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

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Ricardo Kleinlein, PhD - Brigham and Women's Hospital/Harvard Medical School
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Nolan K. Wheeler, BS - Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA

Abstract :

Introduction:

Postpartum hemorrhage (PPH) occurs in approximately 5% of deliveries and can develop into severe PPH requiring transfusion in 1-2%.[1] Although tranexamic acid (TXA) improves outcomes when used to treat established PPH,[2] evidence for prophylactic TXA for cesarean delivery shows a modest reduction in estimated blood loss (EBL) and no clinically relevant difference in outcomes.[3,4] In practice, TXA is often given either immediately after delivery (prophylactic) or later in response to hemorrhage recognition/escalation (therapeutic). Real-world studies comparing TXA timing strategies are limited. We evaluated the association of prophylactic vs therapeutic TXA administration with EBL and hemorrhage interventions among cesarean deliveries complicated by PPH.

Methods:

Cesarean deliveries with PPH (EBL ≥ 1L) that received TXA within 3 days of delivery between 11/2017-05/2025 were identified across four hospitals. Baseline characteristics, EBL, products transfused, and PPH interventions (uterotonics, Bakri balloon, Jada, O'Leary, B-Lynch suture, dilation and curettage (D&C), uterine artery embolization (UAE), hysterectomy) were extracted. TXA exposure was defined as prophylactic (< 6 minutes after fetal delivery) versus therapeutic (≥6 minutes after fetal delivery). This cut point was chosen a priori to reflect real-world timing and approximate the 'immediate post-delivery' administration window used in prior cesarean prophylaxis trials.[3,4] Patients who received TXA prior to delivery were excluded. Differences in EBL and odds of transfusion and additional interventions were estimated with regression analysis adjusting for baseline covariates.

Results:

921 cesarean deliveries from 11/2017-05/2025 with PPH who received TXA were identified. 164 (17.8%) of these patients received prophylactic TXA at median time of 4 [3.0-5.0] min and 757 (82.2%) received therapeutic TXA at a median time of 18.0 [10.6-30.0] min. The prophylactic TXA group had a lower proportion of intrapartum cesarean deliveries and a higher proportion of magnesium sulfate usage, uterotonic usage (including

misoprostol, carboprost, and methylergonovine), and baseline coagulation disorder. After adjustment for these covariates, prophylactic TXA administration was not significantly associated with an adjusted mean difference in EBL (51.72 (±55.33), p=0.35), odds of transfusion (aOR 0.95 (0.58-1.56), p=0.85) or odds of additional intervention (aOR 0.96 (0.55-1.67), p=0.89).

Conclusion:

In this multicenter retrospective study of routine clinical care, prophylactic TXA (< 6 minutes from delivery time) was not associated with a decrease in EBL, transfusion, or additional intervention. These findings provide real-world evidence consistent with prior studies showing mixed effectiveness of prophylactic TXA.[5]

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Table 1. Association between prophylactic vs therapeutic TXA with EBL and PPH interventions for Cesarean delivery with PPH

Outcome	Total (N=921)	Prophylactic TXA (N=164)	Late TXA (N=757)	Adjusted Estimate/OR* (±SD) / (95% CI)	p-value
EBL	1324.5 [1138.0-1644.2]	1310.0 [1106.0-1674.0]	1327.0 [1143.5-1642.5]	51.72 (±55.33)	0.3500
Transfusion (any product)	178 (19.3%)	32 (19.5%)	146 (19.3%)	0.95 (0.58-1.56)	0.8477
Composite PPH intervention	112 (12.2%)	18 (11.0%)	94 (12.4%)	0.96 (0.55-1.67)	0.889
Bakri/Jada	12 (1.3%)	0	12 (1.6%)	---	---
O'Leary	40 (4.3%)	6 (3.7%)	34 (4.5%)	0.94 (0.38-2.33)	0.8956
B-lynch	27 (2.9%)	3 (1.8%)	24 (3.2%)	0.80 (0.23-2.76)	0.7300
Dilation & evacuation	4 (0.4%)	0	4 (0.53%)	---	---
Uterine artery embolization	4 (0.43%)	0	4 (0.53%)	---	---
Peripartum hysterectomy	35 (3.8%)	9 (5.5%)	26 (3.4%)	1.50 (0.66-3.40)	0.3330

Data presented as median [1st-3rd quartile] or n (%)
*Adjusting for uterotonic usage, intrapartum C-section, magnesium sulfate usage, baseline coagulation disorder

THURS - RA - BS 1 - BR 3 - Uterotonics and TXA – 07

Clinical Efficacy of Carbetocin as Primary Uterotonic in High-Risk Cesarean Deliveries: A Retrospective Case Series from a Brazilian Public Tertiary Center

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Co-Authors: Erika Jordao, MD - Hospital das Clinicas
Mariana Rego de Carvalho, MD - Hospital das Clinicas da Universidade de São Paulo
Gabriela T. Saba, md - hospital das clinicas da universidade de sao paulo

Abstract :

INTRODUCTION: Postpartum hemorrhage remains a leading cause of maternal morbidity. Carbetocin, a long-acting oxytocin analogue with ~40-minute half-life, eliminates continuous infusion[1], offering logistical advantages in resource-limited settings. While efficacy is established[1–3], data from public systems managing high-risk populations remain limited. We evaluated carbetocin efficacy/safety in a Brazilian tertiary center.

METHODS: Retrospective study of all consecutive cesarean deliveries (Dec 16-23, 2025, n=22) at a public hospital serving Brazilian Unified Health System. Anesthesia: spinal 77.3%(n=17), combined spinal-epidural 22.7%(n=5). Protocol: 100mcg carbetocin IV bolus post-cord clamping[2]. Primary outcome: therapeutic failure (need for additional uterotonic). Secondary: quantitative blood loss (QBL, gravimetric)[3], hemodynamics, transfusion, adverse effects[4]. [IRB pending].

RESULTS: Mean age 30.6±5.8y; BMI 28.3±11.7kg/m²; gestational age 36.7±3.4wks. Risk factors 54.5%(12/22): twins 13.6%, BMI >40 13.6%, placenta accreta 4.5%, thrombocytopenia 4.5%. Comorbidities 90.9%(20/22). Carbetocin monotherapy successful 86.4%(19/22;95%CI:72.0-100.7%), consistent with meta-analyses[5–7]. Therapeutic failure 13.6%(3/22): Case1-twins, methylergometrine, QBL 930mL; Case2-hypertension/diabetes/endometriosis/IVF, methylergometrine+misoprostol, QBL 1064mL; Case3-thrombocytopenia(77K)/anemia, methylergometrine+tranexamic acid, QBL 506mL. Mean QBL 517±270mL(median 418, range 122-1094). QBL≥1000mL: 9.1%(2/22). QBL failures 833±291mL vs success 467±238mL. Transfusions 0%. Adverse effects 0%-no nausea, vomiting, flushing, headache, chest pain[4]. Notable: focal placenta accreta managed carbetocin alone(QBL 750mL).

CONCLUSION: One-week census shows carbetocin 86.4% effective as sole uterotonic in high-risk cesareans, with zero adverse effects/transfusions[1,4–7]. Single-dose regimen offers logistical advantages eliminating infusion pumps, reducing nursing workload. However, 13.6% require rescue therapy, particularly with uterine overdistension or multiple comorbidities. Findings support carbetocin as first-line in government-funded high-risk deliveries, provided immediate second-line availability[2]. The 100% consecutive capture eliminates selection bias. Larger trials needed to identify failure predictors.

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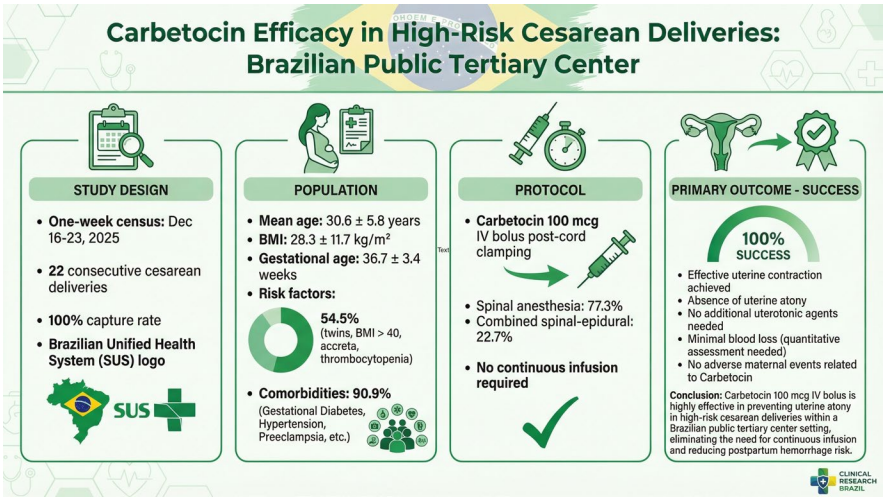

THURS - RA - BS 1 - BR 3 - Patient Voices - 01

Language-based disparities in obstetric blood transfusion: a retrospective cohort study

Presenting Author: Lauren Blake, MD, MHS

Presenting Author's Institution: Stanford Healthcare - Palo Alto, California

Co-Authors: Dominique Arce, MD, MPH - Stanford Medicine
Kelly A. Fedoruk, MD FRCPC - Quality Improvement Lead, Division of Obstetric Anesthesiology and Maternal Health Department of Anesthesiology, Perioperative, and Pain Medicine
Nan Guo, PhD - Stanford University
Natasha Harrison, MPH - Stanford University School of Medicine
Stephanie A. Leonard, PhD - Dunlevie Maternal-Fetal Medicine Center Anesthesiology, Perioperative and Pain Medicine, by courtesy

Abstract :

Background: Postpartum hemorrhage (PPH) remains one of the leading causes of preventable maternal morbidity and mortality worldwide (1). Blood product transfusion is the mainstay treatment for severe anemia secondary to PPH and is estimated to occur in 13% of patients who deliver in the US (2). While disparities in race and ethnicity in maternal transfusion practices are well documented, the impact of language within this population is underexplored. We conducted a multi-thousand patient retrospective cohort study to test the hypothesis that non-English primary language is associated with risk of maternal red blood cell (pRBC) transfusion.

Methods: This IRB-approved, single-center, retrospective cohort study included 41,019 deliveries between 2016 and 2025, comparing patients with live birth delivery who spoke English (n=31,657) versus non-English (n=9,362) as preferred language. The primary outcome was pRBC transfusion. Multivariable Poisson regression models with robust standard errors were used to estimate adjusted relative risk (aRR) for transfusion. The model was adjusted for any demographic, obstetric, or patient factor associated with the primary outcome of blood transfusion, defined by a univariate analysis p value < 0.2.

Results: Unadjusted transfusion rates between non-English and English speaking parturients appeared identical (2.9% in both groups). However, after adjustment for between group differences in gestational age, obstetric service type (university, county, or private), parity, race/ethnicity, pre-delivery hemoglobin, induction or augmentation of labor, duration of each stage of labor, mode of delivery, and PPH, non-English primary language was independently associated with increased transfusion risk (aRR 1.54, 95% CI 1.15–2.07, Table 1). Other predictors of blood transfusion which retained significance in the multivariable analysis included Asian or “Other” race/ethnicity, academic obstetric provider service, primiparity, pre-delivery hemoglobin, and PPH.

Conclusion: Non-English primary language was associated with an increased risk of pRBC transfusion in our multivariable analysis. These findings contrast with one prior study which did note an association between non-English primary language and blood transfusion but interestingly reported *lower* transfusion rates among patients with non-English primary language (3). We hypothesize that factors such as communication about symptomatic anemia among patients with borderline post-delivery hemoglobin or provider beliefs regarding post discharge iron repletion could subtly drive a lower threshold to transfuse a non-English speaking versus English speaking parturient. We will rigorously test this hypothesis in our future studies. Primary preferred language should be considered an important factor in obstetric equity, highlighting the need to further evaluate communication-related processes in hemorrhage management.

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Language-based disparities in obstetric blood transfusion: a retrospective cohort study file attachment.pdf

THURS - RA - BS 1 - BR 3 - Patient Voices - 02

Evaluation of Patient-Reported Outcomes Measurement Information System (PROMIS)-29 v2.1 for Postpartum Women

Presenting Author: Fernanda Septimio Lanza Oliveira, MD

Presenting Author's Institution: Department of Anesthesia, Mount Sinai Hospital - Toronto, Ontario

Co-Authors: Kristi Downey, MSc - Mount Sinai Hospital, University of Toronto
Janny Ke - Department of Anaesthesia, St. Paul's Hospital
Fernanda SL Oliveira, MD - University of Toronto
Pervez Sultan, MD - Stanford University School of Medicine

Abstract :

Background: The Patient-Reported Outcomes Measurement Information System(PROMIS® 29 v2.1) is a well-established, validated, self-reported scoring tool to assess patients' physical, mental and social well-being. It has been used in many populations, like older adults with chronic disease, and demonstrated its reliability and consistency to assess quality of life. We aimed to evaluate the physical and mental health of post-partum patients with PROMIS-29 v2.1.

Methodology: This single centre, longitudinal, cohort study was conducted after IRB approval from July 2025 to Jan 2026. Pregnant patients with term, singleton births who underwent vaginal delivery (VD) with neuraxial labor analgesia or scheduled cesarean delivery (CD) under neuraxial anesthesia were assessed for eligibility in their post-partum period and enrolled after written informed consent. Those who had assisted delivery, failed neuraxial anesthesia, received sedation, or general anesthesia were excluded from the study. Participants reported demographic data and completed the online surveys at defined timepoints (0, 2, 6, and 12 weeks after delivery) on REDCap. The domains of PROMIS are physical function, anxiety, depression, fatigue, pain interference, and pain intensity. The T-scores of individual domains of PROMIS were compared between the VD and CD groups. The average PROMIS T-score is 50 with a SD of 10 based on a previous validated study.[1] We also calculated Spearman correlation between PROMIS with WHO-QoL-BREF and EQ-5D-3L questionnaires.

Results: Of the 200 patients enrolled (100 each in CD and VD group), 100% completed baseline (T0) survey. Further timepoints are still being collected from participants. Individual domain scores for VD and CD groups are highlighted in attached table. The physical (PH) and mental health (MH) summary T-scores were computed from individual domains. Overall, the median T scores of postpartum patients were less than 50 (PH=34.9 (30.7-38.9); MH=43.4 (39.9-48.9)) and PH score was significantly different ($P< 0.01$), and less in women who had CD than VD. In VD group, a significant correlation ($P< 0.001$ and $r>0.5$) was observed between PROMIS scores (both PH and MH) and EQ-5D-3L score. In CD patients, only PH score correlated with EQ-5D-3L ($P< 0.01$, $r=0.35$).

Discussion:PROMIS is an easy to measure quality of life metric after childbirth. The observed lower PROMIS scores reemphasize our understanding that patients undergo a spectrum of physiological,

psychological and social changes after delivery. Though the CD group had lower physical function scores than VD, pain, anxiety, fatigue and depression domain scores were similar in both groups. By integrating qualitative patient reported domains, PROMIS can serve as a robust tool in assessing the overall well-being of post-partum women.

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PROMIS Tscore table .pdf

THURS - RA - BS 1 - BR 3 - Patient Voices - 03

Food for Thought: Patient Perspectives on Diet During Labor with Epidural Analgesia

Presenting Author: Mahathi K. Kosaraju

Presenting Author's Institution: Brigham & Women's Hospital - Dawsonville, Georgia

Co-Authors: Shelby A. Crants, MD - Mass General Brigham
Noor A. Raheel, MD, MPH - Brigham and Women's Hospital
Nicole Smith, MD, MPH - Brigham and Women's Hospital
Bushra W. Taha, MD - Brigham and Women's Hospital

Abstract :

Introduction: Many labor and delivery units in the United States (US) restrict patients with epidural (EPL) analgesia to clear liquid diets (CLD) per national guidelines to reduce aspiration risk if cesarean delivery (CD) under general anesthesia is required.[1] Limiting oral intake can cause distress[2] and aspiration is rare with contemporary techniques, so some US and European hospitals have relaxed diet restrictions.[3-4] However, few studies have explored patient experiences of hunger with these evolving practices. We hypothesized that a less restrictive low-fat diet (LFD) among patients in labor with EPL analgesia would be associated with positive patient feedback.

Methods: Our quaternary center implemented a protocol allowing a LFD for low-risk patients < 6cm dilated with an EPL. Higher-risk patients (BMI >40, hiatal hernia, symptomatic reflux, uncontrolled diabetes, severe preeclampsia, placental abruption, severe fetal growth restriction, fetal macrosomia, multifetal gestation, or category 2 tracing) received only CLD after EPL placement. From 09/2025 to 03/2026, patients are invited to complete a postpartum survey about their labor experience. Qualitative data were analyzed and relative risks (RR) calculated with a=0.05. Data collection is ongoing; results reflect a preliminary analysis after 150 patients were invited to participate.

Results: A total of 111 CLD and 22 LFD patients have completed surveys to date (see attached figure). The smaller LFD cohort reflects conservative eligibility criteria with early protocol implementation. LFD patients were 17% less likely to report hunger during labor and 29% less likely to report a desire to eat more during labor when compared with CLD patients. Participants reported that eating more may help provide energy for pushing and that a CLD would not meet the metabolic demands of labor. Many believed more nutrient-dense foods could ease hunger-related nausea and cited psychological benefits such as distraction and comfort. Experiences were highly variable and influenced by timing of EPL placement, nausea, and labor progression. Even when food was not a priority, participants valued the option to eat after EPL placement. No immediate safety concerns were identified during this period.

Conclusions: Dietary restrictions in labor remain a source of discomfort for many patients, and the option to eat, rather than eating itself, was frequently cited as valuable to support physical and emotional wellbeing during labor. Further evaluation of more liberal oral intake in labor that balances patient-centered outcomes with safety is warranted. Gastric ultrasound may help characterize the impact of intrapartum nutrition on gastric contents and guide evidence-based care.

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Food for Thought - Patient Perspectives on Diet During Labor with Epidural Analgesia Figure.pdf

THURS - RA - BS 1 - BR 3 - Patient Voices - 04

Patient-centered care during neuraxial placement and operating room preparation for cesarean delivery: allowing support people in the operating room

Presenting Author: Sebastian M. Seifert, MD

Presenting Author's Institution: Brigham and Women's Hospital/Mass General Brigham - Boston, Massachusetts

Co-Authors: Chiamaka Onwuzurike, MD, MPH - Harvard Medical School
Marika Osterbur Badhey, MD PhD - NYU Langone- Long Island
Samantha Q. Truong, MD - Boston Medical Center, Boston University School of Medicine

Abstract :

Introduction: Preparation for cesarean delivery (CD), including neuraxial anesthesia placement and operating room setup, often occurs without the presence of a support person, which may contribute to patient anxiety and psychological distress during a vulnerable time. We implemented a quality improvement (QI) initiative allowing support person presence during neuraxial placement and CD preparation and evaluated its feasibility and acceptability among interdisciplinary staff. We hypothesized that allowing support person presence during neuraxial placement and CD preparation would be feasible, well accepted by staff, and perceived to improve patient-centered care.

Methods: As a QI initiative, support persons accompanied patients brought to the operating room during scheduled and unplanned CDs. Support persons were seated in front of the patient during neuraxial placement and moved to the head of the bed prior to surgical draping, with a blanket hung for privacy (Figure 1). For general anesthesia, support persons waited outside the room. Two years following implementation (average 7,000 deliveries/year at our quaternary center), an anonymous post-intervention Likert-scale survey was distributed to nurses, obstetricians, anesthesiologists, and surgical technicians. Qualitative responses were analyzed using iterative open-coding thematic analysis by two independent reviewers.

Results: Of 364 surveys distributed, 111 responses were received (30%). Overall, 109 respondents (98%) reported being very satisfied or satisfied with the intervention, 102 (92%) perceived a positive impact on care, and 100 (90%) would recommend adoption at other institutions. Qualitative themes highlighted improved patient experience, enhanced emotional support, and alignment with patient- and family-centered care. No adverse events related to support person presence during neuraxial placement or operating room preparation were reported.

Conclusions: Allowing support person presence during neuraxial placement and CD preparation was feasible, strongly supported by interdisciplinary staff, and perceived to enhance patient-centered care. These findings support further evaluation, including patient-reported outcomes, and potential adoption in similar clinical settings.

References:

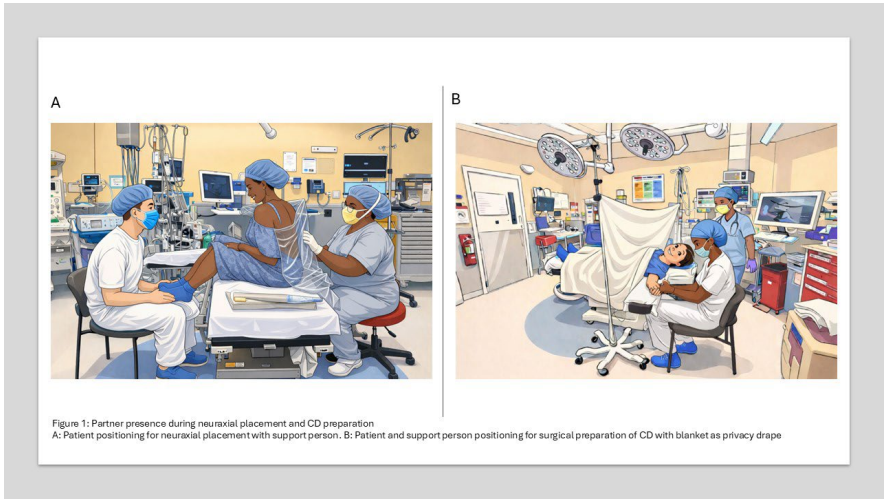

Figure 1: Partner presence during neuraxial placement and CD preparation
A: Patient positioning for neuraxial placement with support person. B: Patient and support person positioning for surgical preparation of CD with blanket as privacy drape

THURS - RA - BS 1 - BR 3 - Patient Voices - 05

Factors affecting Patient Satisfaction with Labor Pain Management: A Qualitative Analysis of Patient Interviews

Presenting Author: Bansri Doshi, MS

Presenting Author's Institution: University of California, San Francisco - San Francisco, California

Co-Authors: Alexander Butwick, MBBS, FRCA, MS - University of California San Francisco

Abstract :

Background:

Patients' satisfaction with labor pain management is shaped by complex interactions between individual preferences, communication, and health system factors, with disparities in counseling and treatment particularly affecting marginalized patients [1,2]. While labor analgesia utilization has been well studied, less is known about how decisional processes and communication influence patients' satisfaction with both pain management and decision-making. Qualitative approaches are well suited to capturing these patient-centered perspectives.

Methods:

We conducted a qualitative study to explore factors shaping decisional and outcome satisfaction with labor pain management. An interview guide was developed through an iterative process. We purposely sampled participants within 10 days of delivery at our institution, recruiting two cohorts: those reporting satisfaction and those reporting dissatisfaction with their labor pain management experience. Interviews were transcribed verbatim, and transcripts and field notes were analyzed using thematic analysis to identify key themes influencing perceptions of satisfaction and dissatisfaction.

Results:

We interviewed nine participants: eight English-speaking and one Spanish-speaking. Five were nulliparous and four were multiparous. Eight had vaginal deliveries and one had an emergent cesarean. Eight received epidural analgesia and intravenous opioids, and one received no pharmacologic analgesia. Six reported overall satisfaction with pain management, and three reported dissatisfaction.

Satisfaction with labor pain management was associated with: 1) effective pain relief methods that met expectations, 2) supportive staff who provided comprehensive pain relief options and prioritized patient autonomy, 3) access to simple and straightforward information about pain control options, and 4) maintenance of flexible expectations regarding care. The term "flexible expectations" refers to acceptance of both positive and negative outcomes of various labor pain relief methods. Dissatisfaction was associated with: 1) mismatch between expectations and experiences, particularly when pain relief methods were less effective than anticipated, and 2) poor communication with anesthesia providers, including inadequate anticipatory guidance and dismissal of pain.

Conclusions:

Preliminary findings suggest that satisfaction with labor pain management depends not only on analgesic effectiveness but also on expectation-setting, communication quality, and respect for patient autonomy. Mismatches between expectations and experience, coupled with inadequate or dismissive communication, contribute to dissatisfaction even when pain relief is provided. This work highlights the importance of anticipatory guidance and patient-centered counseling as potential targets for interventions aimed at improving decisional and outcome satisfaction in labor pain management.

References:

1. *Am J Obstet Gynecol.* 2002;186:S160–72.
2. *J. Clin. Med.* 2025;14(9), 3097.

THURS - RA - BS 1 - BR 3 - Patient Voices - 06

Patient Satisfaction and Preference Valuation in Neuraxial Labor Analgesia Across a Diverse Population

Presenting Author: Diana M. Ruiz, BS

Presenting Author's Institution: Icahn School of Medicine at Mount Sinai - Miami, Florida

Co-Authors: Yaakov Beilin, MD - Department of Anesthesiology, Perioperative, & Pain Medicine
Lucy Shang, BA - Icahn School of Medicine at Mount Sinai

Abstract :

Background: Maternal satisfaction with neuraxial labor analgesia (NLA) is multifactorial.[1] Prior studies have examined satisfaction in homogeneous, higher-income populations, leaving gaps in understanding how satisfaction and priorities related to NLA may differ in more diverse populations.[2]

Objectives: The primary and secondary objectives were to evaluate differences in patient satisfaction and patient preferences related to NLA across a diverse population. We hypothesized that overall satisfaction and anesthesia-related preferences would be similar across demographic and socioeconomic groups.

Methods: This is a cross-sectional, single-site study among postpartum patients who underwent vaginal delivery. Participants rated their satisfaction with NLA on a 0–100 scale and allocated a hypothetical $100 across 10 anesthesia-related outcomes, with higher dollar amounts indicating greater perceived importance. Demographic data were collected.

Variables of interest were dichotomized, including race/ethnicity (White non-Hispanic vs. non-White/Hispanic), annual income (> vs. ≤$52k), education (< bachelor's degree vs. ≥ bachelor's degree), insurance status (Medicaid vs. commercial), marital status, and nationality (U.S. vs. foreign-born). Statistical analyses included descriptive statistics and independent Welch's t-tests to compare satisfaction scores and preference valuations, with statistical significance set at $p < 0.05$.

Results: Of 397 patients approached, 101 met inclusion criteria. The cohort was socioeconomically diverse: 54.5% Non-White and/or Hispanic, 35.6% with income ≤$52,000, 29.7% unmarried, 32.7% Medicaid-insured, 43.6% with less than a bachelor's degree, and 26.7% foreign-born.

Overall satisfaction with NLA was high (92.8 ± 12.9) and did not significantly differ by race/ethnicity, income, education, insurance, marital status, or nationality.

Avoidance of labor pain was the highest valued outcome overall (mean value $39.8 ± 25.9) and across all demographic subgroups. Valuation of labor pain avoidance was significantly higher among White, non-Hispanic participants compared with non-White/Hispanic participants ($48.0 vs $33.0, p=0.004) and among married compared to unmarried participants ($44.3 vs $29.3, p=0.005). Valuation of labor pain avoidance did not differ significantly by income, insurance status, education, or nationality.

Conclusion: Overall satisfaction with neuraxial labor analgesia was high and did not differ significantly across diverse groups. However, patient priorities regarding anesthesia-related outcomes varied, with White, non-Hispanic and married patients assigning significantly greater value to labor pain control

compared with non-White/Hispanic and unmarried patients. These findings underscore the need for patient-centered counseling in NLA, recognizing that similar satisfaction scores may conceal important differences in patient priorities.

References: 1. Arch Gynecol Obstet. 2014;290(1):21-34
2. Anaesthesia. 2019;74(9):1112-1120

Table 1. Patient Demographics, Satisfaction With Neuraxial Labor Analgesia, and Relative Valuation of Labor Pain Avoidance

	Demographics	Overall Satisfaction		$ Value of Labor Pain Avoidance	
Variable	*Mean (SD) [Range] OR n (%)*	*Mean (SD)*	*P-value*	*Mean (SD)*	*P- value*
Total	*101 (100%)*	*92.8 (12.9)*	–	*39.8 (25.9)*	–
Race/Ethnicity					
White, Non-Hispanic	46 (45.5%)	92.9 (9.60)	0.923	48.0 (25.6)	0.004*
Non-White and/or Hispanic	55 (54.5%)	92.7 (15.3)		33.0 (24.4)	
Insurance Status					
Commercial	68 (67.3%)	93.1 (10.1)	0.803	43.1 (25.5)	0.071
Medicaid	33 (32.7%)	92.2 (17.6)		33.1 (26.0)	
Annual Household Income					
Less than or equal to $52,000	36 (35.6%)	91.1 (18.3)	0.414	35.1 (26.6)	0.181
Greater than $52,000	65 (64.4%)	93.8 (8.73)		42.4 (25.4)	
Educational Attainment					
Less than a Bachelor's Degree	44 (43.6%)	93.4 (15.7)	0.707	37.3 (25.9)	0.398
Bachelor's Degree or greater	57 (56.4%)	92.4 (10.5)		41.7 (26.0)	
Marital/Cohabitation Status					
Married	71 (70.3%)	93.7 (9.71)	0.402	44.3 (26.1)	0.005*
Unmarried	30 (29.7%)	90.7 (18.6)		29.3 (22.7)	
Nationality					
US-Born	74 (73.3%)	91.7 (14.5)	0.051	40.7 (26.1)	0.588
Foreign-Born	27 (26.7%)	95.9 (6.55)		37.5 (25.8)	

THURS - RA - BS 1 - BR 3 - Patient Voices - 07

Cesarean Deliveries under Unplanned General Anesthesia: A Qualitative Thematic Analysis of Patient Perspectives

Presenting Author: Mariah L. Johnson, BSc (Hons)

Presenting Author's Institution: Dalhousie University - Rothesay, New Brunswick

Abstract : Cesarean deliveries under unplanned general anesthesia (GA) are significant, infrequent events in obstetric care, and the patient experience in these situations is underexplored. They typically occur in the context of maternal or fetal emergencies where there is insufficient time for neuraxial anesthesia, or when planned neuraxial anesthesia is ineffective. Patients with a history of unplanned cesarean deliveries under regional anesthesia have described their challenges with poor communication, fear, distrust, and loss of control in this setting (1, 2). It is expected that patients undergoing cesarean deliveries under unplanned GA may also describe their experiences in negative terms with lasting psychological impacts, given the additional stressors involved.

The objective of this qualitative study was to identify common themes that emerge from the lived experiences of patients who underwent this event. All patients in the province of New Brunswick, Canada, who had a cesarean delivery under GA during 2024 were identified using a provincial registry (PerinatalNB). Eligible individuals were invited to take part in a semi-structured interview until thematic saturation was reached. Thematic analysis of 22 interviews revealed key themes including loss of agency, impaired bonding, mistrust, and communication gaps with healthcare providers (Table 1). Many participants explained how cesarean delivery with GA challenged their birth expectations, and they often described the experience as an unnatural or failed birth, despite acknowledging it as a life-saving intervention. Participants also highlighted the exclusion of support persons in the birth, as well as challenges in the postpartum period and the emotional burden of processing their experience.

Participants emphasized their need for thorough perioperative counselling, clear anesthetic communication, and provider reassurance before and after delivery (Table 1). Although undergoing cesarean delivery by unplanned GA is often very stressful and emotionally charged, by ensuring that patients feel heard and involved in their own care, some of the negative impacts of this event may be ameliorated.

References:

1. Birth 2016;43:346
2. Am J Perinatol 2024;41:106

Cesarean Deliveries under Unplanned General Anesthesia_A Qualitative Thematic Analysis of Patient Perspectives.pdf

THURS - RA - BS 1 - BR 3 - Pain Control - 01

Utilization of Multimodal Analgesia after Cesarean Delivery with Neuraxial Anesthesia Following Enhanced Recovery and ACOG updated Guidelines

Presenting Author: Alana Davidson

Presenting Author's Institution: Duke University School of Medicine - Durham, North Carolina

Co-Authors: Matthew Fuller, MS - Duke Anesthesiology
Vijay Krishnamoorthy, MD, PhD - Duke Univeristy
Karthik Ranghunathan, MD - Duke University Department of Anesthesia

Abstract :

Background: Cesarean delivery (CD) is the most common major surgery in the United States. A prior study in patients undergoing cesarean delivery under neuraxial anesthesia (2008-2018) reported a low uptake of opioid-sparing multimodal analgesia (osMMA, defined as neuraxial morphine with non-steroidal anti-inflammatory drugs [NSAIDs] and plain acetaminophen) of 6.1%,[1] while 58.9% of patients received neuraxial morphine, NSAIDs, and an acetaminophen-opioid combination drug. In 2021, ACOG[2] updated their guidelines on osMMA recommending against acetaminophen and NSAIDS-opioid combination preparations, which aligned with the SOAP[3] ERAC[4] and PROSPECT[5] guidelines published in 2019 and 2021. We therefore performed this study to describe the postoperative analgesic regimens utilized after CD in the period from 2018-2023 in patients receiving neuraxial anesthesia and assess factors associated with variation in osMMA uptake across hospitals.

Methods: We performed a retrospective cohort study of all women over the age of 18 who received neuraxial anesthesia for CD between 2018 and 2023 using the Premier Healthcare database (Premier Inc., USA). Mixed-effects logistic regression models were used to examine the association of demographic, clinical, and hospital characteristics, as well as time, with the use of the osMMA regimen.

Results: 564,020 patients were included in analysis. Neuraxial morphine was used in 81.2% of patients, NSAIDs in 97.2%, plain acetaminophen in 69.8%, and acetaminophen-opioid combination drugs in 44.7%. The osMMA regimen was used in 204,210 patients (36.2%), whereas a regimen of neuraxial morphine, NSAIDs and acetaminophen (including both plain and combination drugs) was used in 71.8% of patients, of which 16.3% received only the combination drugs with neuraxial morphine and NSAIDs. Use of osMMA increased over the duration of the study from under 25% in 2018 to 55% in 2023. Use of plain acetaminophen increased from just over 50% in 2018 to over 85% in 2023 (Figure 1b). Patient and hospital characteristics associated with the use of osMMA regimens are displayed in Table 1. Hospital-level variation was present (ICC = 0.54).

Conclusions: Since 2018, there is improved uptake of osMMA. However, acetaminophen-opioid combination is still commonly used, either exclusively or together with plain acetaminophen. These findings are concerning as previous work showed use of plain acetaminophen combined with NSAIDs significantly reduces overall opioid consumption without compromising postoperative analgesia. Institutional factors accounted for 54% variation in osMMA uptake.

References:

1. Reed SE, *Anesth Analg*. 2021.
2. Pharmacologic Stepwise Multimodal Approach for Postpartum Pain Management, *Obstet Gynecol*. 2021.
3. Bollag L, *Anesth Analg*. 2021.
4. Macones GA, *Am J Obstet Gynecol*. 2019.
5. Roofthooft E, *Anaesthesia*. 2021.

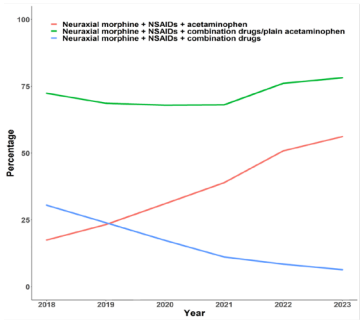

Figure 1a. Temporal trends in multimodal analgesia regimens by acetaminophen formulation, 2018–2023

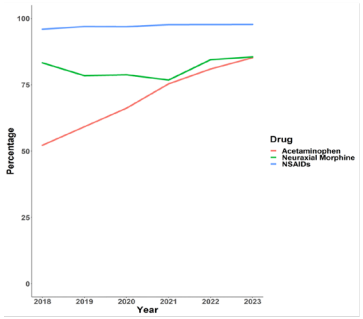

Figure 1b. Use of osMMA Components Over Time, 2018–2023

	OR	p-value
Patient Characteristics		
Age (per year)	1.00 (1.00, 1.00)	0.469
Race		
Black	1.06 (1.02, 1.10)	0.003
Hispanic	0.87 (0.85, 0.89)	<0.001
Other	0.93 (0.90, 0.95)	<0.001
Unknown	1.03 (0.99, 1.07)	0.187
White	1.0	N/A
Payor Category		
Medicaid	0.92 (0.91, 0.94)	<0.001
Medicare	0.84 (0.75, 0.93)	0.001
Other	1.05 (1.03, 1.08)	<0.001
MCO	1.0	N/A
Admission Type		
Emergency	0.88 (0.85, 0.91)	<0.001
Urgent	1.06 (1.04, 1.09)	<0.001
Elective	1.0	N/A
Trauma Center	1.24 (0.80, 1.91)	0.330
Other	1.06 (1.01, 1.12)	0.032
Hospital Characteristics		
Provider Region		
Midwest	0.70 (0.42, 1.16)	0.166
Northeast	1.65 (0.90, 3.05)	0.108
South	0.39 (0.25, 0.63)	<0.001
West	1.0	N/A
Beds		
0-99	0.82 (0.42, 1.61)	0.571
100-199	0.57 (0.32, 1.02)	0.059
200-299	0.48 (0.27, 0.86)	0.013
300-399	0.48 (0.26, 0.87)	0.016
400-499	0.44 (0.23, 0.87)	0.018
500+	1.0	N/A
Urban/Rural		
Urban	1.0	N/A
Rural	0.45 (0.29, 0.69)	<0.001
Teaching		
No	0.50 (0.34, 0.75)	0.001
Yes	1.0	N/A
Year		
2018	0.06 (0.06, 0.06)	<0.001
2019	0.10 (0.10, 0.10)	<0.001
2020	0.18 (0.17, 0.18)	<0.001
2021	0.29 (0.28, 0.29)	<0.001
2022	0.64 (0.63, 0.66)	<0.001
2023	1.0	N/A
Anesthesia Type		
Spinal	1.0	N/A
Epidural	1.29 (1.26, 1.32)	<0.001
Both	1.09 (1.05, 1.13)	<0.001

Table 1. Multivariable Model of osMMA Receipt

THURS - RA - BS 1 - BR 3 - Pain Control - 02

Effects of a Multimodal Analgesic Approach on Opioid Exposure Among Vaginal Delivery Patients: A Retrospective Study

Presenting Author: Tyler Chau, BS

Presenting Author's Institution: Creighton University School of Medicine - Holland, Michigan

Co-Authors: Skye Bakker, MD - Creighton University
Alexander Hall, PhD - Creighton University
Edward J. Hru - Creighton School of Medicine

Abstract :

Introduction: In 2019, an estimated 30% of routine vaginal delivery patients filled an opioid prescription following discharge in the United States.[1] Opioid use can lead to serious adverse events, such as persistent opioid use disorder, overdose, and opioid-related death.[2,3] To reduce opioid exposure in postpartum patients, our institution standardized order sets for vaginal delivery patients, focusing on non-opioid analgesics with a limited amount of oral opioid available for rescue. Pain management education was provided to both clinicians and patients. This study examined the difference in rate and amount of inpatient and outpatient opioid prescriptions for vaginal delivery patients at our hospital before and after order set changes were enacted.

Methods: This was a single center, retrospective study examining vaginal delivery cases at an urban, academic hospital in 2018 and 2023. Opioids were converted to oral morphine milligram equivalents (MMEs) using standard conversions.[4]

The presence or absence of inpatient opioid administration or outpatient prescription was assessed using multivariable log-binomial regression, while MMEs within patients receiving an opioid were estimated using multivariable linear regression (akin to a two-part model). The primary comparison was before and after order set implementation (2018 vs 2023). Covariates included age, BMI, primary language, ethnicity, race, and zip code-associated median household income and (for outpatient models) inpatient opioid administration.

Results: A total of 4,982 patients met inclusion criteria and were primarily white (67% 2018 vs 64% 2023, $p < .001$), non-Hispanic (69% 2018 vs 58% 2023, $p < .001$) with mean age of 35 in 2018 and 31 in 2023 ($p< .001$). Inpatient opioid administration fell from unadjusted 40.85% (95% CI [39.02,42.76]) in 2018 to 5.87% (95% CI [4.99,6.91]) in 2023 (RR: 6.96, 95% CI [5.88,8.24], $p< 0.0001$). Additionally, model-adjusted inpatient MMEs administered per patient fell by an estimated 11.11 units ($p < .001$). The interaction between inpatient prescription and order set implementation are presented in **Figure 1**.

Conclusions: The standardized multimodal analgesia order set was an effective intervention to significantly decrease inpatient and outpatient opioid exposure for vaginal delivery patients. This multimodal analgesic approach has promise in minimizing the adverse effects of opioids through reduction of unnecessary opioid use. Further study into pain scores during and after hospital stay will allow for the evaluation of the management of post-operative pain in the reduction or absence of opioid use, guiding us on any future necessary adjustments to our protocol.

References:

1. Curr Opin Obstet Gynecol. 2019;31(2):83-89.
2. JAMA Netw Open. 2019;2(7):e197863.
3. Womens Health Issues. 2021;31(4):376-383.
4. MMWR Recomm Rep 2022;71(No. RR-3):1–95.

Figure 1 SOAP Abstract 2026.pdf

THURS - RA - BS 1 - BR 3 - Pain Control - 03

Utilization of Multimodal Analgesia after Cesarean Delivery with General Anesthesia 2018-2023

Presenting Author: Alana Davidson

Presenting Author's Institution: Duke University School of Medicine - Durham, North Carolina

Co-Authors: Matthew Fuller, MS - Duke Anesthesiology
Vijay Krishnamoorthy, MD, PhD - Duke Univeristy
Karthik Ranghunathan, MD - Duke University Department of Anesthesia

Abstract :

Background: Cesarean delivery (CD) is one of the most common procedures in the US, yet postoperative pain management remains suboptimal, particularly for patients receiving general anesthesia (GA). Prior analyses of CD performed 2008-2018 showed low uptake of the recommended opioid-sparing multimodal analgesia (osMMA, defined as non-steroidal anti-inflammatory drugs [NSAIDs] and plain acetaminophen) and optimal osMMA (OosMMA, use of a local anesthetic technique such as truncal block or local anesthetic infiltration in addition to osMMA), at 8.5% and 1.6%, respectively.[1] In 2019 and 2021, the ERAS Society[2], SOAP[3], ACOG[4] and PROSPECT[5] published guidelines recommending the use of osMMA and OosMMA, creating an opportunity to explore new patterns, and specifically recommending the use of plain acetaminophen rather than acetaminophen/opioid combination drugs. The objectives of this study were to (1) describe utilization of osMMA after CD with GA (2018-2023) and (2) evaluate the proportion of patients receiving OosMMA.

Methods: A retrospective cohort study of all women aged ≥18 years who had a CD under GA between 2018 and 2023 was conducted using the Premier Healthcare database (Premier Inc., USA). Mixed-effects logistic regression models were used to examine the association of demographic, clinical, and hospital characteristics, as well as time, with the use of the osMMA.

Results: 244,047 patients were included in analysis. Most patients were White (58.0%) and non-Hispanic (70.7%). NSAIDs were used in 91.2%% of patients, plain acetaminophen in 66.8%, and acetaminophen-opioid combination drugs in 41.5% of patients. The osMMA regimen was used in 108,276 patients (44.4%) while the OosMMA regimen was used in 24,272 patients (10.0%). Local anesthetic techniques were used in 53,236 (21.8%) of patients overall, with local infiltration being the most common technique (21.1%). Use of osMMA and acetaminophen increased dramatically over the study period, while OosMMA use was relatively stable (Figure 1). Patient and hospital characteristics associated with the use of osMMA regimens in the multivariable model are listed in Table 1. Hospital-level variation was present (ICC = 0.55).

Conclusions: This observational study shows a significant increase in the use of plain acetaminophen, osMMA, and OosMMA use since 2018. While these trends are promising, the use of acetaminophen-opioid combination drugs remained high and OosMMA was stable over the studied period, likely due to the relatively constant level of use of local anesthetic techniques, which roughly only 1 in 5 patients in this cohort received. Continued education is needed to further optimize postoperative analgesia in this patient population.

References:

1. Zanolli NC, *Anesth Analg*. 2023.
2. Macones GA, *Am J Obstet Gynecol*. 2019.
3. Bollag L, *Anesth Analg*. 2021.
4. Pharmacologic Stepwise Multimodal Approach for Postpartum Pain Management. *Obstet Gynecol*. 2021.
5. Roofthooft E, *Anaesthesia*. 2021.

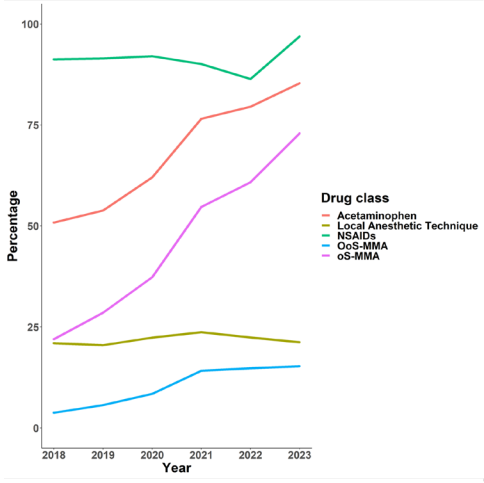

Figure 1.

	OR	p-value
Patient Characteristics		
Age (per year)	1.00 (1.00, 1.00)	0.285
Race		
Asian	0.96 (0.91, 1.02)	0.183
Black	0.89 (0.86, 0.92)	<0.001
Other	0.97 (0.93, 1.01)	0.132
Unknown	1.02 (0.97, 1.07)	0.375
White	1.0	N/A
Payor Category		
Medicaid	0.80 (0.78, 0.82)	<0.001
Medicare	0.88 (0.79, 0.99)	0.032
Other	0.92 (0.88, 0.95)	<0.001
MCO	1.0	N/A
Admission Type		
Emergency	0.94 (0.91, 0.98)	0.002
Urgent	0.95 (0.92, 0.98)	0.003
Elective	1.0	N/A
Trauma Center	0.95 (0.63, 1.44)	0.808
Other	1.76 (1.48, 2.10)	<0.001
Hospital Characteristics		
Provider Region		
Midwest	0.56 (0.33, 0.95)	0.033
Northeast	2.33 (1.19, 4.57)	0.014
South	0.30 (0.18, 0.50)	<0.001
West	1.0	N/A
Beds		
0-99	0.81 (0.40, 1.61)	0.537
100-199	0.70 (0.38, 1.29)	0.249
200-299	0.58 (0.32, 1.07)	0.079
300-399	0.54 (0.29, 1.03)	0.060
400-499	1.13 (0.56, 2.28)	0.736
500+	1.0	N/A
Urban/Rural		
Urban	1.0	N/A
Rural	0.73 (0.47, 1.16)	0.183
Teaching		
No	0.41 (0.27, 0.62)	<0.001
Yes	1.0	N/A
Year		
2018	0.04 (0.04, 0.05)	<0.001
2019	0.07 (0.06, 0.07)	<0.001
2020	0.14 (0.13, 0.15)	<0.001
2021	0.38 (0.36, 0.40)	<0.001
2022	0.50 (0.48, 0.52)	<0.001
2023	1.0	N/A

Table 1.

THURS - RA - BS 1 - BR 3 - Pain Control - 04

Intravenous methadone vs intravenous hydromorphone for analgesia following cesarean delivery under general anesthesia: a retrospective study

Presenting Author: Breta Awuku, MD

Presenting Author's Institution: Mayo Clinic - Rochester, Minnesota

Co-Authors: Ryan D'Souza, MD - Mayo Clinic
Nicole M. Lenort, RRT. - Mayo Clinic Anesthesia Research
Krishnan Ramanujan, MD - Mayo Clinic Rochester
Hans P. Sviggum, MD - Mayo Clinic

Abstract :

Introduction:

When general anesthesia (GA) is performed for a cesarean delivery (CD), postoperative pain is commonly managed with intravenous (IV) hydromorphone and/or transversus abdominus plane (TAP) blocks. Methadone is a long-acting systemic opioid studied in adult and pediatric populations for postsurgical analgesia [1]. Methadone is a mu receptor agonist and also a non-competitive N-methyl D-aspartate antagonist and prevents the reuptake of 5-hydroxytryptamine and noradrenaline [2]. A previous study found a single intraoperative IV methadone dose provided effective analgesia with an acceptable side-effect profile after CD under GA [3]. To evaluate its role alongside current enhanced recovery practices, we compared IV methadone with IV hydromorphone. We hypothesized methadone would reduce supplemental opioid requirements during the first 48 hours postoperatively.

Methods

Retrospective cohort study of patients who underwent CD under GA between January 1, 2023, through December 31, 2025. Our inclusion criteria included receipt of IV methadone or IV hydromorphone. Primary outcome was oral morphine equivalents (OME) at 0-48 hours postdelivery. Exclusion criteria included administration of neuraxial morphine; history of chronic pain, opioid use >30 OME/day, or substance use disorder; had hysterectomy or additional surgical procedures, or prolonged intubation >12 hours post-procedure. A sensitivity analysis was conducted using multivariable linear regression to assess differences in the outcome after adjusting for administration of a TAP block.

Results

There were 13 patients in the methadone group and 34 patients in the hydromorphone group. Demographic and obstetric characteristics were similar. Mean methadone dose was 15.54 (3.67) mg vs hydromorphone 1.36 (0.75) mg. Mean OME 0-48h was 46.73±54.61 mg in the methadone group vs 84.10±79.99 mg in the hydromorphone group (p-value = 0.165). Maximum PACU pain scores were significantly lower with methadone 3.23±27 compared to 6.63±2.48 in the hydromorphone group (p-value= 0.003). No significant adverse effects occurred in either group.

Conclusion

We found no difference in the primary outcome of OME 0-48 hours between patients who received methadone and hydromorphone in the setting of multimodal analgesia and enhanced recovery. However, our study may be underpowered to detect such a difference. Our results showed a significant decrease in PACU max pain score in the methadone group. Given these findings, both medications appear reasonable and effective; however, methadone may be associated with greater analgesic benefit. Further studies are needed to determine the optimum postoperative analgesic regimen in parturients requiring GA for CD.

References:

1. D'Souza R. Pain. 2020 Feb;161(2):237-243
2. Fishman S. *Pain Med*. 2002;3(4):339-48.
3. Russell T. *Int J Obstet Anesth*. 2013;22(1):47-51.

SOAP TABLE 2026.pdf

THURS - RA - BS 1 - BR 3 - Pain Control - 05

Postoperative Opioid Use and Pain After Repeat Cesarean Delivery: A Within-Patient Retrospective Cohort Study

Presenting Author: Briel Lee, MD

Presenting Author's Institution: UNC Hospitals - Chapel Hill, North Carolina

Co-Authors: Monika Nanda, MBBS, MPH, FASA - University of North Carolina
Kathleen A. Smith, MD, FASA. - The University of North Carolina at Chapel Hill
Lacey Straube, MD - UNC Hospitals

Abstract :

Background

Prior studies comparing postoperative pain and opioid consumption between repeat and primary cesarean delivery (CD) have yielded conflicting results and are limited by interindividual variability.1-4 Evaluating outcomes within the same patient may better isolate the effect of repeat surgery on postoperative analgesia outcomes. One prior study comparing primary versus repeat CD in the same patient found no difference in opioid consumption or pain scores between primary and repeat CD.5 We aimed to compare opioid consumption and pain scores between two CDs occurring within the same patients during a defined study period.

Methods

We conducted a single-center retrospective cohort study of patients who underwent two CDs at our institution between July 1, 2019, and June 30, 2025. This within-patient design allowed each patient to serve as her own control. Our institution has a standardized analgesic protocol including neuraxial morphine (0.1mg intrathecal or 3mg epidural), scheduled ibuprofen, scheduled acetaminophen, as needed lidocaine analgesic patches, and as needed oral oxycodone 5mg every 6 hours. Additional analgesic interventions including opioid escalation with oral or intravenous dosing or truncal blockades are used as needed for patients with inadequate pain control. The primary outcome was opioid consumption, measured in mg of oral morphine equivalents (OME), 48 hours after CD. Secondary outcomes included average and maximum pain scores on postpartum day (PPD) 0 and 1.

Results

Over the study period, 471 patients had two or more CDs at our institution. Only the first two CDs for each patient were included in the analysis. Patient characteristics that differed at the time of the second CD included age, weight, BMI, and anxiety. Surgical characteristics that differed included surgical duration and blood loss. Mean 48-hour opioid consumption was higher for the second CD. Average and maximum pain scores were higher on PPD1 for the second CD, with no difference observed on PPD0. Results are presented in the Table.

Conclusions

In this within-patient retrospective cohort study of individuals undergoing two cesarean deliveries during the study period, opioid use and pain scores were higher following the repeat CD. However, the clinical significance of these differences is uncertain. These findings may be useful for counseling patients about postoperative expectations after repeat CD. Additionally, this within-patient design highlights an opportunity for patients undergoing repeat CD to serve as their own controls in future studies evaluating analgesic interventions.

References:

1. Chao et al. J Clin Med 2019; 8(12):2221.
2. Duan et al. BMC Anesthesiology 2019;19(1):189.
3. Mehdiratta et al. IJOA 2020;44:60-67.
4. Yang et al. J Pain Research 2020;13:555-563.
5. Holmes et al. Can J Anesth 2024; 71(11):1518-1524.

Table.pdf

THURS - RA - BS 1 - BR 3 - Pain Control - 06

Intravenous methadone versus intrathecal morphine for analgesia following cesarean delivery: a randomized clinical trial

Presenting Author: Catherine C. Gao, MD

Presenting Author's Institution: Mayo Clinic - Rochester, Minnesota

Co-Authors: Breta Awuku, MD. - Mayo Clinic
Mingchun Liu, MD - Mayo Clinic
Rochelle Pompeian, MD - Mayo Clinic
Mark Rollins, MD, PhD - Mayo Clinic
Hans P. Sviggum, MD - Mayo Clinic

Abstract :

Background: Increased postpartum pain is associated with postpartum depression, breastfeeding difficulties, and chronic pain. [1] Intrathecal morphine (ITM) is considered the gold standard for post-cesarean analgesia but is not always feasible. Intravenous (IV) methadone is a long-lasting systemic opioid with anti-N-methyl-d-aspartate, anti-serotonin reuptake, and anti-norepinephrine reuptake effects. Retrospective studies have shown IV methadone lowers pain scores and opioid requirements when used during cesarean deliveries (CD) under general anesthesia,[2] and has been safely used in lactating patients. We aimed to determine if there is a difference in morphine milligram equivalents (MME) after scheduled CD in patients receiving 150 mcg ITM compared to 0.2 mg/kg IV methadone.

Methods: In this prospective, randomized, double-blinded pilot study of 30 patients undergoing scheduled CD, we compared postpartum MME in patients receiving IV methadone versus ITM. Exclusion criteria included chronic pain, chronic opioid use, substance use disorder, and BMI >50.0 kg/m2.

Participants in the methadone group received standardized spinal anesthesia without ITM and IV methadone (0.2mg/kg total body weight; max dose 20 mg) while participants in the ITM group received standardized spinal anesthesia with 150 mcg ITM and IV placebo. Our primary outcome was MME at 0-48 hours. Patient pain, obstetric quality of recovery (ObsQoR10), and side effects were assessed at 12, 24, 36, 48 hours, and at one-week postpartum.

Results: There were no differences in patient and procedural characteristics between the two groups. Patients in the methadone group required more opioids at 0-48 and 0-24 hours (Table 1). However, self-reported pain scores, ObsQoR10, and global health state were not

statistically different. There was no significant difference between groups in intra-operative and post-operative respiratory depression. The methadone group did have a significantly lower rate of pruritus across all timepoints ($p < 0.05$). There were no differences in pain scores, ObsQoR10, global health state, and PHQ-9 depression scale at 1 week postpartum.

Conclusion: Patients who received ITM required less opioids in the first 48 hours after CD compared to IV methadone. Although IV methadone did not appear to provide superior analgesia compared to ITM, it enabled comparable post-cesarean recovery with an acceptable side-effect profile. In patients who don't have ITM for CD, consider using IV methadone for postoperative analgesia.

References:

1. Landau R. *Int J Obstet Anesth.* 2023;54:103644.

2. Russell T. *Int J Obstet Anesth*. 2013;22(1):47-51.

Intravenous methadone versus intrathecal morphine for analgesia following cesarean delivery a randomized clinical trial .pdf

THURS - RA - BS 1 - BR 3 - Pain Control - 07

A Single-Center Feasibility Study of a Single Pain Skills Session (Empowered Relief®) for Postpartum Pain at 6 Weeks after Cesarean Delivery

Presenting Author: Aleesha Jethwa, MBBS, BMedSci, MSED

Presenting Author's Institution: Stanford - Palo Alto, California

Co-Authors: Beth Darnall, PhD - Stanford University
Guillermina Michel, B.S. - Stanford University
Nina Yen Nhi Nguyen, M.S. - Stanford University
Danielle M. Panelli, MD MS - Stanford University
Jennifer Rabbitts, MD - Stanford University

Abstract :

Introduction: Approximately 17% of patients that undergo cesarean delivery (CD) experience chronic pain, which can impact quality of life. While risk factors for chronic pain after CD have been explored, interventions to reduce chronic pain burden are limited. The primary aim of this study was to explore feasibility of a novel pain coping skills session (Empowered Relief) delivered in the outpatient setting after CD.

Methods: Following IRB approval, patients were screened at the 6 week follow up clinic. Adults were screened for pain symptoms (intensity, interference and qualitative descriptions) and those with ongoing moderate to severe pain (NRS ≥4/10) following a viable birth at any gestational age were randomized to receive virtual ER or standard follow-up. The primary outcome was feasibility (% registered and attended ER; treatment satisfaction). Secondary outcomes were change in pain interference, intensity, and catastrophizing before vs after treatment.

Results: Of 48 patients screened, 29 reported no pain, 15 had 1-3/10, and 4 had ≥4/10 pain intensity (92%; n=44 were ineligible for ER intervention). 3 eligible participants with pain ≥4/10 declined to participate due to the anticipated ER time commitment. 1 patient consented and registered for ER, however, did not attend for family reasons. The trial was terminated due to the low eligibility rate and an inability to deliver the ER intervention to sufficient patients over 3 months. Pain interference was reported by 41/48 patients (24 (59%) and 10 (24%) reporting interference >0/10 and ≥4/10, respectively). Median pain intensity [IQR] was 0 [0,3] (n=48) and median pain interference [IQR] was 1 [0, 1.25] (n=41). 17 patients (35%) reported different pain intensity scores to the obstetric clinic team vs research team, with the majority (15/17; 88%) reporting higher scores to the research team.Table 1 is a summary of reported pain intensity and pain interference scores from screened participants.

Conclusion: The main finding from this study is that the inclusion criteria comprising a moderate to severe NRS pain intensity score of ≥4/10 yielded an inadequate proportion of eligible patients for ER intervention in the 6 week follow-up clinic setting. Pain interference was frequently present despite low

pain intensity, and Electronic Health Record (EHR) pain scores were frequently under reported compared to reporting to the research team. Future studies should consider inclusion criteria based on pain interference or intensity of *any* severity rather than moderate to severe pain intensity and use standardized researcher-collected screening rather than EHR pain scores.

References:

1. J Clin Anesth 2025, 104:111832

Table 1: Matrix of pain intensity and pain interference

		Pain Intensity				Total
		None (0)	**Mild (1 – 3)**	**Moderate (4 – 6)**	**Severe (7 – 10)**	
Pain Interference	**None (0)**	16 (39.0%)	1 (2.4%)	0 (0.0%)	0 (0.0%)	17 (41.5%)
	Mild (1 – 3)	4 (9.8%)	10 (24.4%)	0 (0.0%)	0 (0.0%)	14 (34.1%)
	Moderate (4 – 6)	4 (9.8%)	3 (7.3%)	2 (4.9%)	1 (2.4%)	10 (24.4%)
	Severe (7 – 10)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total		24 (58.5%)	14 (34.1%)	2 (4.9%)	1 (2.4%)	41 (100.0%)

Table includes patients that have both pain interference and pain intensity (n=41) recorded at the same time by research team

Program Material
Saturday, May 2, 2026

Breakout Session #2 – 8:00am – 9:30am

Room 1 (McGill) - Oral Research Presentations (Breakout Rooms)

Case Reports (Breakout Rooms)
Room 2A (Ste-Helene) – Cardio Obstetric Challenges
Room 2A (Ste-Helene) – Coagulation, Hemorrhage, and Hemoglobin
Room 2B (Ste-Helene) – Ethics
Room 2B (Ste-Helene) – Critical Decisions
Room 3A (Beaver Hall) – Cesarean Delivery, Unusual Issues
Room 3A (Beaver Hall) – Misc Hematology
Room 3B (Beaver Hall) – Complex Cesarean
Room 3B (Beaver Hall) – Complex Accreta

Research Abstracts (Breakout Rooms)
Room 1 (Palais) – Hemorrhage: Transfusion
Room 1 (Palais) – Efficiency, Education, Access
Room 2 (Viger) – Refining Hemorrhage Management
Room 2 (Viger) – Leadership: Education for All
Room 3 (Ramezay) – POCUS
Room 3 (Ramezay) – PDPH

Breakout Session #3 – 3:00pm – 5:15pm

Oral Research Presentations (Breakout Rooms) - McGill

Case Reports (Breakout Rooms)
Room 1 (McGill) – Can't Do a Neuraxial
Room 1 (McGill) – Strange Conditions
Room 2A (Ste-Helene) – Pulmonary Morbidity
Room 2A (Ste-Helene) – Dilemmas in Labor
Room 2B (Ste-Helene) – Tricky Cesareans
Room 2B (Ste-Helene) – Oncology and Neuromuscular
Room 3A (Beaver Hall) – Preeclampsia and Coagulopathy
Room 3A (Beaver Hall) – Challenging Blocks
Room 3B (Beaver Hall) – Call a Consult!
Room 3B (Beaver Hall) – Blood, Platelets, Vessels

Research Abstracts (Breakout Rooms)
Room 1 (Palais) – Cardiac and Misc
Room 1 (Palais) – Potpourri
Room 2 (Viger) – High Risk and Crisis Management
Room 2 (Viger) – Rare Conditions
Room 3 (Ramezay) – Patient Voices 2
Room 3 (Ramezay) – Cesarean Delivery and other Surgery

General Anesthesia, Pain During Cesarean Delivery, and Their Intersection With Patient Satisfaction: An Exploratory Study To Help Refine General Anesthesia As a Quality Metric

Presenting Author: Kerwin Wang, BA

Presenting Author's Institution: Boston University Chobanian and Avedisian School of Medicine - Phoenix, Arizona

Co-Authors: Vesela P. Kovacheva, MD, PhD - Brigham and Women's Hospital/Harvard Medical School
Kristina Nedeljkovic - Brigham and Women's Hospital
Lawrence C. Tsen, MD - Harvard Medical School

Abstract :

Introduction:
The avoidance of general anesthesia (GA) during cesarean delivery (CD) is a key quality metric in obstetric anesthesia as defined by criteria from the SOAP Centers of Excellence, with a goal of < 5% CD rate. However, pain during CD (PDCD) has been identified as a driver of traumatic recovery, which may benefit from prompt GA conversion (1). Efforts are needed to refine GA as a quality metric, as a poor metric when it may be avoided, but a positive metric if it yields patient comfort and satisfaction. Here we report an exploratory study comparing pain during CD under neuraxial anesthesia, GA during CD, and their interplay. We hypothesize high heterogeneity and poor associations between PDCD, use of GA, and recovery experience, suggesting that the patient's decision-making and recovery should define the nature of GA as an outcome metric.

Methods:
After IRB exemption, this quality initiative evaluated all CDs at our institution from January and February 2024. Patients reporting PDCD on their postpartum check and all patients who received GA were identified. Qualitative characteristics preceding the CD and during recovery were captured to evaluate representative scenarios for GA and PDCD.

Results:
Of 193 total CD cases identified, 26 fit criteria for analysis: 14 (14/193, 7%) received GA and 12 (12/193, 6%) experienced PDCD with neuraxial anesthesia. Among GA cases, indications were heterogenous and included contraindication to neuraxial, obstetric/bleeding emergency, pain prior to incision, and PDCD(Table). Of patients reporting PDCD who did not receive GA, there was no consistent correlation with poor satisfaction. Indeed, despite experiencing PDCD *without* conversion to GA, 8 (67%) and 3 (25%) patients reported moderate to high satisfaction, respectively.

Discussion:

Closely analyzing contemporary cases of PDCD, use of GA, and patient experience at our center, we demonstrate true heterogeneity. Our findings confirm the likelihood that the interpretation of GA as quality metric in obstetric anesthesia may be classified as positive or negative based on patient experience, recovery, and reported satisfaction. To enhance quality provided and reported, preoperative counseling about risks and benefits of neuraxial versus GA, management options for inadequate anesthesia, and patient autonomy in requesting GA can be emphasized. The high satisfaction rate (92%) among patients experiencing PDCD who did not convert to GA suggests that pain alone does not determine patient experience, rather communication and appropriate management may mitigate negative outcomes. Heterogeneity in our findings suggests that patients have room for choice when pain during CD occurs, and GA may be warranted. If a patient opts for GA, documentation can characterize GA as a quality marker rather than suboptimal management.

References:

1. Callihan P et al, Int J of Obst Anesth 2025

Table Figure SOAP 2026.pdf

Intraoperative Pain During Cesarean Delivery and Perinatal Mood and Anxiety Disorders

Presenting Author: Rachel Pinkhasov, BS

Presenting Author's Institution: Mayo Clinic Alix School of Medicine - Rochester, Minnesota

Co-Authors: Leslie Carranza, MD - Mayo Clinic
Rachel Pinkhasov, BS - Mayo Clinic Alix School of Medicine
Hans P. Sviggum, MD - Mayo Clinic

Abstract :

Background:
Pain during cesarean delivery (PDCD) under neuraxial anesthesia is a distressing complication associated with adverse psychological sequelae and is a leading cause of anesthesia-related maternal litigation.[1] Although PDCD has been linked to acute distress and post-traumatic stress symptoms, its relationship with perinatal mood and anxiety disorders (PMAD), including postpartum depression (PPD) and postpartum anxiety (PPA)), remains incompletely characterized.[2] We hypothesized that patients experiencing PDCD would be at increased risk of PPD and PPA.

Methods:
We conducted a retrospective observational study comparing postpartum outcomes among patients who reported experiencing PDCD and those who denied intraoperative pain. Patients were asked on postpartum day 1 if they had PDCD and then maternal, obstetric, and anesthetic outcomes were collected from the medical record. Primary outcomes included diagnoses of PPA and PPD. Secondary outcomes included incidence of PDCD, pain scores, and adjuvant treatment. Associations were assessed using Fisher's exact tests, with odds ratios (OR) reported.

Results:
PDCD was reported by 31 out of 169 patients (18.3%). Patients who experienced intraoperative pain had significantly higher odds of PPA (OR 2.90, $p = 0.022$) and PPD (OR 2.81, $p = 0.034$) compared with those who didn't. Patients with PDCD reported substantially higher pain scores, with a mean (SD) of 6.0 (3.0), compared with a mean score of 0.0 (0.0) in those without PDCD. A prior history of anxiety was more common in the intraoperative pain group (OR 2.83, $p = 0.017$), whereas a history of depression was not (OR 2.13, $p = 0.065$).

Conclusions:
PDCD was significantly associated with increased odds of PPD and PPA. These findings suggest that PDCD may represent an important and potentially modifiable risk factor for PMADs and highlight the need for targeted postpartum follow-up and mental health screening in affected patients.

References:

1. Anaesthesia 2018; 73:223–230.

2. Anesth Analg 2024; 139:1156–1158

	Control group N=138		Pain Group N=31		
Primary Maternal Outcomes					
PPA Diagnosis	22	15.9%	11	35.5%	OR 2.90, P 0.022
PPD Diagnosis	20	14.5%	10	32.3%	OR 2.81, P 0.034
Anxiety History	63	45.7%	22	71%	OR 2.83, P 0.017
Depression History	44	31.9%	16	51.6%	OR 2.13, P 0.065*
Demographics					
Average maternal age	32		30		
Average Gestational age	37.3		37.3		
Average Gravidity/Parity	G3P2		G3P2		
Cesarean Urgency					
Scheduled	40	29%	8	25.8%	OR 0.85, P 0.83*
Routine	40	29%	5	16.1%	OR 0.47, P 0.18*
Urgent	52	37.7%	15	48.4%	OR 1.55, P 0.31*
Emergent	6	4.3%	3	9.7%	OR 2.36, P 0.37*
Anesthetic Techniques					
Spinal	81	58.7%	15	48.4%	OR 0.66, P 0.32*
Dural-Puncture Epidural	25	18.1%	10	32.3%	OR 2.15, P 0.089*
Combined Spinal-Epidural	25	18.1%	3	9.7%	OR 0.48, P 0.42*
Epidural Top-Up	5	3.6%	3	9.7%	OR 2.85, P 0.16*
Conversion to general	6	4.3%	6	19.4%	OR 5.28, P 0.0098
Surgical Data					
Estimated Blood Loss	842		1027		
Transfusion within 24 hours	5		0		
Surgery Duration (hours)	1.3		1.5		
Neonate Outcomes					
Stable	107	77.5%	19	61.3%	OR 0.46, P 0.11*
Initial PPV, then stable	4	2.9%	4	12.9%	OR 4.95, P 0.030
NICU	26	18.8%	8	25.8%	OR 1.50, P 0.44*
Deceased	1	0.07%	0	0.0%	
APGAR Score 1 minute	7.4		7		
APGAR Score 5 minutes	8.5		8.4		
Average neonate weight	3.2		3.2		
Length of Stay Average	7.0		9.9		
Length of Stay Median	3		3		
Other Maternal Outcomes					
Maternal Length of Stay	2.7		3.2		
Readmissions	6	4.3%	4	12.9%	
*Non-significant					

Intraoperative Pain During Cesarean Delivery – A Survey of Practice in Centers of Excellence (COE), as designated by the Society for Obstetric Anesthesia and Perinatology (SOAP)

Presenting Author: Jace R. Battrell, MD, MSMP

Presenting Author's Institution: Northwestern University Feinberg School of Medicine - Chicago, Illinois

Co-Authors: Adithya Bhat, MD - Northwestern University Feinberg School of Medicine
David T. Monks, MB ChB - St. Vincent's University Hospital
Kaitlyn E. Neumann, MD, MEd - Northwestern University Feinberg School of Medicine

Abstract :

Background:
Intraoperative pain during cesarean delivery (IPCD) under neuraxial anesthesia has an incidence of approximately 17% and can have serious psychological sequelae[1] Despite guideline recommendations for intraoperative pain assessment,[2] inconsistent practices undermine meaningful quality improvement (QI) efforts, increase medicolegal risk, and erode trust within the obstetric anesthesia community. Accordingly, this study sought to broadly characterize how centers document and manage intraoperative pain during CD to define the scope of current practices and inform future QI endeavors.

Methods:
Following IRB exemption, a cross-sectional survey was distributed to medical directors or division chiefs of obstetric anesthesiology divisions at SOAP COE in North America. Data were collected over a two-month period and subsequently analyzed.

Results:
Of the 71 eligible respondents, 25 completed the survey (35% response rate). More than half of these institutions (52%) reported no institutional requirement for intraoperative pain documentation; among those that did, documentation was predominantly free-text and lacked standardization. Routine, proactive assessment of pain during CD was uncommon (< 10%), with most institutions (82%) relying on unsolicited patient complaints rather than structured assessments. The majority of these institutions (65%) reported having no formal protocols for intraoperative pain management, instead deferring treatment decisions to individual clinician judgement. Furthermore, 71% of institutions did not maintain databases to track intraoperative pain, and 76% did not routinely analyze its incidence. In contrast, 76% of respondents expressed support for the implementation of mandatory pain assessment and documentation standards for SOAP COE.

Discussion:
This study has identified a critical gap in obstetric anesthesiology practice: the lack of a standardized approach to the assessment and documentation of intraoperative pain during CD. This survey further

reveals substantial heterogeneity in documentation infrastructure and management protocols, suggesting that intraoperative pain events may be underrecognized and underreported. Collectively, these deficiencies constrain meaningful benchmarking across SOAP COE. Notably, most respondents endorsed the establishment of mandatory pain assessment and documentation standards, reflecting broad acknowledgement of the need for systematic change. Future efforts should prioritize the development of minimum documentation standards and the integration of electronic medical record-based assessment tools.

References:

1. Anesthesiology 2025; 143(1): 156-167
2. American Society of Anesthesiologists. *Statement on Pain During Cesarean Delivery*. 2023.

Pressure experience during cesarean delivery: risk factors, management, and patient satisfaction

Presenting Author: Scott Kelly

Presenting Author's Institution: Columbia University Vagelos College of Physicians and Surgeons - New York, New York

Co-Authors: George Ghafari, BS - Columbia University Irving Medical Center
Jean R. Guglielminotti, MD, PhD - Columbia University Irving Medical Center; Department of Anesthesiology
Sascha Morris, BS - Columbia University Vagelos College of Physicians and Surgeons
Stephanie Wong, BA - Columbia University Vagelos College of Physicians and Surgeons

Abstract :

Introduction:
Studies on sensations experienced during cesarean delivery (CD) have primarily focused on pain, assuming “pressure is normal”, and there has been recent attention not to dismiss patients reporting pressure.[1] Pressure may indeed induce a distressing sensory experience with potential implications for intraoperative management and patient satisfaction, though robust data is currently lacking. We decided to specifically characterize intraoperative pressure and associated risk factors among patients who did not report pain. We hypothesized that moderate or severe pressure would be associated with increased analgesic administration and lower satisfaction compared to no or mild pressure.

Methods:
We conducted a prospective observational study among patients undergoing CD under neuraxial anesthesia (May – Nov 2025). Within 48 h after CD, patients completed a 23-question survey assessing intraoperative experiences, including intensity of pain and pressure (none, mild, moderate, severe) at all time points. Obstetric, anesthetic, and patient-related factors were extracted from medical records. Patients reporting pain were excluded from analysis. The primary outcome was moderate or severe pressure. Risk factors for moderate or severe pressure as well as its association with supplemental analgesic administration and patient satisfaction were analyzed.

Results:
Of 1005 enrolled patients, 940 (93.5%) did not report any pain and were included in the analysis. Of these, 67 (7.1%) reported severe pressure, 268 (29%) moderate pressure, 457 (49%) mild pressure, and 148 (15.7%) no pressure (Table 1). Risk factors for moderate/severe pressure included patient-reported lack of communication regarding what to expect (OR 2.94 [1.19-7.22]), emergency CD (OR 2.04 [1.16-3.60]), and anxiety (OR 1.52 [1.03-2.26]). Hispanic ethnicity was associated with lower odds of moderate/severe pressure (OR 0.43 [0.32-0.58]), while anesthetic technique (spinal, CSE, epidural) and tubal ligation were

not. Moderate/severe pressure was associated with increased intravenous analgesic administration (17.6% vs 7.3%, p< 0.001) and lower satisfaction with anesthesia care (80% vs 91% “very satisfied”, p< 0.001) compared to no/mild pressure.

Discussion:

One third of patients experienced moderate/severe pressure which was associated with increased analgesic administration and lower satisfaction, confirming our hypothesis that “it’s not just pressure,” even when patients did not report experiencing any pain. We identified several actionable risk factors (lack of communication about what to expect and anxiety) that suggest a tailored approach and better preparedness could influence patients’ intraoperative experience and satisfaction with anesthesia care.

References:

Int J Obstet Anesth 2025;65:104828

Table 1.pdf

Intrathecal dexmedetomedine and visceral sensations and pain during cesarean delivery: a prospective patient-reported outcome study

Presenting Author: George Ghafari, BS

Presenting Author's Institution: Columbia University Irving Medical Center - New York, New York

Co-Authors: Jean R. Guglielminotti, MD, PhD - Columbia University Irving Medical Center; Department of Anesthesiology
Scott Kelly - Columbia University Vagelos College of Physicians and Surgeons
Sascha Morris, BS - Columbia University Vagelos College of Physicians and Surgeons
Stephanie Wong, BA - Columbia University Vagelos College of Physicians and Surgeons

Abstract :

Introduction:
The rate of patient-reported pain during cesarean delivery (PDCD) is 4.4-8.9% with spinal/CSE anesthesia.1 Neuraxial α2-agonists are proposed to reduce PDCD.2 Visceral sensations (pressure/tugging) have not been characterized in recent studies.[1,3] We evaluated both visceral sensations and pain, hypothesizing intrathecal dexmedetomidine (ITdex) is associated with less intraoperative pain and pressure and lower analgesic supplementation during CD.

Methods:
This prospective observational survey study enrolled patients with scheduled/urgent CD under spinal/CSE anesthesia (May-Nov 2025). Within 24-48h after CD, patients answered 23 questions evaluating whether they had felt pain or pressure/tugging (none, mild, moderate, severe) at different time points during CD. Other data were extracted from EMR. ITdex (or clonidine) was added to standard spinal dose at the discretion of the anesthesia team. Outcomes were visceral sensations described as pressure/tugging and pain, defined as moderate or severe (reported at any time point). Secondary outcomes were analgesic supplementation (including general anesthesia). Comparison of “ITdex” vs. “no ITdex” groups used Fisher’s exact, Chi-2, or Wilcoxon tests. Adjusted odds ratios were calculated using propensity score adjustment (Table 1).

Results:
There were 701 patients enrolled; 441 cases were elective (62.3%) and 260 were not (37%) (Table 1). There were no baseline differences between “ITdex” (n=139) vs “no ITdex” (n=562). ITdex dose ranged from 2-5 μg with most receiving 4 μg (68.4%). Pressure rate was 35.3% (n=248) and pain rate was 2.3% (n=16). Preoperative factors associated with ITdex were repeat CD, placenta previa, tubal ligation. Surgical duration was longer and blood loss higher in cases with ITdex. Pressure rate was reduced with ITdex (36.3% to 31.7%, adjusted OR 0.62 (95% CI: 0.40, 097)) but not pain. Analgesic supplementation was not significantly different with or without ITdex (12.1% with vs 10.8% without), with conversion to GA

in 3 cases (all without ITDex).

Discussion:
In this large cohort of patients with scheduled to emergent CD, ITdex had a statistically significant yet modest effect on moderate to severe visceral sensations, defined as pressure or tugging at any time point. The incidence of pain was low (2.3%), with no measurable reduction with ITdex. Since patients receiving ITdex were presumed to be at risk for prolonged surgery (which was the case), it is possible that its effect is masked due to confounding by selection. This suggests that ITdex may attenuate sensations in clinical scenarios with anticipated prolonged duration and more pronounced visceral traction (e.g. tubal ligation). Further randomized clinical trials evaluating sharp pain and visceral sensation are needed, though these will preclude inclusion of urgent/emergent complex cases.

References:

1. Anesthesiology 2025; PMID 41284721
2. Int J Obstet Anesth 2025; PMID 40199022
3. Anaesth Crit Care Pain Med 2024; PMID 37865217

Intrathecal dexmedetomedine and visceral sensations and pain during cesarean delivery.pdf

Analysis of Adjuvant Medication Use During Cesarean Delivery Under Neuraxial Anesthesia

Presenting Author: Tauras Vucianis, BS

Presenting Author's Institution: UCCOM - Cincinnati, Ohio

Co-Authors: Elizabeth Lopez, BS - UCCOM
Nedas Semaska, BS - UCCOM

Abstract :

Introduction:
Intraoperative pain during cesarean delivery under neuraxial anesthesia occurs in up to 17% of patients and can adversely affect maternal psychological well-being. When neuraxial anesthesia (NA) is inadequate, intravenous (IV) adjuvant medications can be administered as part of patient-centered care. The ASA Committee on Obstetric Anesthesia includes adjuvant medication use during CD as a suggested quality metric, but evidence guiding best practice is limited. We examined the frequency and patterns of IV adjuvant use during CD under NA at an academic medical center.

Methods:
We retrospectively reviewed CDs at a single academic center (Jan-Dec 2023), comparing cases with and without adjunct medication. Collected data included maternal demographics, obstetric, and anesthetic details. Categorical variables were analyzed using chi-square; continuous variables used two-sample t-tests. After excluding cases with dexmedetomidine < 30 μg, we compared: BMI, race, interpreter requirement, psychiatric diagnosis, pre-eclampsia on magnesium, chorioamnionitis, prior CD count, surgical length, quantitative blood loss, APGAR scores, and time of day. For labor epidurals converted to CD, we also compared LA bolus amount, number of labor LA boluses, and epidural infusion duration before CD.

Results:
A total of 716 CD performed under NA were reviewed. 236 cases (33%) required intraoperative adjuvant medications, while 480 (67%) did not. Epidural cases (n=235) required greater use of adjuvants (90 cases, 38%) compared to cases under spinal or combined spinal-epidural (n=481) (146 cases, 30%), χ^2 = 4.51, p=0.034. The most common IV adjuvants were fentanyl (45%) and dexmedetomidine (38%). Most variables did not differ significantly between groups (ASA class, labor status, urgency, in-room provider, attending specialization). In the analysis excluding dexmedetomidine < 30 μg (Adjunct n=125; control n=179), adjunct use was more common in English-speaking patients (8.8% vs 20.7%, p=0.003) and cases with a higher mean QBL (876 vs 768 mL, p=0.031). Among labor epidural cases converted to CD, a higher number of LA boluses during labor was associated with adjunct administration (2.19 vs 1.28,

p=0.017). In a subset of cases with documented APGAR scores, there was no observed difference in APGAR scores between adjuncts and non-adjuncts; full-cohort APGAR analysis is ongoing.

Conclusion:
33% of CD under NA required intraoperative adjuvant medications. IV fentanyl and dexmedetomidine were most frequently used. Adjunct medication was more commonly used in patients with epidural anesthesia vs spinal anesthesia. Adjunct use was associated with higher QBL, English-speaking patients, and a higher number of labor epidural boluses among labor epidural conversions. These findings add to the evidence surrounding IV adjuvant use during CD.

References:

1. American Society of Anesthesiologists. Statement on Pain During Cesarean Delivery. asahq.org

2. Anesthesiology 2025;143:156-167

Associations between patient preferred language and real-time reported pain experienced during cesarean delivery

Presenting Author: Alyson Sato, BS

Presenting Author's Institution: University of Illinois College of Medicine at Chicago - Chicago, Illinois

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Abstract :

Introduction:
Maternal pain experienced during cesarean delivery may contribute to maternal distress during and post-delivery (1). Real-time communication is crucial for recognizing and promptly intervening when patients experience pain during the procedure; however, non-English speakers are often excluded from research in this area (2). Our study examined whether there is an association between patient language preference and maximum reported pain during cesarean delivery.

Methods:
We conducted a retrospective chart review of patients who underwent cesarean delivery at a large, urban, academic training hospital. Cesarean deliveries between 04-01-2025 and 11-15-2025 were included. Patient demographics included language preference documented in their chart, delivery characteristics, and the patient's maximum pain score during the procedure. Maximum pain score was grouped into none (0/10), mild (1-3/10), moderate (4-6/10), and severe (7-10/10). Descriptive and bivariate analyses were conducted. Patients who did not prefer speaking English were provided a translation phone during the cesarean procedure.

Results:
We included 343 patients who had cesarean deliveries. Mean maternal age was 29.80 ± 5.93 years, mean gestational age at delivery was 37.95 ± 2.76 weeks, English was the preferred language for 86.41%, 10.60% preferred Spanish, 1.63% preferred Arabic, and 1.36% another language. Patients who initiated the delivery under general anesthesia and those with emergent cesarean deliveries were excluded, as they were not provided a translation phone during the procedure. Race and ethnicity were not associated with the maximum pain score. When grouped as English versus other languages, no difference in max pain score was observed [X^2 (3)=1.82, p=.61]. Preferred language was associated with the type of cesarean section [X^2 (2)=10.92, p < .01], where rates of urgent cesarean section were double for women reporting English as their preferred language as compared with women reporting they preferred any other language.

Discussion:

Language was not found to be associated with reported pain for women undergoing cesarean delivery under neuraxial anesthesia. Our findings show that with the use of a translation phone, language barriers may not prevent communication of patient pain experienced during cesarean section. Further research is needed to understand how language relates to the type of cesarean procedure, whether routine or urgent.

References:

1. Eur J Pain 2022; 26:219
2. JAMA Netw Open 2023; 6:e2322743

A Descriptive Study of Retrospective Data to Define the Incidence and Severity of Intraoperatively Recorded Pain Scores in Patients Undergoing Cesarean Delivery Under Neuraxial Anesthesia

Presenting Author: Heather Nixon, MD

Presenting Author's Institution: University of Illinois at Chicago - Deerfield, Illinois

Co-Authors: Nakia M. Hunter, MD - University of Illinois Chicago (UI Health)
Rachel Waldinger, MD, MPH - University of Illinois at Chicago

Abstract :

Background:
Intraoperative pain during cesarean delivery (PDCD) is one of the most common complications in obstetric anesthesiology. Recent prospective and meta-analysis studies using postpartum patient reported PDCD indicate the incidence is 11-33%. Currently, no data exists regarding real-time patient CD pain scores. This study utilizes intraoperatively recorded pain scores (0-10 scale) during CDs to define the incidence and severity of pain during CD.

Methods:
Billing records for singleton Cesarean Delivery from Jan 2023 – Aug 27th 2025 at UIC Health System were hand searched by three of the authors to verify study inclusion and extract details regarding provider documented pain scores during CD. Extracted data included patient demographics, neuraxial techniques employed, highest pain scores recorded, and surgical activity at the time of highest pain score. Only cases with at least 2 pain scores recorded were included. If details of cases were unclear, a second reviewer was consulted for consensus.

Results:
An overall number of 1475 cases were reviewed and 183 were excluded (144 records did not contain intraoperative pain scores, 35 utilized GA from onset of case, 4 were not CD cases) leaving a total of 1292 records for analysis. 1259 cases had at least two intraoperative pain scores recorded and from data extraction 33 more cases had indicators of intraoperative pain including notes indicating pain, conversion to GA for pain or notes addressing treating pain. Of the 1291 cases analyzed 838 (64.91%) reported no pain, 150 (11.62%) reported Mild Pain (1-3), 181 (14.02%) Moderate Pain (4-6), 87 (6.74%) Severe and 35 (2.71%) had notes regarding pain but no pain number indicated. Overall, 35% of patients experienced some sort of pain during CD. When IT catheters and patients with no numerical pain scores were removed from the dataset, the rates of preexisting labor catheters to de novo surgical anesthesia were 43.9% and 55.9% in the No pain category, 53.02% and 46.97% in the Mild Pain category, 58.62% and 41.37% in the Moderate Pain category and 55.95% and 44.04% in the Severe Pain category.

Discussion:

Our study, using protocolized recorded intraoperative pain scores during CD cases showed an intraoperative pain incidence of 35%. Our data also delineates the severity of pain, with most patients having pain that is mild to moderate. The data did not support previous findings that preexisting labor epidural catheters have a much higher rate of intraoperative pain although there was a trend of higher epidural catheter use in the more severe pain categories. The overall number of patients with intraoperative pain is much higher than previous studies and may lend evidence to having systems that monitor and record pain intraoperatively to more accurately assess it.

References:

1. O'Carroll et al, Anesthesiology, 2025

Self-Reported Pain, Pressure, and Satisfaction During Cesarean Delivery in Patients with Spanish as Preferred Language

Presenting Author: Stephanie Wong, BA

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Abstract :

Introduction:
Barriers to communication are associated with poorer outcomes and patient satisfaction, though there is limited data on the impact of preferred spoken language on intraoperative pain and satisfaction with its management during cesarean delivery (CD).[1-3] We evaluated self-reported pain, pressure, and satisfaction during CD among English- and Spanish-speaking patients, hypothesizing that Spanish-speaking patients are more likely to experience higher pain or pressure and lower satisfaction.

Methods:
In this prospective patient-reported outcome study conducted in 2025, patients undergoing a CD under neuraxial anesthesia completed a survey within 48h post-CD. English-speaking patients (Group E) completed the survey in English, and Spanish-speaking patients (Group SP) completed it in Spanish with access to an interpreter. Primary outcomes were pain and pressure/tugging severity during CD (defined as none/mild, vs moderate/severe). Secondary outcomes were satisfaction with pain/pressure management, importance of perceived patient-provider ethnic concordance, and overall satisfaction. Outcomes were assessed using Fischer exact or χ^2 tests.

Results:
There were 1,005 patients enrolled, with 268 (26.7%) in Group SP. Group SP was younger, less anxious, and more likely to have a scheduled repeat CD with spinal (Table 1). Language was not associated with any level of pain (mild, moderate, or severe) during CD (5.6% SP vs 6.5% E) but Group SP was more likely to answer not needing any medication. Incidence of any pressure was lower in Group SP vs E (78.4% vs 87%), with no difference in proportion needing medication. Among those reporting pressure, moderate to severe pressure was less common in Group SP vs E (74/210 (35.2%) vs 295/641 (46%); P=0.006). Overall satisfaction with pain management and difficulty communicating with anesthesia team were similar between groups, as was total or partial patient-provider ethnic concordance as perceived by

the patient (30.2% SP vs 31.6% E). A significant proportion of Group SP considered ethnic concordance with the anesthesia team to be important (39.2% vs 19.6% Group E; P< 0.001). Ethnic concordance was also important to patients who felt any pain regardless of language (39.7% vs 23.7% no pain; P=0.012).

Discussion:
Overall, the incidence of pain was low in this cohort (6.3%), incidence of pressure was high (84.7%), and satisfaction was high (85.4%). Contrary to our expectation, Spanish-speaking patients experienced overall less frequent and less severe pressure despite expected language barriers. Our findings might be explained by higher rate of scheduled CD with spinal anesthesia and lower history of anxiety. More studies are needed to further evaluate communication with non-English speaking patients and setting expectations when it comes to visceral sensations separate from pain during CD.

References:

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2. *Anaesthesia* 2025; PMID 40050931
3. *Anesthesiology* 2025; PMID 41284721

Self-Reported Pain, Pressure, and Satisfaction During Cesarean Delivery in Patients with Spanish as Preferred Language.pdf

SAT - ORP - BS 2 - BR 1 - Oral Research Presentations – 10

Intraoperative pain during cesarean delivery and impaired quality of recovery: a retrospective cohort study.

Presenting Author: Darragh O'Reilly, MBBS, MSc, FCAI

Presenting Author's Institution: BC Women's Hospital, University of British Columbia - Vancouver, British Columbia

Co-Authors: Elise Hindle, MBChB, BSc (Med Sci), FRCA, FRCPC, RAF (retired) - BC Women's Hospital, University of British Columbia
Kaitlin Nelson, BSc, MSc - Women's Health Research Institute, BC Women's Hospital, University of British Columbia

Abstract :

Introduction:
Cesarean delivery (CD) is among the most common surgical procedures worldwide. Despite neuraxial anesthesia being the preferred technique, patient-reported intraoperative pain occurs in 11–22% of cases.[1] Physician assessment often underestimates pain, emphasizing the need for patient-reported measures.[2] The Obstetric Quality of Recovery Score (ObsQoR-10) is a validated patient-reported outcome measure assessing functional recovery after CD.[3] However, the relationship between intraoperative pain and ObsQoR-10 scores within 24 hours of post-CD remains unclear. This study aims to evaluate patient-reported survey data to explore a relationship between intraoperative pain and low ObsQoR-10 scores.

Methods:
After local REB approval was obtained, our team began retrospectively reviewing survey data routinely collected as part of our tertiary teaching hospital's quality assurance (QA) initiative, launched in November 2025. QA data (ObsQoR-10 score and intraoperative pain questions) are collected 24h postpartum through an electronic survey platform securely stored on REDCap. Patients aged 19 years and older who underwent cesarean delivery at ≥37 weeks' gestation are invited to complete the survey. For research purposes, we excluded the following subjects: history of substance use disorder, general anesthesia used as the primary anesthetic technique, neonatal admission to the neonatal intensive care unit or stillbirth, and those with incomplete survey responses or multiple entries.

Results:
Preliminary analysis for 22% (n=110) of our intended sample size (n=500) revealed an intraoperative pain incidence of 6.4% (n=7). ObsQoR-10 scores (median [IQR]) were lower in patients experiencing intraoperative pain (63 [57–74]) compared to those without pain (72 [64–85]). (Figure 1) The estimated median difference was −8 points (95% CI −19 to 2, p=0.18).

Discussion:
Our data revealed ObsQoR-10 scores to be lower in patients with intraoperative pain in comparison to those without, but that difference was not found to be statistically significant. At the current data collection

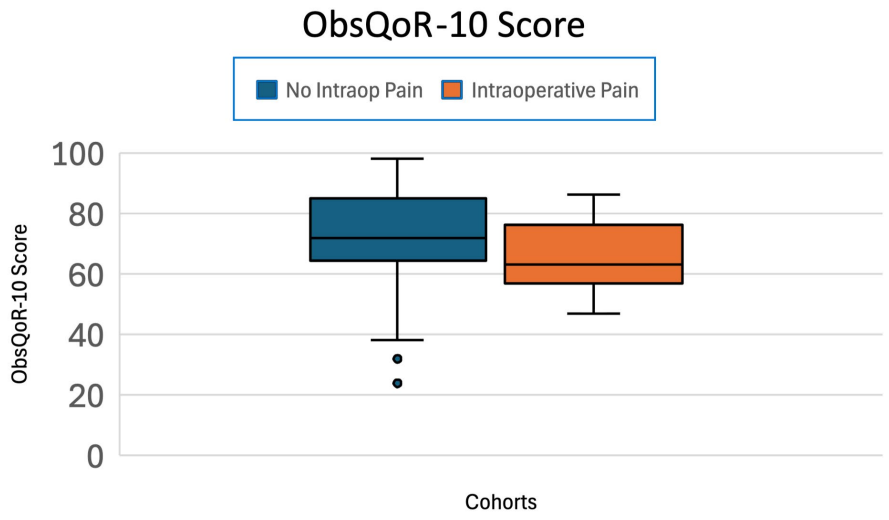
rate, we expect to have results for 250 subjects ready to be presented at SOAP 2026, including adjustment for confounders and analysis of individual items of the ObsQoR-10 potentially affecting the overall score.

References:

1. Anesthesiology. 2025;143(1):156-167

2. Eur J Pain. 2022;26(1):219-226

3. J Clin Anesth. 2020;63:109781



SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 01

Reflections on 2 high-risk cardio-obstetrical patients

Presenting Author: Ali Mubarki, MD

Presenting Author's Institution: Mcgill university - Montréal, Quebec

Co-Authors: James Lawson, MD, PhD, BSc - McGill University

Introduction:
With the advancement in medical care, increased maternal age, and multiple comorbidities, the high-risk cardio-obstetrical patients are more prevalent and account for the foremost cause of maternal mortality in high-income countries, with Canada reporting an 8% rate. The literature cites an increase in indications and use of peripartum ECMO.

Case One:
29 yo, G1P0, previously healthy, presented at 37+ 5 w GA with sudden onset of dyspnea. Investigations revealed de novo severe heart failure with LVEF 15–20% and moderate mitral regurgitation, suggestive of peripartum cardiomyopathy. An urgent cesarean delivery was performed under carefully titrated epidural anesthesia. A peripherally inserted central catheter (Picc line) was placed before surgery, whereas the arterial line and ExtraCorporeal Membrane Oxygenation (ECMO) catheters were placed in the operating room, before performing the neuraxial anesthesia. The procedure went uneventfully; the patient needed Norepinephrine during and immediately after the case, but no ECMO. Two weeks postpartum, the patient was discharged with an EF 30%, asymptomatic.

Case Two:
38 yo, G4P2A1, obese, stable multiple sclerosis, with placenta praevia, and suspected of accreta, presented at 25 w GA with preterm premature rupture of membranes and dyspnea with orthopnea: the echocardiography shows severe biventricular systolic dysfunction with LVEF 10%, pulmonary hypertension sPAP 46 mmHg, and severe mitral regurgitation. Due to the gravity and urgency of the clinical deterioration, with increased lactate and need for hemodynamic support with inotropes and vasopressors, the patient underwent emergent cesarean delivery under general anesthesia. Central triple lumen catheter, arterial line and ECMO femoral lines were placed before the induction of general anesthesia. The procedure was uneventful, and the patient was extubated at the end of the case; 2 weeks postpartum EF was still 10%, therefore, a PM/ICD was installed, and at 30 days, the patient was discharged home.

Discussion:
A multidisciplinary team was involved in each case. Cardiac risk stratification tools (mWHO, CARPREG) were used. Individualized treatment and strategic plans were made based on patients' cardiac lesions, pregnancy and fetal status, following the who-what-when-where-how delivery framework. We chose VA precannulation ECMO for both of our cases; we did not have to initiate the ECMO therapy. Both patients

were safely decannulated in the postpartum period; no complications related to the ECMO lines were reported We reflect on the decision-making process regarding the precannulation vs. standby ECMO. We choose based on predictability + reversibility + time -to-rescue criterias. There are no guidelines yet.

References:

1. J Obstet Gynaecol Can. 2011 Oct;33(10):1020-30.

2. Circulation. 2023 Mar 14;147(11):e657-e673.

3. Can J Cardiol. 2021 Dec;37(12):1886-1901.

4. Eur Heart J. 2018 Sep 7;39(34):3165-3241.

SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 02

Anesthetic Considerations of Cardiomyopathy in the Peripartum Period

Presenting Author: Emma L. Stoltz, MD

Presenting Author's Institution: University of Kansas Medical Center - Kansas City, Kansas

Introduction:
As medicine advances, the demographics of parturients continues to evolve with an increase in age and co-morbidities. Acquired cardiac conditions is no exception to this trend. Peripartum cardiomyopathy (PPCM) is associated with high rates of morbidity and mortality. Physiological changes in pregnancy make PPCM difficult to diagnose and necessitates unique considerations in terms of treatment and delivery planning.

Case One:
A 32-year-old G4P1021 at 36w6d with a PMH of short interval pregnancy, obesity (BMI 43), anxiety, LGA presented to an outside hospital with SOB, hypoxia, tachycardia, and was found to have LVEF 20-25%, severe MR, mod to severe TR. She was transferred to our institution for higher level of care. A day after arrival, she went into spontaneous labor and underwent urgent c-section (CS). An arterial line was placed for hemodynamic monitoring and a central line for large bore access. The CS under epidural anesthesia was uncomplicated and she was transferred to the cardiac ICU. On postoperative day one she had worsening SOB. A pulmonary artery catheter was placed with elevated filling pressures and low cardiac index. She was treated with IV diuresis and milrinone. On postoperative day 7 she was able to be discharged on GDMT and apixaban. Despite medical management of her PPCM, her condition continued to worsen. A repeat echo around 4 weeks post operatively showed severely reduced ejection fraction with worsening of TR. Ultimately, she underwent LVAD implantation and TV repair 2 months after delivery. Unfortunately, she has not shown any recovery of her heart function with LVAD placement. She is currently being evaluated for cardiac transplantation.

Discussion:
Although delivery planning is highly individualized, vaginal delivery is preferred route of delivery for stable patients with cardiomyopathy. However, in unstable patients or severe cases requiring CS, epidural anesthesia is superior to general anesthesia for c-section1. In this subset of patients, delivery would ideally be after 32 weeks for fetal considerations if achievable3. With patients in cardiogenic shock, early intervention with advanced therapies such as IA balloon pump/LVAD/ECMO should be considered early due to findings of decreased LVEF recovery with prolonged ionotropic/pressor support2,3.

References:
1. American College of Obstetricians and Gynecologists. (2019). Obstetrics and Gynecology 133(5): e320-e356.

2. Mehta, L. et al. (2020). Circulation 141(23): e884-e903.

3. Sliwa, K. et al. (2025). Lancet 406(10518): 2483-2493.

SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 03

Peripartum anesthetic considerations for patients with high-risk congenital heart disease

Presenting Author: Braydon M. Bak, MB BCh.,BAO

Presenting Author's Institution: Duke University Hospital - Durham, North Carolina

Introduction:
Congenital heart disease (CHD) is the most common cardiovascular condition in pregnancy.1 The modified World Health Organization (mWHO) classification stratifies maternal risk from class I (lowest) to class IV (pregnancy strongly discouraged). Class III–IV conditions should be managed with a multidisciplinary team at a level IV maternal care center.2 We present a case highlighting anesthetic considerations for high-risk CHD in pregnancy.

Case One:
A 31-year-old G2P0 with CHD (dextrocardia, double outlet right ventricle with pulmonary atresia, right-sided aortic arch, hypoplastic right ventricle, atrial and ventricular septal defects, Fig. 1) underwent surgical repairs in infancy, including septal defect closures, right ventricle-pulmonary artery (RV-PA) conduit complicated by moderate stenosis, and Glenn procedure. Baseline transthoracic echocardiogram (TTE) showed left ventricular ejection fraction (LVEF) 30–35%, right ventricular systolic pressure (RVSP) 43 mmHg, and mild–moderate mitral regurgitation (MR). At 35 weeks' gestation, she presented with worsening heart failure and breech presentation. Admission workup revealed elevated BNP, pulmonary edema on chest x-ray, and repeat TTE demonstrating LVEF 25%, RVSP 63 mmHg, and moderate–severe MR. Additional history included sinus node dysfunction with fractured transhepatic atrial pacemaker lead, asthma, and T5–T12 spinal instrumentation. After two days of diuresis, cesarean delivery was performed. The anesthetic plan included preinduction radial arterial line and peripherally inserted central catheter for vasopressor/ionotropic support, asynchronous pacemaker mode, and intraoperative TTE. Multiple ultrasound-guided combined spinal-epidural (CSE) attempts were unsuccessful, necessitating general anesthesia. Induction and delivery were well-tolerated; oxytocin and methylergonovine were administered with 500mL blood loss. Intermittent pacemaker capture caused bradycardia and hemodynamic instability during uterine manipulations, requiring repeated epinephrine boluses. She was extubated postoperatively, transferred to intensive care on an epinephrine infusion (weaned by postpartum day one), and discharged on postpartum day five with a healthy newborn.

Discussion:
CHD in pregnancy requires individualized anesthetic management. In this case, invasive monitoring and intraoperative TTE helped achieve hemodynamic goals for Glenn physiology with severe left ventricular dysfunction, RV-PA conduit stenosis, and moderate-severe MR—maintaining preload and contractility while minimizing pulmonary vascular resistance. Sequential CSE was planned for hemodynamic optimization. Oxytocin boluses, carboprost, and methylergonovine require caution in patients with CHD.3

Multidisciplinary planning and comprehensive understanding of patient-specific physiology are essential for safe peripartum care in this high-risk population.

References:

1. J Am Coll Cardiol. 2021;77:1778–1798.

2. Circulation. 2017;135:e50–e87.

3. Anesthesiology. 2021;135:164–183.

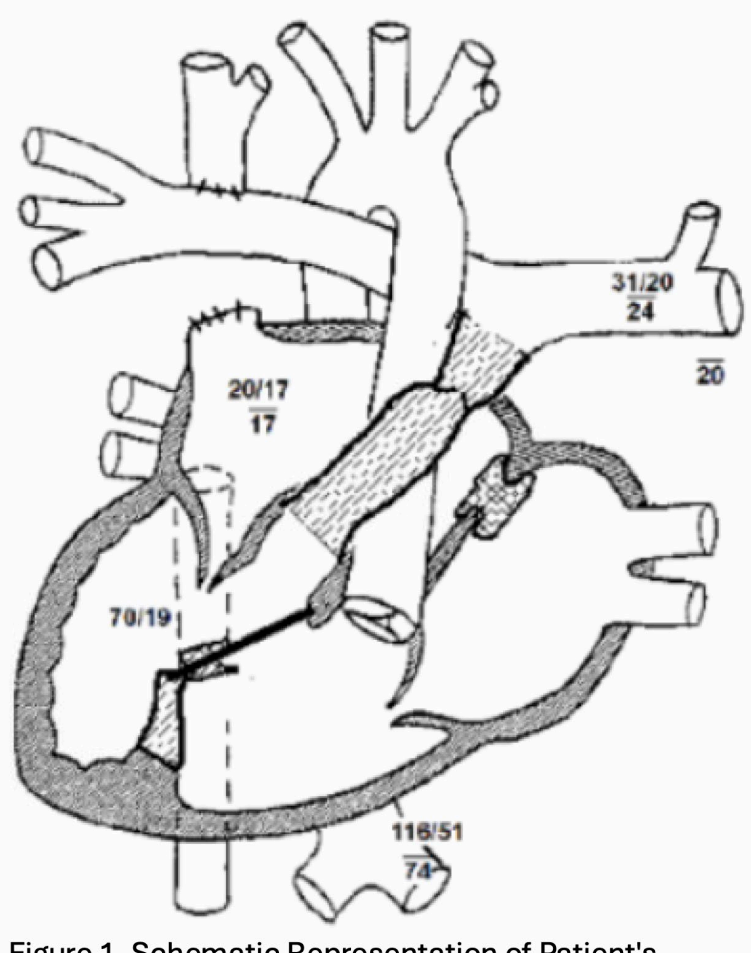


Figure 1. Schematic Representation of Patient's Congenital Heart Disease with Surgical Modifications

SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 04

Anesthetic Management of a Parturient with Co-arctation of Aorta and Noonan Syndrome Undergoing Cesarean Section: A Case Report

Presenting Author: Ashka V. Surve, MBBS, MD

Presenting Author's Institution: University of Texas Medical Branch Galveston - Galveston, Texas

Co-Authors: Ryan Griffin, MD - University of Texas Medical Branch
Taha Mohamad - Texas A&M University College of Medicine Bryan, Texas

Introduction:
Advances in the management of congenital heart disease have allowed many patients to survive into childbearing age. It occurs in approximately 0.4–0.9% of newborns, with more than 85% surviving into adulthood [1]. Coarctation of the aorta is narrowing of the aorta near the ductus arteriosus and occurs in approximately 1 in 10,000 live births [2,3]. Noonan syndrome is caused by germline variants affecting the Ras/Mitogen Activated Protein Kinase pathway, and is associated with congenital heart disease, sometimes coarctation of aorta, cardiomyopathy, renal, intracranial, lymphatic, pulmonary and learning disability and abnormal bleeding [4,5]. Narrowing of aorta may result in upper extremity hypertension, left ventricular hypertrophy, or heart failure [6,7]. We report a case of a parturient with Noonan syndrome and coarctation of the aorta.

Case One:
A 22-year-old primi gravida at 39 weeks' gestation with coarctation of the aorta, status post stenting at ages 4 and 8, hypertension, Noonan syndrome, asthma and learning disability presented for delivery. Whole exome sequencing identified a monoallelic LZTR1 mutation consistent with Noonan syndrome. Cardiology recommended heart rate control and avoidance of tachycardia. Transthoracic echocardiography showed mild mitral stenosis, increased left ventricular mass with preserved ejection fraction, and a 25-mmHg gradient across the aortic stent; cardiac imaging confirmed re-coarctation without. A cesarean section was planned to minimize hemodynamic stress. A combined spinal–epidural with low-dose intrathecal bupivacaine (10.5 mg), fentanyl (15 mcg) and morphine (150mcg) and epidural backup was performed with invasive monitoring. Despite discrepant invasive and non invasive systolic pressures, mean arterial pressure correlated and surgery proceeded uneventfully. A healthy neonate was delivered and recovery was uncomplicated, and postpartum angiography showed no new aortic changes.

Discussion:
Coarctation of the aorta in pregnancy increases maternal and fetal risks due to elevated blood volume and cardiac output, predisposing to aortic rupture, dissection, hypertension, and impaired distal perfusion [1,8]. Hemodynamic shifts may worsen diastolic dysfunction, pulmonary edema, or heart failure [8]. Anesthetic management focuses on tightly controlled hemodynamics, distal perfusion, and avoidance of abrupt afterload changes [1,8]. Neuraxial anesthesia, preferably combined spinal–epidural, allows gradual

dosing, while only spinal or general anesthesia carries hemodynamic risks [1,3,9]. Serial echocardiography is recommended, and vaginal delivery is preferred, though cesarean rates remain high in untreated cases [3,10].

References:

1.J Obstet Anaesth Critic Care 2018,8:54

2.Cardiol Rev Epub 2025

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5.AHACirculation 2023,147:657

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7.Diagnostics 2023,13(13):2189

8.Am J Med Genet 1998,80(2):160

9.Rev Esp Cardiol 2011,64:1045

10.J Clin Anesth 2017,37:176

SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 05

Early Recognition and Anesthetic Implications of Pericardial Effusion in Pregnancy

Presenting Author: Kayla M. Walker, BS

Presenting Author's Institution: Wake Forest University School of Medicine - Crofton, Maryland

Co-Authors: Zachary Anderson, DO - Wake Forest Baptist Medical Center
John Thomas, MD - Wake Forest University School of Medicine

Introduction:
Pericardial effusion with early tamponade during pregnancy is rare and can pose significant anesthetic risks, especially when compounded by preeclampsia and complex cervical spine pathology [1]. Early detection and multidisciplinary planning are essential to optimize both maternal and fetal outcomes.

Case One:
This case describes a 27-year-old G1P0 patient at 34 weeks and 5 days who was found to have new-onset preeclampsia and a large circumferential pericardial effusion with early tamponade physiology. She presented with new-onset hypertension and a persistent cough lasting over one month following a respiratory illness. Her medical history was notable for congenital platybasia with prior C1-C2 fusion and cervical syringomyelia, creating a predicted difficult airway. The patient underwent a pericardiocentesis prior to delivery with the removal of 600 mL of serosanguinous fluid and placement of a pericardial drain. She then developed severe chest pain, prompting reassessment. Transthoracic echocardiography (TTE) showed no evidence of rapid reaccumulating of the effusion. Based on clinical assessment of maternal cardiac stability, fetal considerations, and worsening preeclampsia, the decision was made to proceed with delivery. Obstetric anesthesia planning emphasized early epidural placement, avoiding general anesthesia if possible, and preparedness for an awake intubation if needed during an emergent cesarean delivery. Given the patient's complex spine pathology, including syringomyelia, neurosurgery was consulted and deemed there to be no contraindication to neuraxial anesthesia. The patient was able to have an uncomplicated cesarean delivery without any airway compromise. Physicians attributed the pericardial effusion to viral pericarditis with colchicine treatment postpartum.

Discussion:
This case highlights the importance of early cardiac imaging, pre-delivery pericardial drainage, and proactive anesthetic planning in pregnant patients with pericardial effusion and an anticipated difficult airway. For obstetric anesthesiologists, early epidural placement, multidisciplinary coordination, and contingency planning for airway management are critical to reducing morbidity in high-risk cardiac and neurologic conditions during pregnancy.

References:
1. Romagano MP, Patel K, Williams S, Apuzzio JJ. Evaluation and treatment of cardiac tamponade in a

pregnant patient. Case Rep Obstet Gynecol. 2020;2020. doi:10.1155/2020/8703980

SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 06

Anesthetic Management of a Patient with Rheumatic Heart Disease Undergoing Cesarean Delivery

Presenting Author: Tyler Austin, MD

Presenting Author's Institution: University of Nebraska Medical Center - Omaha, Nebraska

Introduction:
The anesthetic management of pregnant patients with cardiopulmonary disease can be challenging, especially when other comorbidities are present. Of the cardiac pathologies, rheumatic heart disease is unique in that it tends to present earlier in life with multiple valvular lesions, resulting in 250,000 deaths per year worldwide [1]. Here, we present the anesthetic management of a patient with rheumatic heart disease (RHD) complicated by anti-phospholipid antibody syndrome (APLAS).

Case One:
A 32-year-old G3P1011 woman at 37 weeks gestation presented for scheduled repeat Cesarean delivery. Her history included severe mitral regurgitation and moderate mitral stenosis secondary to RHD, focal epilepsy, and APLAS with prior stroke on therapeutic enoxaparin. The timing, method of delivery, and anesthetic plan were discussed in the antepartum period between Maternal-Fetal Medicine, Cardiology, Cardiothoracic Surgery, and Obstetric Anesthesiology. Regarding the patient's anticoagulation, her last dose was over 24 hours before hospital presentation. Upon arrival, two large-bore peripheral intravenous catheters and a radial arterial line were placed in the preoperative holding area. The patient was then transported to the operating room, where a lumbar epidural was placed, and neuraxial anesthesia was achieved with a slowly titrated epidural until a sensory block was present up to the T4 dermatomal level. An uncomplicated Cesarean section was performed, and at the conclusion of the procedure, the patient was transported to the cardiovascular intensive care unit for overnight monitoring. Therapeutic enoxaparin was resumed 24 hours following epidural catheter removal. The patient was discharged home on postpartum day 2.

Discussion:
Cardiac disease can present challenges in the anesthetic management of a pregnant patient, especially given the significant physiologic changes that occur in the peripartum period. Understanding appropriate management of these high-risk patients is important as cardiovascular disease is the leading cause of maternal mortality in the developed world [2]. While neuraxial anesthesia with a spinal anesthetic is commonly used for Cesarean section, it can result in significant hemodynamic changes with onset. In patients with valvular lesions, especially mixed pathology with opposing hemodynamic goals, epidural anesthesia can be beneficial for the more gradual onset of sympathectomy. Additional comorbidities, such as APLAS requiring therapeutic anticoagulation, pose further challenges. This case demonstrates one method for the successful anesthetic management of a pregnant patient with multiple comorbidities, including cardiac disease. Furthermore, as discussed in previous literature [3], our case emphasizes the

importance of multidisciplinary care planning in the antepartum period.

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SOAP case report mitral valve.pdf

SAT - CR - BS 2 - BR 2A - Cardio Obstetric Challenges – 07

Anesthetic Management for the Pregnant Patient with a Moderate-sized Right Ventricle Pericardial Effusion

Presenting Author: Lucas Steele, MD

Presenting Author's Institution: The Ohio State University - Columbus, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center

Introduction:
Pericardial effusion can be a normal and isolated finding in pregnancy without observed clinical effects. However, the differential for pericardial effusion in pregnancy must include more serious possibilities, such as infection, rheumatological causes, and vascular conditions. Most pregnancy-related pericardial effusions resolve following delivery. Given the hemodynamic changes associated with pregnancy, it is critical to understand their associated implications and ensure proper monitoring and follow-up.

Case One:
A 23-year-old G2P1 at 39 weeks with a past medical history of prior shoulder dystocia complicated by clavicular fracture and neonatal hypoxic-ischemic encephalopathy presented for elective cesarean section. She had developed dyspnea early in pregnancy and was found to have an elevated ESR and positive rheumatoid factor. Further workup revealed a moderate pericardial effusion (Figure 1) around the right ventricle with a maximum size of 2cm and normal biventricular size and function. Given her lab findings, rheumatology suspected the effusion to be associated with rheumatoid arthritis, though she lacked peripheral joint symptoms and had a normal CRP. Her effusion and symptoms ultimately remained stable throughout pregnancy. She underwent a successful, reduced-dose CSE with 1 mL of 0.75% in 8.25% bupivacaine in dextrose, 100 mcg PF morphine, and 15 mcg of fentanyl. She was monitored throughout the case with standard plus non-invasive hemodynamic monitoring. Her cesarean was uneventful with an uncomplicated postpartum course. She was discharged on post-op day 2 in stable condition with unchanged symptoms. Repeat 3-month echocardiogram revealed a stable small to moderate sized effusion around the right ventricle and her shortness of breath was resolved.

Discussion:
This case notably shows the typical pattern observed with pericardial effusions in pregnancy – shortness of breath that appears as the pregnancy progresses. Fortunately, this patient had stable echocardiographic findings throughout and following pregnancy. A positive RF and ESR makes a rheumatological cause possible but is unclear. Anesthetic management for this patient focused on maintenance of preload, avoidance of bradycardia, and maintenance of SVR – typical goals for spinal anesthesia in obstetric patients. Phenylephrine infusion was initiated following administration of the spinal to minimize hemodynamic fluctuations. Given her symptom stability, it was felt that non-invasive continuous hemodynamic monitoring was appropriate as it allowed for SVR monitoring and more directed

volume therapy.

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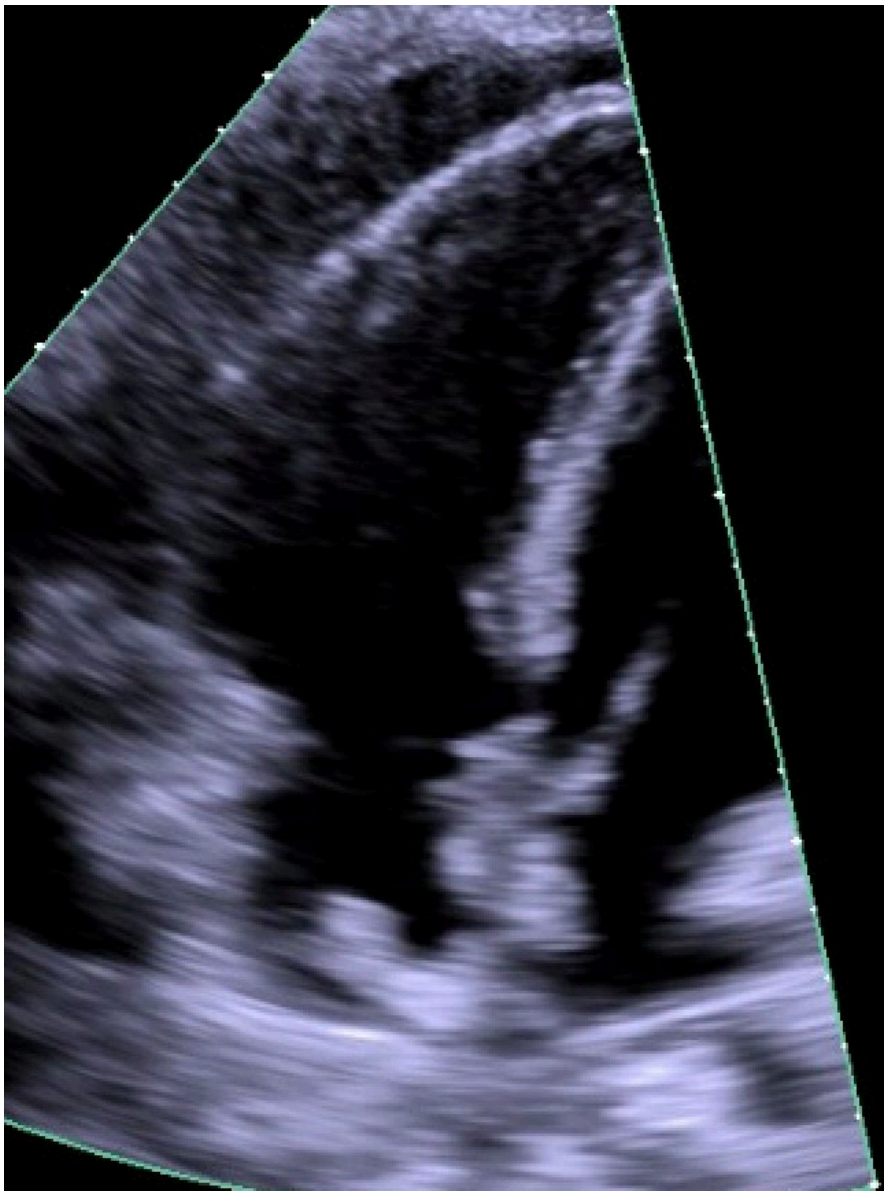

Successful Embolization of Spontaneous Uterine Artery Rupture Following Vaginal Delivery

Presenting Author: Haylee Bergstrom, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Introduction:
Spontaneous uterine artery rupture is a rare but potentially fatal obstetric complication requiring rapid recognition and intervention. Diagnostic delays are common due to variable clinical presentation, and few reported cases have been successfully managed with uterine artery embolization (UAE) (1,2). We report a case of postpartum uterine artery rupture following spontaneous vaginal delivery successfully treated with bilateral UAE.

Case One:
A 26-year-old G3P2012 with gestational diabetes mellitus presented at 39w1d for induction of labor. Course was uncomplicated, resulting in spontaneous vaginal delivery with estimated blood loss of 250 mL. One hour postpartum, she developed acute hypotension with blood pressures of 50s/30s mmHg confirmed by arterial line. Obstetric emergency team was activated. Point-of-care testing revealed hemoglobin 8.9 g/dL (from 11.9 g/dL) and lactate 3.5 mmol/L. Obstetric evaluation demonstrated a firm uterus with minimal clot and pelvic ultrasound showed a thin endometrial stripe. Focused assessment with sonography revealed a small volume of right upper quadrant free fluid. Bedside cardiac ultrasound was unremarkable. Given persistent vasopressor requirement without an identified bleeding source, she received 1 unit (U) packed red blood cells (PRBC) and was transferred to surgical intensive care unit (SICU). Computed tomography angiography revealed active uterine extravasation prompting emergent interventional radiology consultation and activation of massive transfusion protocol. She required norepinephrine up to 40 mcg/min and received 6U PRBC, 5U fresh frozen plasma (FFP), 1U platelets, and 5 packs cryoprecipitate prior to intervention. Angiography demonstrated extravasation from the left uterine artery, and bilateral UAE was performed. Intraoperative transfusion totaled 9U PRBC, 9U FFP, 3U platelets, and 10 packs cryoprecipitate. Vasopressors were weaned, and she was transferred intubated to the SICU in stable condition. She was extubated on postpartum day (PPD) 2 and transferred back to labor and delivery. On PPD 4, she developed a new oxygen requirement with elevated brain natriuretic peptide (1241 pg/mL). Echocardiography showed moderate global left ventricular systolic dysfunction with ejection fraction (EF) 35-40%. Guideline-directed medical therapy was initiated and she was discharged on PPD 7 with normalization of biventricular systolic function (EF 55%).

Discussion:
Spontaneous uterine artery rupture is a rare but life-threatening cause of postpartum hemorrhage, often presenting as hypovolemic shock with acute anemia and abdominal pain (1,3). While management has traditionally included emergent laparotomy, UAE offers a uterus-sparing alternative (2). This case

underscores the importance of early multidisciplinary collaboration and consideration of radiologic intervention in cases of unexplained postpartum shock to enable timely diagnosis and definitive hemorrhage control.

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SAT - CR - BS 2 - BR 2A - Coagulation, Hemorrhage, and Hemoglobin – 02

When Expectations Mislead: Anchoring Bias in Postpartum Hemorrhage

Presenting Author: Margaret L. Lund, MD

Presenting Author's Institution: University of Kentucky - Lexington, Kentucky

Introduction:
Thromboembolic disease remains a significant cause of maternal morbidity and mortality, with a prevalence of 0.5-2 per 1000 pregnant patients and accounting for 10% of maternal deaths (1). Patients with additional thromboembolic risk from coagulopathy or preeclampsia require close monitoring and appropriate prophylaxis(2). However, it is critical to avoid anchor bias, since other peripartum complications can have similar presentations. (3)

Case One:
A 33-year-old G3P1011 at 34w5d was admitted from clinic with increasing LFTs. Her pregnancy had been complicated by gestational hypertension, IVF pregnancy, maternal obesity, and history of prior Cesarean section. Her family history was significant for a sister who died from an unprovoked pulmonary embolism following Cesarean delivery and was posthumously diagnosed with an MTHFR mutation. Our patient tested positive for the same mutation, but she denied any history of abnormal coagulation. During admission, she developed a headache and right upper quadrant tenderness and underwent an uncomplicated repeat Cesarean delivery. Her PACU course was uneventful, and she was discharged with a heart rate of 94 and blood pressure of 118/59. 2 hours after delivery, she developed dyspnea, chest pain, and significant hypotension. Oxygen saturations remained 100% on room air, but she became progressively tachycardic. She responded briefly to boluses of pressors and was stabilized on a phenylephrine infusion. Per obstetrician examination, the uterine fundus remained firm with a small clot on ultrasound and no significant vaginal bleeding. Given our new concern for PE in the setting of family history and clinical presentation, a CTPE was ordered and MICU consulted for admission in the setting of hemodynamic instability. En route to CT, she decompensated further, with MAPs dropping to 40s despite increasing pressor support. Plans for CT scan were delayed and repeat bedside ultrasound demonstrated significant intrauterine clot burden. MTP resuscitation was initiated with improvement in vitals, and she returned to the OR for D&C. Resuscitation was guided by TEG and coagulation studies, with a final estimated blood loss of 4L. Postoperatively, her vitals remained stable; all symptoms resolved, and her recovery was otherwise uneventful.

Discussion:
Although thromboembolic disease is a significant clinical concern in the postpartum period, especially in patients known to be at elevated risk, postpartum hemorrhage remains the leading cause of maternal morbidity and mortality. Anchor bias, given this patient's family history and initial clinical presentation, could have had a devastating impact had prompt re-evaluation with bedside ultrasound not been performed when the patient's clinical status changed. Maintaining a broad differential diagnosis and

performing a thorough investigation is essential to avoid missing life-threatening complications.

References:

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SAT - CR - BS 2 - BR 2A - Coagulation, Hemorrhage, and Hemoglobin – 03

Anesthetic Considerations in an Obstetric Patient with Hemoglobin Casper Complicated by Moyamoya

Presenting Author: Damon Wallace, MD

Presenting Author's Institution: University of Michigan - Ann Arbor, Michigan

Co-Authors: Mario Belfiglio, MD, MS - University of Michigan

Introduction:
Hemoglobin Southampton (Casper) is a rare unstable hemoglobinopathy where a single point mutation disrupts the tertiary hemoglobin structure and leads to chronic hemolysis requiring chronic transfusions(1-2). Moyamoya disease is a cerebrovascular condition due to narrowing arteries around the circle of Willis and development of collateral vessels, increasing risk for ischemic stroke and intracranial hemorrhage(3). Moyamoya syndrome is associated with hemoglobinopathies including hemoglobin Southampton(4-6). Literature regarding anesthetic management of Moyamoya in pregnancy is sparse(7-9). Strict blood pressure control is necessary to avoid ischemic and hemorrhagic stroke. The preferred method and timing of delivery remain a subject of debate, with case reports showing a variety of anesthetic techniques. No anesthesia literature specifically exists in the subset of pregnant Moyamoya patients with hemoglobinopathies.

Case One:
A 21-year-old G1P0 with transfusion-dependent hemoglobin Southampton complicated by Moyamoya with recurrent strokes status post splenectomy and cerebral revascularization surgery. She initially presented at 32 weeks 4 days gestation for preoperative anesthesia consultation with plans for a vaginal delivery. Recommendations at that time included an early epidural to reduce pain and avoid hyperventilation and hypertension, which would alter cerebral perfusion pressures. If a cesarean section were required, recommendations included an arterial line and sequential combined spinal epidural to avoid large hemodynamic changes. She subsequently presented at 37 weeks 0 days gestation with acute right-sided pulmonary embolisms necessitating a therapeutic heparin infusion. A scheduled cesarean section was favored to decrease total time off anticoagulation and to reduce risk of hemorrhage if a prolonged labor course led to an unscheduled cesarean section. Given the new contraindication to neuraxial anesthesia, the Cesarean section was performed under general anesthesia with an arterial line. The heparin infusion was discontinued 1-hour prior to incision and restarted 1-hour post-operatively. The case proceeded without complications or stroke.

Discussion:
There were multiple complex anesthetic considerations for this patient. She was not a candidate for neuraxial anesthesia due to her pulmonary embolism and need for therapeutic anticoagulation. Her Moyamoya disease with previous stroke and surgical revascularization history necessitated careful blood

pressure management during induction and maintenance of general anesthesia. Lastly, her hemoglobin Southampton disease required careful blood product planning and coordination with our blood bank and hematology colleagues.

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3. Lancet Neurol 2022;21(8):747-75

4. Cerebrovasc Dis Extra 2015;5(2):52–54

5. Am J Hematol. 2019;94:949–954

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SAT - CR - BS 2 - BR 2A - Coagulation, Hemorrhage, and Hemoglobin – 04

Thromboelastography-Guided Neuraxial Anesthesia in a Parturient with Delta Storage Pool Disease

Presenting Author: Thaha A. Afridi

Presenting Author's Institution: VCU School of Medicine - Richmond, Virginia

Co-Authors: Victor Saxena, MD - VCU School of Medicine

Introduction:
Platelet δ-Storage Pool Disease (δ-SPD) is a rare genetic disorder that poses an increased risk of bleeding complications during childbirth, bruising, and excessive bleeding [1]. As a qualitative platelet disorder, δ-SPD has poor diagnostic frequency; therefore, its prevalence remains largely unknown. The patient for our case is a 27-year-old G2P0 ASA Class 3 parturient (BMI >40) with δ-SPD and frequent episodes of epistaxis and menorrhagia. Her platelet electron microscopy demonstrated 2.73 δ-granules/platelet (Normal 3-10), consistent with δ-SPD.

Case One:
Upon initial anesthesia consultation, the patient was considered not a candidate for neuraxial anesthesia due to the risk of spinal and epidural hematoma from their associated δ-SPD [2] in which general anesthesia was planned in possibility of a C-section surgery. However, after TEG, PLT disorder, and CBC (plt 314 x 10*3/uL) were tested and found to be within normal limits, it was determined there was no absolute contraindication associated with δ-SPD for the use of neuraxial anesthesia. During delivery, the patient required a C-section procedure due to NRFS remote from delivery after induction of labor following worsening chronic hypertension on medications. As a result, the patient was administered desmopressin acetate and a spinal block. In this case, spinal block anesthesia was preferred over epidural due to a lower risk of bleeding and the latter having a higher risk of complications for those with bleeding disorders [2]. During the C-section, the patient remained hemodynamically stable with an estimated blood loss of 915 mL and received IV tranexamic acid intraoperatively, then oral tranexamic acid postoperatively.

Discussion:
Proper management of δ-SPD during delivery and surgical procedures presents many unique challenges due to platelet dysfunction and risk of bleeding complications. Opting for spinal block anesthesia after close monitoring of the patient’s condition can provide several benefits, such as the avoidance of general anesthesia risks. Neuraxial anesthesia is associated with reduced 30-day mortality risk, shorter lengths of hospital visits, and lower risk of serious complications such as myocardial infarction [2]. By ensuring the patient's δ-SPD condition is stable and their clotting functional, providers can collaboratively help prevent potential spinal hematoma development with spinal blocks.

References:

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2. Peterson W, Martin R, Arnold D, et al. Delphi consensus recommendations for neuraxial anesthesia in adults with platelet disorders and coagulation defects: communication from the ISTH SSC Subcommittee on von Willebrand Factor. J Thromb Haemost. 2025 Jun;23(6):2039-2049. doi: 10.1016/j.jtha.2025.01.019. Epub 2025 Feb 12. PMID: 39952359.

TEG (on day of delivery):

Component (Reference Range)	Values
R (5.0-10 min)	5.2 min
K (1.0-3.0 min)	1.4 min
Angle (53.0-72.0 degrees)	69.6 degrees
Max Amplitude (50.0-70.0 mm)	71.4 mm (elevated)
Anti-Coagulation Therapy	No Anticoagulant

SAT - CR - BS 2 - BR 2A - Coagulation, Hemorrhage, and Hemoglobin – 05

When Collagen and Clotting Fail: Catastrophic Postpartum Hemorrhage in a Patient with Ehlers–Danlos Syndrome and Functional Platelet Disorder

Presenting Author: Nicholas Mangano

Presenting Author's Institution: Stony Brook University Hospital - Stony Brook, New York

Co-Authors: Morgane Factor - Stony Brook University Hospital
Michael Lu - Stony Brook University Hospital

Introduction:
Ehlers–Danlos Syndrome (EDS) is a group of connective tissue disorders associated with abnormal collagen synthesis, tissue fragility, and, in some cases, bleeding tendencies (1). Obstetric complications include uterine rupture, poor wound healing, and postpartum hemorrhage (PPH), which may be worsened by coexisting hematologic disorders (2). PPH, defined as ≥1,000 mL blood loss within 24 hours after delivery, remains a leading cause of maternal morbidity and mortality worldwide (3). In patients with platelet dysfunction or connective tissue disease, bleeding may be severe and refractory to standard measures. Interventional radiology (IR) techniques such as uterine artery embolization (UAE) can be lifesaving when conservative measures fail (4).

Case One:
A 36-year-old G2P1001 with hypermobility-type EDS, functional platelet disorder, chronic hypertension, and prior hemorrhage presented for scheduled cesarean with bilateral tubal sterilization under general anesthesia. Her first delivery was complicated by uterine inversion and hemorrhage requiring laparotomy, balloon tamponade, and transfusion of seven units PRBCs. Given her history, hematology recommended tranexamic acid (TXA) and avoidance of intramuscular uterotonics. Cesarean delivery was initially uncomplicated until brisk placental bed bleeding and intermittent atony occurred. Despite Bakri balloon placement, rectal misoprostol, TXA, and transfusion, quantified blood loss exceeded 6 liters. She received 8 units PRBCs, 5 units FFP, 3 units platelets, and 2 units cryoprecipitate. Persistent bleeding prompted transfer to IR, where bilateral UAE achieved hemostasis. Post-procedure, she stabilized with hemoglobin ~11 g/dL. She was discharged on postoperative day four on oral TXA with close hematology follow-up.

Discussion:
This case illustrates the synergistic hemorrhagic risks of EDS and platelet dysfunction. Connective tissue fragility may impair vascular integrity and uterine tone, while platelet abnormalities magnify bleeding (1, 2). Management was complicated by limited uterotonic options and reliance on mechanical and antifibrinolytic measures. PPH guidelines emphasize early escalation, multidisciplinary involvement, and rapid deployment of surgical or IR interventions (3, 4). UAE avoided hysterectomy and preserved uterine integrity, particularly important in EDS due to wound healing concerns. For anesthesiologists,

perioperative care required anticipating massive transfusion, tailoring uterotonic therapy, and coordinating with hematology and IR. This case underscores the importance of individualized hemorrhage management protocols in medically complex obstetric patients.

References:

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SAT - CR - BS 2 - BR 2A - Coagulation, Hemorrhage, and Hemoglobin – 06

Perioperative Management of a Pregnant Patient with Hereditary Spherocytosis

Presenting Author: Katina S. Kassicieh, MD

Presenting Author's Institution: Resident Physician - Albuquerque, New Mexico

Co-Authors: Pearl M. Huynh - UNM School of Mdicine

Introduction:
Hereditary red blood cell membrane disorders are rare causes of hemolytic anemia with important anesthetic implications. Hereditary spherocytosis features defective membrane proteins leading to hemolysis, anemia, and splenic sequestration. Pregnancy greatly increases risk of hemolysis, bleeding, and thrombosis. Accurate diagnosis and tailored anesthetic management are critical in obstetric patients with complex hematologic disease.

Case One:
A 23-year-old female presented at 24 weeks with a category 3 fetal tracing and severe fetal growth restriction. Her pregnancy was complicated by a history of hereditary spherocytosis with prior splenectomy, multiple first trimester pregnancy losses, non-alcoholic cirrhosis, portal hypertension, esophageal varices, portal vein thrombosis, and anemia. Her hematologic disorder was initially documented as stomatocytosis in childhood and later revised to hereditary spherocytosis after extensive diagnostic evaluation. Her pregnancy course was further complicated by gastric variceal bleeding, interstitial pancreatitis, ascites, severe fetal growth restriction, and recurrent thromboembolic disease, including bilateral non-occlusive subsegmental pulmonary emboli after missed anticoagulation doses. She underwent multiple procedures during the second trimester, including esophagogastroduodenoscopy with variceal banding at 16 weeks and ascites drainage at 17 weeks. Anesthetic planning for delivery was complicated by early gestational age, high bleeding and thrombotic risk, and chronic opioid use. Following multidisciplinary consultation with NICU, anesthesia, MFM and obstetrics, she underwent cesarean delivery under general anesthesia. The anesthetic management included a pre-induction arterial and central line placement and preparation for possible massive transfusion. While the case was uneventful surgically, the fetus required resuscitation after delivery and unfortunately did not survive.

Discussion:
This case highlights anesthetic challenges of pregnancy complicated by hereditary spherocytosis and associated co-morbities. Differentiating hereditary spherocytosis and its distinct perioperative risks is crucial. Successful management requires multidisciplinary coordination, careful balancing of hemorrhagic and thrombotic risk, and individualized analgesic strategies. Awareness of rare hematologic conditions and their interaction with pregnancy physiology is critical to optimizing maternal and fetal outcomes.

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SAT - CR - BS 2 - BR 2B – Ethics – 01

Respecting Autonomy at the Edge of Risk: Cesarean Refusal Following Prior Uterine Rupture

Presenting Author: Megan Howell, DO

Presenting Author's Institution: The University of Kansas - Kansas City, Kansas

Co-Authors: Molly Cason, MD - The University of Kansas
Marc Parrish, DO - The University of Kansas Medical Center
Grace Shih, MD - Department of Anesthesiology, The University of Kansas

Introduction:
We will explore how a patient's right to autonomy conflicted with the physician's goal of nonmaleficence for both mother and child in a risky clinical situation.

Case One:
A 39-year-old G5P4004 Swahili-speaking patient from Tanzania presented to a high-risk obstetrics clinic requesting VBAC despite a history of four prior cesarean deliveries and uterine rupture in two prior pregnancies after TOLAC. G1: Cesarean for non-reassuring fetal heart tones G2: Repeat LTCS complicated by uterine dehiscence and iatrogenic cystotomy G3: TOLAC with terminal bradycardia and uterine rupture → emergent repeat LTCS G4: TOLAC → repeat LTCS after failed operative delivery; uterine rupture documented In the current pregnancy (G5), the patient declined a scheduled repeat LTCS and induction. She presented in labor at 41w5d, progressed to complete dilation, and pushed in the OR for 36 minutes without fetal descent. She then agreed to cesarean delivery, which was complicated by an incidental 7 cm cystotomy; a uterine window was present without overt rupture. Postoperative recovery was uncomplicated; she was discharged with a urinary catheter for two weeks.

Discussion:
The patient believed her first two cesareans were unnecessary ("a way for doctors to make money"). During G4, ethics consultation revealed strong cultural beliefs that children born via cesarean are viewed as inferior and may be shunned, and faith-based conviction that "God would keep her safe." Ethics concluded that a cesarean could not be performed while she had decisional capacity if she refused; if she became incapacitated, her husband would be the surrogate decision-maker. A cesarean could not be performed solely to save the fetus if she collapsed after explicitly refusing. In G4 she ultimately verbally consented after failed operative delivery. That ethics guidance was revisited and considered applicable in G5. This case posed major obstetric and anesthesia challenges due to mistrust of the health system, refusal of induction and neuraxial anesthesia, language barriers with intermittent reliable interpretation, cultural beliefs, and prior traumatic deliveries. Autonomy of the patient was at odds with beneficence of the provider. A key factor in G5 was rapport and trust built by a Swahili-speaking Kenyan CRNA, which likely contributed to the patient's eventual agreement to cesarean. The most beneficial harm-reduction

strategy was a monitored trial of labor in the OR without augmentation, followed by cesarean when agreeable. Teaching points: 1) Explore cultural context and prior experiences to understand current decisions. 2) Identify staff who speak the patient's language or share cultural background to build trust. 3) Consider involvement of trusted community/religious leaders when appropriate. 4) In Kansas, if a competent patient explicitly refuses cesarean, it cannot be performed to save the fetus, even if she later becomes incapacitated; know

References:

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SAT - CR - BS 2 - BR 2B – Ethics – 02

Ethical Challenges in Obstetric Anesthesia: Managing Medically Indicated Cesarean Delivery in the Setting of Acute Psychosis

Presenting Author: Emma James Barksdale, MD

Presenting Author's Institution: Atrium Health Wake Forest Baptist - Winston-Salem, North Carolina

Introduction:
The care of an acutely psychotic, gravid patient presents complex ethical and medical challenges. These challenges are amplified when the patient has co-existing conditions that require urgent interventions, such as gestational hypertension. Obstetric anesthesiologists and obstetricians must navigate decision-making capacity, maternal autonomy, and fetal well-being. We present a case of a patient with acute psychosis and gestational hypertension who was found to lack decision-making capacity, necessitating careful ethical and anesthetic considerations.

Case One:
The patient was a 28-year-old, gravida 1 para 0 at 37 weeks and 5 days gestation who presented with acute psychosis characterized by paranoia, delusions, and disorganized thinking. She was evaluated by psychiatry and admitted to the medical psychiatric unit. At 38 weeks and 1 day, she met diagnostic criteria for gestational hypertension. Psychiatry determined that her ongoing psychosis impaired her decision-making capacity regarding delivery, raising ethical concerns regarding consent for neuraxial anesthesia and obstetric intervention. A multidisciplinary discussion involving obstetric anesthesiology, obstetrics, and ethics was held to determine a justifiable approach to delivery that prioritized maternal safety and respected maternal autonomy as much as possible. Her family, with legal power of attorney, and as surrogate decision-makers, were able to override her refusal to undergo cesarean delivery, as was recommended by Maternal Fetal Medicine. The patient accepted neuraxial anesthesia for presumed induction of labor and willingly walked from the psychiatry unit to the labor and delivery unit. With her permission, an epidural catheter was placed to minimize maternal distress and avoid general anesthesia. We then explained that we would be going to the operating room for delivery. Mild sedation was provided to ensure cooperation, and the epidural was dosed for surgical anesthesia. The patient was transported to the obstetric operating room, and cesarean delivery was completed without maternal or neonatal complications.

Discussion:
This case illustrates the ethical complexity of caring for pregnant patients who lack decision-making capacity. The care team prioritized respect for maternal autonomy through clear communication to the extent possible with the patient and involvement of family members as surrogate decision makers. The principles of beneficence and nonmaleficence guided clinical decisions throughout the patient's care. A multidisciplinary, ethics-focused approach is essential when managing obstetric patients who lack decision-making capacity. Early collaboration amongst team members along with thoughtful anesthetic

planning can facilitate safe delivery while upholding ethical obligations.

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SAT - CR - BS 2 - BR 2B – Ethics – 03

Ethical and Logistical Challenges during Emergent Cesarean Delivery for an Incarcerated Patient with HELLP Syndrome and Schizophrenia

Presenting Author: Shreya Goswami, MD

Presenting Author's Institution: WashU Medicine - Saint Louis, Missouri

Co-Authors: Arvind Palanisamy, MD, FRCA - WashU
Preet Mohinder M. Singh, MD - WashU Medicine

Introduction:
Caring for incarcerated pregnant patients with pre-existing psychiatric condition presents unique clinical, ethical, and logistical challenges1. These complexities are amplified in time sensitive obstetric emergencies such as HELLP syndrome2, where rapid multidisciplinary coordination is essential. This case describes the clinical management of an incarcerated parturient with schizophrenia who had become incapacitated just before an emergent cesarean delivery (CD).

Case One:
A 33 year old G3P2 at 38 weeks' gestation was transferred from a correctional facility for psychiatric evaluation. She was found to have laboratory evidence of HELLP syndrome (AST 290 U/L, ALT 61 U/L, platelets 31,000/μL, LDH 521 U/L, haptoglobin < 10). Her clinical situation deteriorated with platelets dropping to 18,000/μL, new onset right upper quadrant pain and coffee ground emesis prompting activation of an emergent CD. The patient was deemed to have lost decision making capacity, as she refused all interventions and became increasingly combative. Psychiatry determined that the patient did not have the capacity for decision making as they confirmed that she was unable to understand the consequences of the choice she was making for her clinical care. With no available surrogate and recurrent fetal decelerations, a twophysician consent process was initiated. For patient and staff safety, ketamine was administered covertly in her room to facilitate transport to the operating room. Her shackles were removed after induction of general anesthesia and one correctional officer stayed in the OR during the CD. Platelet transfusion, tranexamic acid, and ROTEM guided hemostatic management were required intraoperatively. A viable male neonate was delivered and subsequently placed under the custody of social services. The patient was transferred to the ICU at the end of the case with shackles and was discharged back to the correctional facility on postoperative day 8.

Discussion:
This case highlights the intersection of medical urgency, ethical considerations, and operational barriers in the care of an incarcerated parturient. Patients with schizophrenia with acute stress (labor or plan for surgery) can rapidly lose decision-making capacity and may need frequent re-evaluations to ensure safe care. Involved care team must deal with the legal constraints of incarceration, ethical dilemma of medication administration without patient's knowledge but for the best interest of the patient, and

coordinating perioperative logistics in emergent settings. This case emphasizes the importance of understanding rapidly changing mental status and highlights institutional preparedness, the need for clear emergency consent pathways, and robust interdisciplinary communication to optimize outcomes in similar high stakes scenarios.

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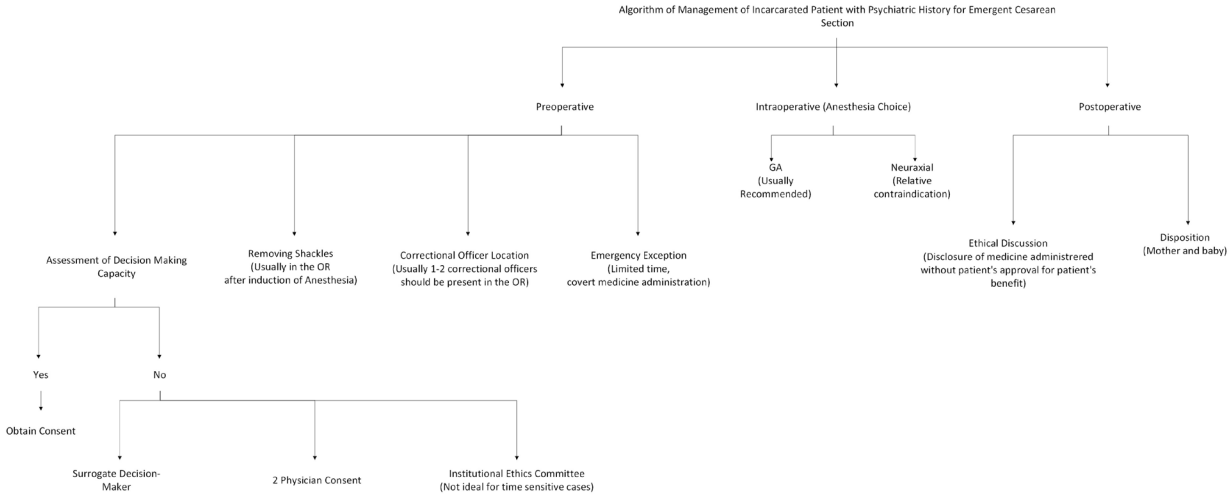

SAT - CR - BS 2 - BR 2B – Ethics – 04

A Preventable Delay: Cesarean Scar Ectopic Pregnancy Complicated by Restrictive Reproductive Policy

Presenting Author: Jil Decker, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Elise W. Boos, MD, MSc - Vanderbilt University Medical Center
Edward (Ted) Yaghmour, MD FASA - Vanderbilt

Introduction:
Tennessee maintains some of the most restrictive reproductive laws in the United States. Although a 2023 amendment permits allowing abortion care in cases of "medical emergency," such as molar or ectopic pregnancies [1], the definition remains ambiguous. These unclear guidelines create litigation concerns for physicians and result in delays in necessary obstetric intervention.

Case One:
A 27-year-old G5P1302 at 12w1d with two prior cesarean births, including one neonatal demise, presented at 8:30 PM with acute onset lower abdominal pain and vaginal bleeding. Ultrasound and bHCG levels were consistent with early pregnancy loss in progress, with concern for dehiscence and hemorrhage at prior cesarean scar at 12:30 AM. OB/GYN was consulted and documentation showed a clinically stable patient. A decision was made to observe until morning, at which time the case could be reviewed with the Family Planning team. At 8 AM, it was determined that the patient required emergent operative intervention. Diagnostic laparoscopy revealed a 6–8-week gravid uterus densely adherent to the bladder and anterior abdominal wall with increased vascularity, consistent with a cesarean scar ectopic pregnancy. No frank uterine rupture was noted. The team performed a laparoscopic supracervical hysterectomy. Post-operative surgical pathology confirmed placenta accreta spectrum grade 3a involving the cesarean scar. The patient remained hemodynamically stable and did not require transfusion. She was discharged on post-operative day 1, grieving her lost fertility.

Discussion:
This case illustrates how delays between recognition of pathology and surgical intervention lead to significant morbidity and mortality. Restrictions on abortion care and ambiguous "medical emergency" standards contribute to delays and denial of care to pregnant patients, even those that have high-risk pregnancy complications. Healthcare laws that allow physicians to offer all appropriate interventions are essential to improve outcomes for pregnant patients.

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SAT - CR - BS 2 - BR 2B – Ethics – 05

Peripartum Management of Acute Psychosis

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Introduction:
Pregnancy can precipitate the onset or exacerbation of severe mental illness. However, psychosis is rare during pregnancy and presents unique anesthetic and ethical considerations (1). We describe a safe, trauma-informed, and ethically-grounded approach for obstetric anesthesia care for an acutely psychotic patient.

Case One:
A 32-year-old G4P3 with dichorionic-diamniotic twin pregnancy at 34+5 weeks was admitted with fetal growth restriction. PMH included hepatitis C, hypothyroidism, polysubstance use disorder, recent incarceration, housing instability, and bipolar disorder versus schizophrenia. On hospital day two, the patient developed acute psychosis. She displayed verbal and physical protective responses, such as shouting, swatting at staff, and removing monitors. She removed multiple IVs and was resistant to new IV placement. The patient lacked decision-making capacity, and there were no identifiable surrogates. A multidisciplinary conference with ethics, psychiatry, obstetric anesthesiology, neonatology, maternal fetal medicine, and nursing determined cesarean section, psychotropic medications, and anesthesia were permissible to protect maternal and fetal health. Cesarean was scheduled as the first case of the day when the patient was typically most cooperative. A preoperative huddle was held to clearly define staff roles, establish strategies to reduce the risk of patient escalation, and maximize the patient's sense of safety. If the patient would not tolerate IV access, IM sedation followed by IV placement and general anesthesia was planned. The IM injection would include midazolam, ketamine, +/- glycopyrrolate, and +/- clonidine. An anesthesiologist with expertise in ethics and trauma-informed care (TIC) was present to provide focused patient support during anesthetic initiation. In the OR, the patient accepted IV placement, received IV midazolam, and tolerated neuraxial anesthesia. Anesthesia was successfully delivered without the need for physical restraint or emergent sedation, and the delivery was uncomplicated.

Discussion:
This patient was high risk for peripartum trauma given her inability to consent to care and prior experiences associated with trauma exposure. Peripartum stress and trauma are significant contributors to maternal mortality (2). Thus, TIC was critical in anesthetic planning. Helping the patient feel a sense of control is a key component of TIC and poses a challenge for a patient with diminished capacity (2). We

employed thoughtful counseling and intentional trust-building to deliver safe anesthesia while minimizing retraumatization. Incorporating a TIC philosophy into the multidisciplinary collaboration process ensured shared understanding of the care plan and is recommended to promote the well-being of those with severe psychiatric illness in pregnancy and the healthcare workers serving them (1, 3).

References:

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SAT - CR - BS 2 - BR 2B - Critical Decisions – 01

Ruptured Hepatocellular Adenoma in Pregnancy: Navigating Maternal-Fetal Conflict

Presenting Author: Miriam P. Griffin, MD, MSCR

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Introduction:
Hepatocellular adenoma (HCA) is a rare, benign liver tumor most common in women of child-bearing age (1) with a strong association with estrogen. Complications include hemorrhage, rupture, and malignant transformation (2). Maternal and fetal mortality is 44% and 38%, respectively, following HCA rupture in lesions >6.5cm (3). Treatment guidelines favor surgical resection of lesions >5cm (1-3). Management of peripartum HCA must be individualized given the dynamic changes of pregnancy and high risk of maternal and fetal morbidity and mortality.

Case One:
A 38yo multigravida at 19w1d presented with abdominal pain, hypotension and tachycardia, was found to have multiple HCA masses with evidence of rupture (>8cm) and hemoperitoneum. Emergent embolization was performed. At 20w1d she presented with similar symptoms and was found to have significant interval enlargement (>11cm) of the HCAs and underwent additional embolization. Subsequent imaging revealed continued increase in size. Given extent of the HCAs, patient was not a candidate for resection. Further embolization was not recommended due to concern that additional compromised hepatic blood flow would lead to subsequent hepatic failure, necessitating transplantation or maternal, and therefore fetal, death. Unfortunately, liver transplant was not an option given her funding status. Without intervention, patient remained at high risk of further life-threatening bleeding with the continued increase of estrogen during pregnancy. Termination of pregnancy was recommended to remove estrogen source. Patient elected to proceed with termination. At 20w4d she underwent an uncomplicated hysterotomy with bilateral salpingectomies under general anesthesia with two large bore PIVs and arterial line. She received intraoperative blood transfusion and a transversus abdominus plane block for post operative pain control. She was discharged on post operative day 20 with surgical oncology and psychotherapy follow up.

Discussion:
Collaborative multidisciplinary planning with ethics team involvement was essential in informed decision making for the patient. This medically complex case illustrates a significant maternal-fetal conflict, balancing maternal well-being against fetal benefit. HCAs carry a significant morbidity and mortality risk highlighting the importance of early identification, treatment, and specialist support.

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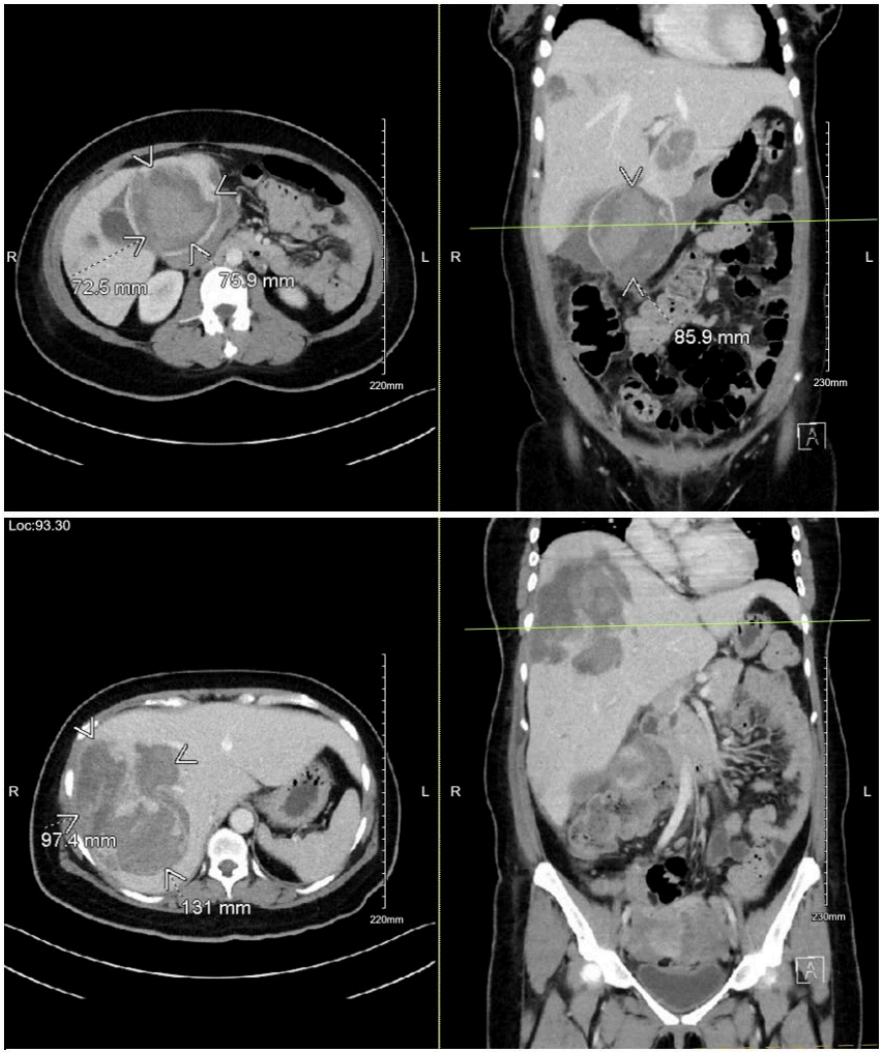

SAT - CR - BS 2 - BR 2B - Critical Decisions – 02

When Magnesium Masquerades: Complexity in Obstetric Anesthesia

Presenting Author: Vivienne Pham, BS

Presenting Author's Institution: The Ohio State University College of Medicine - Columbus, Ohio

Co-Authors: Archis Deshpande - The Ohio State University College of Medicine
Vivienne E. Pham, BS - The Ohio State University College of Medicine

Introduction:
Magnesium sulfate is used for seizure prophylaxis in management of pre-eclampsia with severe features (PreE w SF)[1]. Mg toxicity, though rare, may be hard to detect due to overlap with spinal anesthesia (SAB) and epidural hematomas.

Case One:
A 45 y/o G5P3013 twin gestation, with chronic hypertension (cHTN) and PreE w SF presented for Cesarean delivery (CD) w/ SAB at 32 weeks. Mg infused. The patient became hypotensive, lost consciousness, and underwent stat CD. Pt awoke when Mg was discontinued and vasopressors initiated. Mg infusion was held due to hypotension from blood loss and restarted after 2 hours of recovery.

Case Two:
A 22 y/o G4P2204 presented at 30 weeks gestation, transferred for CD w/ SAB due to PreE w SF and HELLP syndrome. She received a Mg infusion. Postoperatively, bilateral LE weakness developed, concerning for epidural hematoma with Plt of 23K/uL. Mg was 13.2 mg/dL and showed AKI with Crmax of 4.5. Weakness resolved 1 day after stopping $MgSO_4$,; kidney function normalized in 5 days.

Discussion:
Mg toxicity is a serious condition with symptoms ranging from loss of deep tendon reflexes to respiratory depression and cardiac arrest. In both cases, patients had recently received a spinal anesthetic concurrently with magnesium as an adjunct treatment. Magnesium, especially infused as a bolus, has additive smooth muscle relaxant properties contributing to already initiated neuraxial hypotension[1]. In the first case, chronic hypertension likely impaired cardiovascular and renal compensation, promoting magnesium sulfate toxicity [2] in conjunction with SAB to result in hemodynamic instability. In the second case, magnesium toxicity and epidural hematoma can both cause lower extremity weakness, differentiated by localization generalized vs below the block. Epidural hematomas are devastating, especially with HELLP-related coagulopathy, but magnesium also causes neuromuscular blockade. HELLP-related renal failure precipitated severe hypermagnesemia, revealing that magnesium therapy is not benign. Magnesium therapy in peripartum patients can masquerade as neurologic emergencies and escalate quickly, as impaired renal clearance drives toxicity; vigilant renal and magnesium monitoring is critical.

References:

1. Clin Pharmacokinet 2000;38:305–314

2. Obstet Gynecol 2019;133:e26–e50

SAT - CR - BS 2 - BR 2B - Critical Decisions – 03

Balancing Relative Contraindications: Epidural Anesthesia in a Pregnant Patient with Cardiac and Hepatic Dysfunction

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Presenting Author's Institution: University of Arkansas for Medical Sciences - Department of Anesthesiology - Little Rock, Arkansas

Introduction:
Transamititis in pregnancy can be due to several pathologies, such as AFLP, HELLP, severe pre-eclampsia, viral hepatitis, or HIV (1). While pregnancy is a hypercoagulable state, significant liver disease can disrupt clotting factor production and increase the risk of bleeding complications such as epidural hematomas. Worsening liver function is often an indication for urgent delivery and may precede full diagnostic workup, requiring the anesthesiologist to make a quick decision about whether to offer neuraxial versus general anesthesia. There are many conditions for which neuraxial anesthesia may be preferred due to relative hemodynamic stability. We present a challenging case of a patient with significant transaminitis concerning for AFLP and newly diagnosed peripartum cardiomyopathy for whom we performed an epidural for urgent CS.

Case One:
38-year-old G2P2002 presented at 28w1d with newly diagnosed HFrEF (LVEF 20%) and transaminitis (ALT/AST 1900s) with concern for AFLP, and ultimately underwent urgent CS due to NRFHT. Medical history significant for Hepatitis C, untreated HIV, asthma, and active polysubstance abuse (meth, THC, MDMA). Initially presented with RUQ pain, N/V, lethargy, and HTN (SBP into the 160s) and was unaware that she was pregnant. Labs notable for mild anemia without hemolysis, leukocytosis, lactic acidosis, AKI with uremia, transaminitis, and prolonged PT/PTT with INR of 1.4. ROTEM without hypocoagulability. Given concern for untreated HFrEF and relatively normal coagulation studies, after discussion of risk/benefits of GA vs NA, patient elected to proceed with neuraxial. Patient remained hemodynamically stable throughout an uneventful low-dose CSE. Epidural catheter removed in PACU and close follow-up revealed no epidural hematoma formation. Liver enzymes continued to trend down with no significant bleeding events. Further workup during immediate postpartum period revealed transaminitis was more consistent with the combination of pre-eclampsia, heart failure, and HIV cholangiography. Postpartum course was complicated by PE and IVC thrombosis and necrotizing surgical site infection.

Discussion:
When medically complex patients with relative contraindications for both neuraxial and general anesthesia present for urgent delivery, it may be beneficial to proceed with neuraxial anesthesia after overt coagulopathy has been ruled out. Given cardiovascular disease is one of the leading causes of maternal mortality in the US and epidural hematoma, while devastating, remains a rare complication, optimizing cardiac function when able is prudent (2).

References:

1. Sharma AV, John S. Liver Disease in Pregnancy. [Updated 2023 Jun 12]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan.

2. Meng M-L, et al. Anesthetic care of the pregnant patient with cardiovascular disease: A scientific statement from the American Heart Association. Circulation. 2023;147(11).

ROTEM prior to epidural.pdf

SAT - CR - BS 2 - BR 2B - Critical Decisions – 04

Paternal Malignant Hyperthermia and Risk to Susceptible Fetus During Maternal Anesthesia

Presenting Author: Monika Martinek, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Jil Decker, MD - Vanderbilt University Medical Center

Introduction:
Malignant Hyperthermia (MH) is a genetically inherited disorder, with 60-70% of cases caused by mutations of the RYR1 gene, which encodes a ryanodine receptor protein. MH is inherited in an autosomal dominant pattern, and each child of an affected individual has a 50% risk of susceptibility1-2. In patient with MH, exposure to certain triggering medications including succinylcholine or volatile anesthetics can result in uncontrolled calcium release from the sarcoplasmic reticulum leading to acidosis, hypercapnia, tachycardia, hyperthermia, rhabdomyolysis, and cardiac arrhythmias. Without prompt recognition and treatment, mortality approaches 80%1.

Case One:
This case discusses a 31-year-old G5P0040 patient at 12 weeks 2 days gestational age, with past medical history of hypothyroidism and asthma, who presented for cerclage placement due to cervical incompetence with a history of recurrent pregnancy loss. The patient's husband had a history of genetically-confirmed MH, and he had been treated for an acute episode of MH previously which required 8 doses of dantrolene, cooling, and ICU admission. The patient herself denied any personal family history of MH. Primary anesthetic included a spinal injection at the L4 level with intrathecal hyperbaric bupivacaine and fentanyl. Appropriate precautions were taken in case the patient were to require general anesthesia during the procedure. The anesthesia circuit was flushed and inhalational agents were removed, with plans to use IV anesthetics if needed. Fortunately, the patient tolerated neuraxial analgesia well and did not require any further medication interventions intraoperatively.

Discussion:
This case of paternal MH highlights unique aspects of pregnancy care. It is recommended that when the fetus is considered at-risk, such as in cases of paternal MH susceptibility with unknown maternal status, anesthesia should be provided using regional techniques or total intravenous general anesthesia that avoids triggering agents. Dantrolene crosses the placenta and can be used for suspected MH crises in the fetus, however, prophylactic dantrolene utilization is not recommended in these cases3. Unfortunately, there is little evidence-based management of suspected fetal MH currently in the literature. Detection and diagnosis of fetal MH in utero is very challenging, as direct assessment of classic clinical signs is limited to fetal heart rate monitoring and indirect maternal laboratory abnormalities. Fetal demise secondary to untreated MH crisis is a high risk. More research is required to allow for earlier detection of

MH in susceptible fetuses as well as to guide management.

References:

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3. PMID: 9288384

SAT - CR - BS 2 - BR 2B - Critical Decisions – 05

A Triple Threat at the Incision: Severe Pulmonary Hypertension, Impending Thyroid Storm, and Preeclampsia with Severe Features in Cesarean Delivery

Presenting Author: Saheb S. Dhillon, MD

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Co-Authors: Matthew Sikora, DO - Case Western Reserve University/MetroHealth Medical Center

Introduction:
Severe pulmonary arterial hypertension (PAH) in pregnancy confers extraordinarily high maternal mortality, most often from acute right ventricular (RV) failure during rapid hemodynamic transitions. Cesarean delivery is particularly perilous, as abrupt changes in preload, afterload, and pulmonary vascular resistance may precipitate RV ischemia and collapse. These risks are magnified by superimposed preeclampsia with severe features and uncontrolled Graves'-related hyperthyroidism with impending thyroid storm; conditions that independently increase sympathetic tone, myocardial oxygen demand, and cardiovascular instability. Anesthetic management in this setting requires physiologic precision to preserve RV coronary perfusion, maintain systemic vascular resistance (SVR), and avoid increases in pulmonary vascular resistance1,2. We present a rare and highly complex case of urgent preterm cesarean delivery in a patient with severe PAH, superimposed preeclampsia with severe features, and Graves'-related hyperthyroidism with impending thyroid storm, highlighting innovative, goal-directed anesthetic strategies to mitigate cardiopulmonary decompensation in the setting of converging high-mortality conditions.

Case One:
A 34-year-old G4P3003 at 28w3d required urgent cesarean delivery for non-reassuring fetal status remote from delivery in the setting of PPROM, intraamniotic infection, chronic hypertension, severe Graves'-related hyperthyroidism with medication non-adherence and impending thyroid storm, fetal hyperthyroidism, and severe maternal PAH. To mitigate RV failure, invasive hemodynamic monitoring with arterial access, central venous access, and pre-induction pulmonary artery catheter placement was established. A low-dose Combined Spinal-Epidural anesthetic was performed using intrathecal bupivacaine, fentanyl, and morphine, followed by slow epidural titration to a T4 sensory level with 2% lidocaine. Vasopressin was selected to augment SVR while minimizing pulmonary vasoconstriction. Magnesium sulfate was administered for seizure prophylaxis and its favorable cardiopulmonary effects, including pulmonary vasodilation and attenuation of catecholamine release

Discussion:
Cesarean delivery was completed without cardiopulmonary decompensation, and the patient was transferred to the CICU for continued PAH management, initiation of methimazole and stress-dose

hydrocortisone for impending thyroid storm, and blood pressure control. This case highlights the integration of pulmonary artery catheter-guided management, low-dose neuraxial anesthesia, and targeted vasoactive selection; underscoring the importance of individualized anesthetic planning, physiologic goal-directed management, and multidisciplinary collaboration when multiple high-risk maternal conditions converge3,4.

References:

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2. Obstetrics & Gynecology 133(5):p e320-e356, May 2019.

3. Indian J Anaesth. 2018 Sep;62(9):682-690.

4. N Engl J Med. 2022 May 12;386(19):1817-1832.

SAT - CR - BS 2 - BR 2B - Critical Decisions – 06

A Pivot in Plans: Preeclampsia and PPROM in a Patient with PAH

Presenting Author: Andrea Fritz, MD, MPH

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Co-Authors: Dillon Patel, MD - The University of North Carolina at Chapel Hill

Introduction:
Group 1 pulmonary arterial hypertension (PAH), defined by a mean pulmonary artery pressure >20 mm Hg, may be idiopathic, inherited, drug- or toxin-induced, or associated with conditions like connective tissue disease.[1] PAH is more common in women and is the most frequently encountered form in pregnancy.[2] Pregnancy carries substantial risk as physiologic changes like increased blood volume and cardiac output, decreased systemic vascular resistance, and hypercoagulability may exacerbate PAH and precipitate decompensation.[1,2] Accordingly, close multidisciplinary management is critical. Delivery is typically planned for between 34 and 36 weeks via operative vaginal or cesarean delivery (CD), though earlier delivery may be required.[1]

Case One:
A 32yo G3P2002 with history of mixed connective tissue disease/SLE, Raynaud's, pulmonary embolism, psoriasis, and PAH was admitted at 24w5d for initiation of IV epoprostenol after PAH progression, with mPAP increasing from 24 mmHg pre-pregnancy to 42 mmHg. Her antepartum hospital course was complicated by preeclampsia with severe features by thrombocytopenia (platelets 98) at 28 weeks. Given clinical deterioration, consensus among the interdisciplinary team and patient was to forego plan for operative vaginal delivery later in pregnancy and proceed with CD the next day at 28w5d with cardiac surgery and ECMO on standby. Anticoagulation was held, and an arterial line and pulmonary artery catheter were placed. Overnight, PPROM necessitated urgent mobilization of the multidisciplinary delivery team. Patient was transferred to the OR, where a low-dose CSE was performed. Femoral micro-puncture catheter sheaths were placed for rapid ECMO cannulation if needed. The epidural was incrementally dosed, and intraoperatively, she received furosemide and hemodynamic support with a norepinephrine infusion and intermittent vasopressin boluses. CD was uneventful. She was initially managed postoperatively in the ICU, where her course was complicated by a femoral hematoma after the micro-puncture line was pulled and intermittent epistaxis requiring transfusion. She was discharged on IV epoprostenol on POD 10.

Discussion:
This case highlights the importance of close monitoring, multidisciplinary coordination, and adaptability in delivery planning for pregnant patients with PAH. Even well-controlled disease may worsen during gestation, and complications can arise. Regardless of delivery route, anesthetic management should focus on preserving RV function by maintaining perfusion, euvolemia, and normal heart rate and rhythm while minimizing increases in PAP through avoidance of hypoxemia, hypercapnia, acidosis, inadequate

analgesia, and hypothermia.2

References:

1. Martin SR, Edwards A. Pulmonary hypertension and pregnancy. Obstet Gynecol. 2019;134(5):974-987. doi:10.1097/AOG.0000000000003549

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SAT - CR - BS 2 - BR 2B - Critical Decisions – 07

Pregnancy-Preserving Management of a Uterine Artery Pseudoaneurysm

Presenting Author: Justine Lewis, MD

Presenting Author's Institution: Johns Hopkins Anesthesiology and Critical Care Medicine - Baltimore, Maryland

Co-Authors: David Berman, MD, Med - Johns Hopkins Anesthesiology and Critical Care Medicine
Anna Gitterman, MD - Johns Hopkins Anesthesiology and Critical Care Medicine

Introduction:
Uterine artery pseudoaneurysm (UAP) during pregnancy is a rare, life-threatening condition associated with sudden rupture, massive hemorrhage, hysterectomy, and maternal mortality. Symptoms are often nonspecific, leading to delayed diagnosis. Optimal management is complex and requires careful coordination among maternal–fetal medicine, interventional radiology (IR), obstetric anesthesia, neonatology, and critical care. Anesthetic planning is central to balancing maternal hemodynamic stability, anticoagulation, neuraxial safety, fetal well-being, and preparedness for catastrophic hemorrhage. Given the rarity of this condition, evidence guiding anesthetic and peripartum management of UAP is limited.

Case One:
We report the case of a G1P0101 female who presented at 23w5d with pregnancy complicated by a rapidly enlarging left UAP. She experienced multiple admissions for severe abdominal pain presumably due to degenerating fibroids and preterm labor. Imaging demonstrated UAP expansion from 1.2 cm to 3.6 cm over three weeks, raising concern for imminent rupture. Following multidisciplinary discussion, the patient underwent urgent left uterine artery embolization under neuraxial anesthesia with no sedation. Embolization successfully excluded the pseudoaneurysm while preserving uteroplacental perfusion, allowing pregnancy continuation and reducing risk of spontaneous rupture. Following embolization, the patient developed VTE with PE requiring therapeutic low-molecular-weight heparin and placement of an IVC filter, further complicating anesthetic planning. She later presented at 29w1d with non-reassuring fetal heart tracing and progressive preterm labor in the setting of large obstructing fibroids. Given recent anticoagulation, altered pelvic anatomy, and high hemorrhage risk, general anesthesia was selected for urgent classical cesarean delivery. A viable neonate (1170 g) was delivered with acceptable cord gases. Despite extensive fibroid burden and complex anatomy, estimated blood loss was 832 mL, with uterine preservation.

Discussion:
This case highlights the central role of obstetric anesthesia in managing rare obstetric vascular emergencies, from facilitating neuraxial anesthesia for embolization with preparation for emergent delivery to coordination of a complex cesarean delivery in the setting of anticoagulation. Rapidly enlarging UAP should be treated as an obstetric emergency with early anesthesiology leadership. Selective uterine

artery embolization may be pregnancy-sparing when rupture risk outweighs prematurity risk. Neuraxial anesthesia for IR procedures can be safely performed in carefully selected pregnant patients, while subsequent thromboembolic events influence anesthetic choice at delivery. Development of multidisciplinary protocols for rare obstetric vascular lesions may reduce hemorrhage, hysterectomy, and maternal morbidity while improving neonatal outcomes.

References:

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2.Case Rep Perinat Med 2022;11:129–134

SAT - CR - BS 2 - BR 3A - Cesarean Delivery, Unusual Issues – 01

Decompensated Cirrhosis in Pregnancy Complicated by Placental Abruption

Presenting Author: Silvia Chiang, MD

Presenting Author's Institution: Univeraity of California Irvine - Orange, California

Introduction:
Cirrhosis in pregnancy is associated with increased maternal and fetal morbidity and mortality. Management of decompensated cirrhosis is complicated by pregnancy-related hemostatic changes superimposed on cirrhosis-associated coagulopathy. Anesthetic care requires careful consideration of airway management, anesthetic technique, and correction of coagulopathy in collaboration with obstetrics and hepatology. We present a case of cirrhosis with acute decompensation during pregnancy complicated by placental abruption requiring emergent dilation and evacuation.

Case One:
A 42-year-old G5P0040 woman at 20 weeks and 3 days GA with a history of alcoholic cirrhosis presented with preeclampsia. The patient reported worsening leg swelling and weight gain over two weeks. She was found to have a MELD score of 28 and Child-Pugh class C on presentation. The initial plan was to continue the pregnancy with close monitoring under guidance of the hepatology team. However, the patient developed acute vaginal bleeding and cramping during hospitalization, concerning for placental abruption. The clinical course was complicated by severe coagulopathy and ascites in the setting of decompensated cirrhosis. Given maternal instability and nonviable gestational age, the decision was made to proceed with emergent dilation and evacuation. Preoperatively, the patient received vitamin K and prothrombin complex concentrate for coagulation optimization. General anesthesia was induced with an arterial line in place and frequent lab draws. Blood product resuscitation included 3U FFP, 4U cryoprecipitate, 2U pRBC, and 2U platelets. The procedure was successful, and the patient made a stable recovery with improvement in liver failure symptoms.

Discussion:
This case highlights the complex interplay between cirrhosis, pregnancy, and obstetric hemorrhage, as well as the critical role of anesthesiology in emergent management. Pregnancy induces a hypercoagulable state with increased clotting factors and plasma volume expansion, which may partially mask cirrhosis-related coagulopathy. However, advanced liver disease disrupts both procoagulant and anticoagulant pathways, resulting in a fragile hemostatic balance that can rapidly decompensate. Placental abruption poses a particularly high risk in cirrhotic patients due to thrombocytopenia, decreased synthesis of clotting factors, and hemodynamic changes. Anesthetic planning is complicated by frequent contraindications to neuraxial anesthesia in severe coagulopathy. In this patient, early administration of targeted blood products and procoagulant therapy was essential in stabilizing the patient and minimizing hemorrhagic complications. This case underscores the importance of multidisciplinary coordination and individualized anesthetic strategies when managing pregnant patients with decompensated cirrhosis

undergoing emergent obstetric procedures.

References:

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2. Clin Liver Dis. 1999;3:147–162

SAT - CR - BS 2 - BR 3A - Cesarean Delivery, Unusual Issues – 02

Cesarean Delivery in a Parturient with Refractory Epilepsy and Neurosyphilis

Presenting Author: Mohammad A. Nawaz, MD

Presenting Author's Institution: Mount Sinai West Hospital - Edison, New Jersey

Introduction:
Obstetric patients with significant neurologic disease and impaired decision-making capacity present unique anesthetic challenges. While neuraxial techniques are preferred for Cesarean delivery, patients with neurosyphilis pose concerns regarding neurologic deterioration, further dissemination of the disease, and difficulty identifying new neurologic deficits. In this case, these considerations are further complicated when mentation and cooperation also pose a challenge.

Case One:
A 33-year-old G2P1001 with limited prenatal care was admitted at 35 weeks gestation for delivery planning. Her medical history includes right temporal lobe tumor resection, refractory epilepsy, and a fluctuating mental status (AAOx0-2). She also has borderline intellectual disability, major depressive and anxiety disorders with prior suicide attempts, and late latent syphilis with the infectious disease team treating her for active neurosyphilis. She had a recent neuro-ICU admission for status epilepticus necessitating intubation, likely due to missed medication. This patient is also a Jehovah's witness with refusal of allogeneic blood products. Of note, the patient's mother also serves as her healthcare proxy but was unable to provide further details on the social situation. After multidisciplinary discussions involving maternal-fetal medicine, neurology, infectious disease, ethics, bloodless medicine, and anesthesia, delivery was planned for 36 + 6 weeks to optimize resource availability. On the day of the Cesarean delivery, the patient received her scheduled antiepileptic medications. Anxiolysis with midazolam facilitated positioning and surgical preparation and allowed for adequate preoxygenation. Rapid sequence induction and intubation proceeded with anesthetic maintenance initially with volatiles and transitioned to total intravenous anesthesia. Baby was delivered without complication with Apgar scores 8 and 8. Long-acting opioid analgesia was administered intraoperatively, and bilateral ultrasound-guided transversus abdominis plane blocks were placed for postoperative analgesia.

Discussion:
Although neurosyphilis is not an absolute contraindication, a safe awake neuraxial anesthetic requires patient cooperation and awareness. Active central nervous system infection raises theoretical risks of pathogen introduction into the neuraxial space, exacerbation of neurologic injury, and difficulty attributing postoperative changes to anesthetic versus disease progression. While some literature supports neuraxial anesthesia in treated or asymptomatic neurosyphilis, there is limited guidance for patients with suspected active disease and impaired capacity. Early multidisciplinary coordination and ethical consultation are critical in optimizing outcomes for medically and socially complex parturients.

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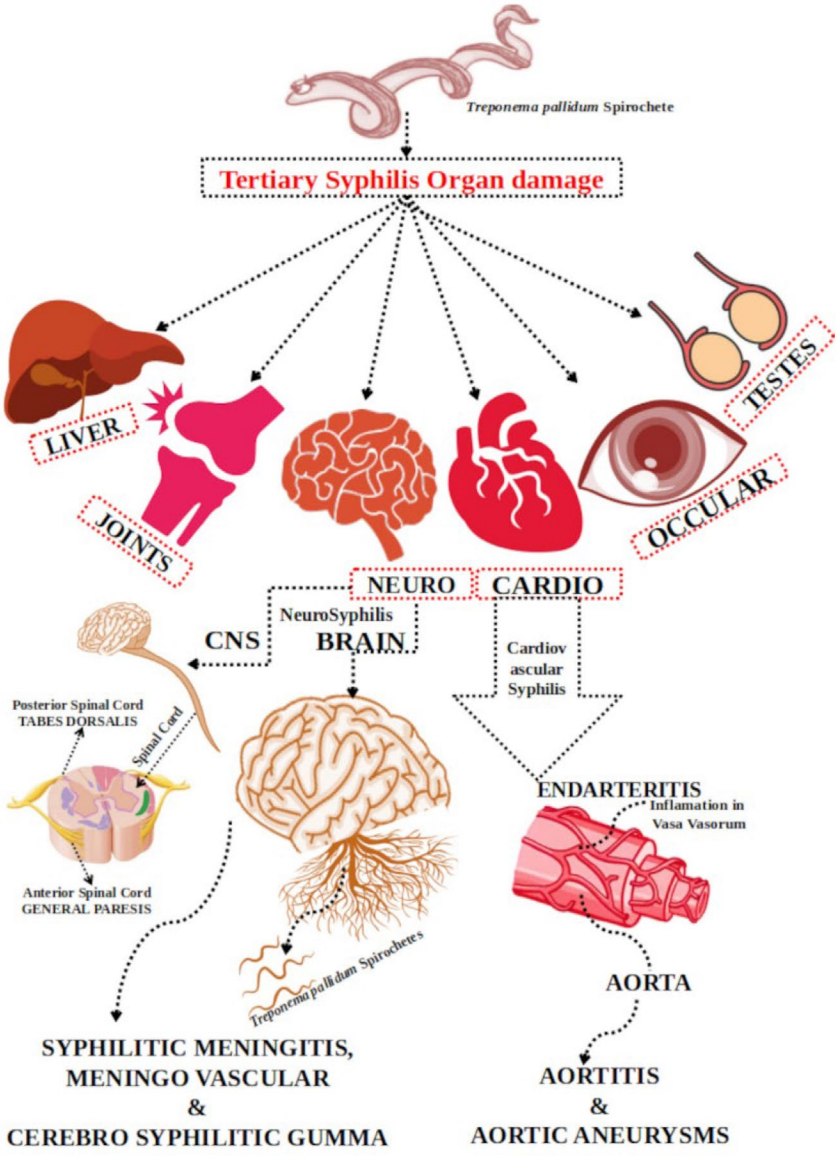

SAT - CR - BS 2 - BR 3A - Cesarean Delivery, Unusual Issues – 03

Anesthetic Management of a Morbidly Obese Parturient Requiring Preterm Delivery due to Severe-Range Hypertension

Presenting Author: Maria Santa Cruz, DO

Presenting Author's Institution: Albany Medical Center - Albany, New York

Introduction:
Severe-range hypertension in pregnancy is associated with significant maternal and fetal morbidity and may require urgent delivery. Anesthetic management is further complicated in patients with morbid obesity and hemodynamic instability. Careful multidisciplinary planning is essential to minimize maternal risk and optimize outcomes.

Case One:
A G3P2002 woman at 28 weeks and 4 days' gestation transferred from another hospital for severe-range blood pressures, with systolic values exceeding 200 mmHg. She reported a history of gestational hypertension and pre-eclampsia in prior pregnancies but denied chronic hypertension or antihypertensive use outside of pregnancy. She was admitted to the medical intensive care unit (ICU) and required a nicardipine infusion with intravenous boluses of labetalol and hydralazine. The patient was morbidly obese with a body mass index of 59. While in the ICU, she remained asymptomatic for pre-eclampsia, and blood pressures improved to the mild range on a nicardipine infusion. Given ongoing maternal risk, the obstetric team recommended delivery. The anesthetic plan included arterial line placement for continuous blood pressure monitoring. Bedside point-of-care ultrasound demonstrated good left ventricular contractility without obvious cardiac abnormalities. A combined spinal–epidural technique was attempted at the L3–4 interspace using 1.8 mL of 0.75% hyperbaric bupivacaine, 15 mcg fentanyl, and 100 mcg morphine. Although intrathecal dosing was successful, the epidural catheter could not be threaded. This was communicated to the obstetric team, including the potential need for conversion to general anesthesia. The cesarean section was performed under a spinal. The rest of intra-op course was uneventful. Postoperatively patient discharged to the ICU for further care.

Discussion:
Severe hypertension in pregnancy is associated with increased maternal morbidity, including stroke, myocardial ischemia, pulmonary edema, and postpartum hemorrhage. Neuraxial anesthesia is generally preferred for cesarean delivery in hypertensive parturients, as it is associated with lower maternal morbidity compared with general anesthesia [3,4]. In this case, invasive arterial blood pressure monitoring allowed close hemodynamic control in a patient requiring intravenous antihypertensives. Although epidural catheter placement was unsuccessful, early communication and contingency planning was essential to ensure maternal safety. This case highlights the importance of individualized anesthetic planning,multidisciplinary coordination, and prioritization of neuraxial anesthesia when feasible to

optimize maternal outcomes in high-risk obstetric patients [2,5].

References:

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SAT - CR - BS 2 - BR 3A - Cesarean Delivery, Unusual Issues – 04

Delivery Management in Marfan Syndrome with Aortic Root Dilation and Failed Combined Spinal-Epidural

Presenting Author: Colette E. Jones

Presenting Author's Institution: UAB Heersink School of Medicine - Huntsville, Alabama

Co-Authors: Xiao Lu Zhang, DO, PhD - University of Alabama at Birmingham

Introduction:
Marfan syndrome (MFS) places patients at increased risk of cardiovascular complications, most often aortic dilation, which can progress to aortic dissection [1]. Pregnancy has been linked with a 5-fold increase in aortic complication among MFS patients [2]. Therefore, it is recommended that patients with an aortic root (AoR) diameter >4.5cm undergo aortic root replacement and/or avoid pregnancy [3]. This case displays a patient with a 4.6cm AoR dilation who delivered a live neonate via cesarian section (CS) and reviews anesthetic management of this high-risk delivery.

Case One:
A 28-year-old G1P1 with a history of MFS with AoR dilation presented for scheduled CS at 37 weeks gestation. AoR dilation had been previously diagnosed but increased in size during her pregnancy from 4.3cm at 17.5 weeks to 4.6cm at 28.6 weeks, as visualized via echo. During her anesthesia consult, the patient expressed that she had not experienced adequate pain relief with epidural during her prior vaginal forceps delivery. Combined spinal-epidural (CSE) was attempted at multiple levels with convincing loss of resistance; however, anesthesia was unable to obtain cerebrospinal fluid flow with attempted dural puncture. An epidural catheter was threaded and a T4 level was obtained with 2% lidocaine and fentanyl bolus. Unfortunately, after draping the patient, she had a failed Allis test. After discussion with the patient, her family, and the obstetricians, the patient elected for general anesthesia. An arterial line was employed, and her BP remained < 130/90. Patient developed post-partum hemorrhage with estimated blood loss 1000 cc, which was controlled with a Pitocin bolus and hysterotomy closure. Her post-op course was uncomplicated, and she was discharged on post-op day 4.

Discussion:
The patient's AoR dilation of >4.5cm classified her pregnancy as extremely high-risk (mWHO class IV) due to likelihood of aortic dissection. Anesthetic considerations included blood pressure monitoring, failed neuraxial, and management of PPH. This case adds to the literature of successful CS delivery in a high-risk cardiac patient.

References:
1. Cardiology. 2020;146(1):98-105

2. Int J Cardiol. 2009;136(2):156-161

3. Eur Heart J. 2018;39(34):3165-3241

SAT - CR - BS 2 - BR 3A - Cesarean Delivery, Unusual Issues – 05

Anesthetic Considerations for Cesarean Delivery in a Patient with History of Antepartum Hemicraniectomy

Presenting Author: Jeremy Altman, MD

Presenting Author's Institution: Albany Medical Center - Albany, New York

Introduction:
Neurosurgical emergencies during pregnancy are rare but challenging, often requiring urgent craniectomy to prevent maternal deterioration. Clinicians must balance maternal survival, neurological function, and fetal well-being. Subsequent obstetric care is complex, requiring a balance between intracranial pressure (ICP) and hemodynamic stability. We present a case of a parturient who underwent a craniotomy and emergent craniectomy followed by a successful cesarean delivery under neuraxial anesthesia.

Case One:
A 39-year-old G6P1131 female with a history of asthma, hypothyroidism, and gestational diabetes presented for elective cesarean delivery at 37 weeks. At 16 weeks gestation, she underwent endoscopic resection of a meningioma and bilateral optic nerve decompression; two weeks later, she required an emergent right hemicraniectomy for subdural empyema. To avoid Valsalva-induced ICP increases associated with labor, neurosurgery recommended a C-section. Given her prior bone plate removal, neuraxial anesthesia was deemed safe. The patient was neurologically intact at 37 weeks and received spinal anesthesia (0.75% bupivacaine, 15 mcg of fentanyl, 100 mcg of morphine sulfate), subsequently delivering a healthy boy. The patient was then discharged on post-partum day two. Eight weeks post-delivery, she underwent successful cranioplasty.

Discussion:
This case report aims to highlight the importance of employing an interdisciplinary approach to consider the risks and benefits of neuraxial versus general anesthesia to safely aid a parturient through delivery in the setting of pre-existing neuropathology. One of the primary concerns was avoiding active labor for the patient to reduce the risk of increasing intracranial pressure. Though cesarean delivery promises to mitigate one risk factor of increased ICP, the alternatives of neuraxial and general anesthesia are not without new risks to mother and baby. With general anesthesia, there is the risk of significant hypertension with laryngoscopy and inhaled anesthetics may further contribute to increased ICP [1, 2]. The patient's presence of her right craniectomy served as a pressure release, which allowed neuraxial anesthesia to be performed without a significant risk of brain herniation. The risk of brain herniation has been seen in conditions including obstructive hydrocephalus or space-occupying lesions with mass effect. However, there have been some reports of pregnant women with prior history of craniectomy without neurologic symptoms safely receiving epidural anesthesia for labor analgesia [3]. This case demonstrates the successful use of neuraxial anesthesia in a patient with prior craniectomy and the importance of the multidisciplinary approach between anesthesiologists and subspecialty surgical teams.

References:

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SAT - CR - BS 2 - BR 3A - Cesarean Delivery, Unusual Issues – 06

Intentional Minimalism: Anesthetic Choice for Cesarean Section in Patients with Myotonic Dystrophy

Presenting Author: Katherine T. Fortson, MD

Presenting Author's Institution: Weill Cornell Medical College - Queens, New York

Co-Authors: Catharine Keim, MD - New York Presbyterian - Weill Cornell Medicine

Introduction:
Type 1 myotonic dystrophy (DM1) is a smooth muscle disorder characterized by distal muscle weakness in more mild cases and gastrointestinal (GI), cardiac, and respiratory compromise in more severe cases. Patients with DM1 are generally considered high risk from an obstetric perspective, and given the multisystem nature of the disease, they are also high risk candidates for both neuraxial and general anesthetics.

Case One:
34 year old G4P3003 with a history of three c-sections, PPH, prior cardiac arrest, DM1, and recent ICU admission at 28w0d for respiratory failure. After presenting for a mechanical fall, the patient was noted to be hypoxic, with imaging revealing pneumonia and a dilated esophagus (suspected to be related to GI dysmotility). She underwent bronchoscopy and PEG-J placement under general anesthesia. Her airway was secured via awake fiberoptic intubation due to respiratory status and a Mallampatti IV exam. She remained intubated for one day, was treated with antibiotics, and was discharged on room air. At 37w0d the patient presented for a scheduled c-section. On exam she was frail-appearing with short stature (137.2cm and 46 kg), and airway exam was notable for limited mouth opening. The decision was made to place a low-dose combined spinal epidural with an opioid-only spinal (75 mcg IT morphine, 15 mcg IT fentanyl), while incrementally dosing the epidural with 2% lidocaine (19 mL). In light of her DM1, carboprost, magnesium, and succinylcholine were avoided. Prophylactic methylergonovine and oxytocin were administered immediately after delivery of the newborn. While the OB did note dense adhesions, the case was otherwise uncomplicated. Mild intraoperative discomfort was treated with additional 3% chlorprocaine administered on the field, additional 3 mL of 2% lidocaine via epidural and 0.5 mg IV midazolam. She used a low-dose PCEA for postoperative pain control and received a second dose of neuraxial morphine before epidural removal on POD 1. Her course was complicated by an episode of pulmonary edema, which resolved on POD 2. She was discharged on POD 4.

Discussion:
The multisystem nature of DM1 requires vigilant anesthetic planning. The primary goals in this case were to avoid weakening the intercostal and accessory muscles with a full-dose spinal, and avoid a general anesthetic given her stature, poor airway exam, respiratory complications, and vulnerability to certain IV paralytics and sedatives. Rescue airway equipment included a glidescope, McGrath 2 blade, 5.0-7.0 ETT

sizes, and pediatric oral airways. Other considerations were risk of aspiration, hemorrhage, and myotonic crisis, which can be triggered both pregnancy and by perioperative stimuli (pain, shivering, cautery)1,2. Thus, anesthetic planning for pregnant patients with DM1 should reflect intentional minimalism: emphasizing avoidance of triggers rather than escalation of therapy.

References:

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2. Anaesth Intensive Care. 2011 Mar;39(2):293-8.

SAT - CR - BS 2 - BR 3A - Misc Hematology – 01

Second Trimester Abortion Complicated by Atypical Hemolytic Uremic Syndrome

Presenting Author: Elizabeth McCarthy, MD, PhD

Presenting Author's Institution: University of California, San Francisco - San Francisco, California

Co-Authors: Luis Garcia, MD, MS - University of California, San Francisco
Rafa Ifthikhar, MD - Department of Obstetrics, Gynecology and Reproductive Sciences, University of California San Francisco

Introduction:
Abortion is overall safer than childbirth (1), but understanding uncommon abortion complications is essential to ensure patient safety. Pregnancy-associated thrombotic microangiopathy (TMA) is the clinical presentation of several rare pregnancy-related disorders, including atypical (or complement-mediated) hemolytic uremic syndrome (aHUS) – a highly morbid and even life-threatening syndrome, which usually occurs in the peripartum period (2). Here we report an unusual case of aHUS after a second-trimester abortion.

Case One:
A 23-year-old nulliparous woman presented for a 24-week abortion by dilation and evacuation under paracervical block and deep sedation. Her procedure was complicated by intraoperative hemorrhage and disseminated intravascular coagulation, which were successfully managed with uterotonics, blood products, and uterine artery embolization. Postoperatively, the patient had worsening renal function thought to be secondary to hypotensive acute tubular necrosis and contrast induced nephropathy. However, on post-operative day (POD) 4, as the patient's renal function continued to worsen with her serum creatinine increasing from 0.73 mg/dL preoperatively to 9.07 mg/dL, TMA was diagnosed based on newly positive hemolysis labs. A diagnosis of aHUS was made after ruling out other causes of pregnancy-associated TMA, including HELLP syndrome, thrombotic thrombocytopenia purpura, and antiphospholipid syndrome. The patient was transferred to a tertiary care center to start eculizumab, a complement inhibitor, but self-directed her discharge on POD6 before beginning treatment. The patient re-presented on POD11 with dyspnea and lower extremity swelling and was found to have new heart failure with mildly reduced ejection fraction with likely etiologies including stress-induced, peripartum, or aHUS-associated cardiomyopathy. The patient's symptoms improved without diuresis and she was initiated on Guideline-Directed Medical Therapy. Her renal function also significantly improved (serum creatinine 1.82 mg/dL on POD14) without intervention. Due to the spontaneous resolution of her aHUS and the risks of long-term complement inhibition, treatment with eculizumab was deferred.

Discussion:
This case showcases aHUS as a rare abortion complication. Our case, along with another recent case of aHUS after first-trimester abortion complicated by infection (3), suggests rare development of aHUS after abortion with other clinical risk factors (e.g., genetic predisposition, hemorrhage, and infection). The

deferral of eculizumab due to spontaneous self-resolution of aHUS in our case differs from a previous report of aHUS in the first-trimester of pregnancy (4) where ongoing eculizumab infusions were used for initial and preventative therapy. Further studies are needed to clarify the risk factors for abortion-associated aHUS and to provide guidance for optimal management.

References:

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3. PMID: 41477157

4. PMID: 28101432

SAT - CR - BS 2 - BR 3A - Misc Hematology – 02

Management Considerations in a Parturient Patient with BENTA Disease

Presenting Author: Daniel Stevens, MD

Presenting Author's Institution: UCI Medical Center - Orange, California

Co-Authors: Michael Holland, MD - University of California, Irvine
Daniel Webster, MD - UCI Medical Center

Introduction:
Performing neuraxial anesthesia in laboring patients with thrombocytopenia requires careful risk-benefit consideration. SOAP has released a consensus statement that in patients with gestational thrombocytopenia, ITP, or hypertensive disorders of pregnancy with platelet counts ≥70k, there is likely a low risk of epidural hematoma, one of the most feared complications of neuraxial anesthesia. However, SOAP does not extrapolate this guideline to other conditions of thrombocytopenia. Conditions leading to splenomegaly and subsequent platelet sequestration may be overlooked. One rare example is BENTA disease (B-cell Expansion with NF-KB and T-cell Anergy), a primary immunodeficiency caused by an autosomal dominant gain-of-function mutation in the CARD-11 gene, resulting in lymphoproliferation, immunodeficiency, splenomegaly, and chronic thrombocytopenia.

Case One:
A 29-year-old G1P0 with BENTA disease presented for scheduled cesarean section with a platelet count of 49k, consistent with her previous baseline. A multidisciplinary discussion was held with MFM, hematology, and OB anesthesia for delivery planning. Given the patient's strong preference for neuraxial anesthesia and prior response to platelet transfusion with counts >100k for several days, hematology felt neuraxial anesthesia could be performed safely following transfusion. The agreed plan was platelet transfusion followed by cesarean section under single-shot spinal anesthesia. On the morning of surgery, the patient received 2 units of platelets with minimal change on repeat CBC, rising to only 56k. As this was below OB anesthesia team's threshold, the decision was made to proceed under general anesthesia. Intraoperatively, she received oxytocin, methylergonovine, and 1 g tranexamic acid with a quantitative blood loss of ~800 mL. The procedure was otherwise uncomplicated, and a healthy infant was delivered.

Discussion:
This case highlights the importance of recognizing both common and rare conditions that can result in thrombocytopenia. Particularly in rare conditions that lack consensus guidelines, multidisciplinary collaboration can be helpful to guide management decisions. In this case, given patient preference and hematology input, an attempt was made to raise the patient's platelets with transfusion to perform neuraxial anesthesia but was ultimately unsuccessful. Hematology could not identify a clear reason why the patient did not respond as she did not have a significant past transfusion history to be sensitized to platelet antigens. More research in parturient patients with BENTA disease and other similar conditions is needed to better address how to safely perform neuraxial anesthesia and prevent other possible

complications like postpartum hemorrhage in the setting of thrombocytopenia.

References:

1. Anesth Analg 2021;132:1531–1544

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SAT - CR - BS 2 - BR 3A - Misc Hematology – 03

Thinking Outside the Epidural Space: Labor Analgesia in a Patient With PNH and Prior TBI

Presenting Author: Briel S. Lee, MD

Presenting Author's Institution: University of North Carolina - Chapel Hill, North Carolina

Co-Authors: Bridget M. Marroquin, MD, MS - University of North Carolina
Christine P. McKenzie, MD - University of North Carolina

Introduction:
Paroxysmal nocturnal hemoglobinuria (PNH) is a rare, acquired clonal hematopoietic stem cell disorder caused by deficiency of glycosylphosphatidylinositol-anchored complement regulatory proteins, resulting in uncontrolled complement activation with intravascular hemolysis, bone marrow failure, and a markedly increased risk of venous and arterial thrombosis 1. Thromboembolism remains the leading cause of mortality in PNH and is further potentiated during pregnancy due to physiologic hypercoagulability. Obstetric management is complicated by frequent cytopenias which may preclude neuraxial anesthesia. Concomitant neurologic comorbidities, such as prior traumatic brain injury, craniotomy, and seizures further narrow anesthetic considerations and require careful balancing of maternal analgesia, cerebral perfusion pressure (CPP), and hemorrhagic and thrombotic risk.

Case One:
We report the anesthetic management of a parturient with a history of traumatic brain injury (TBI) status post decompressive craniotomy, seizure disorder, and PNH. Given the competing risks of these comorbidities, a multidisciplinary plan was developed to emphasize close monitoring, optimal CPP, and avoidance of neuraxial anesthesia due to extreme thrombocytopenia. Anesthetic management prioritized minimization of physiologic stress by prevention of hypoxia and hypercarbia with frequent respiratory checks, offering alternative analgesia, and vigilance for thrombotic and hemorrhagic complications via anticoagulation, ambulation, and quick recognition of postoperative hemorrhage. Alternative labor analgesia was denied by the patient; serial platelet counts showed a nadir at 38,000/μL following labor, consistent with her missed pharmacologic management (monoclonal antibody, complement inhibitor) and physiologic stress precipitating hemolysis. Additionally, frequent neurologic checks occurred q1h to evaluate for seizure activity or altered consciousness. Ultimately, her spontaneous vaginal delivery and recovery was accomplished without neurologic deterioration, hemorrhagic events, or thrombotic complications.

Discussion:
To our knowledge, there are limited reports describing labor analgesia in parturients with PNH complicated by severe thrombocytopenia, and none that include the added anesthetic considerations of prior TBI with decompressive craniotomy. In this context, heightened thrombotic risk and profound

thrombocytopenia significantly limit anesthetic options but emphasize our role as obstetric-perioperative consultants that think "outside the epidural space" with multidisciplinary collaboration. Our experience demonstrates that carefully titrated alternative analgesic strategies can minimize the severity of hemolysis while maintaining maternal hemodynamics for neurologic stability in a complex patient.

References:

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CBC						
Slide Scan						
WBC	5.1		5.7	9.8	9.6	7.1
RBC	3.31 ↓		2.96 ↓	3.04 ↓	3.00 ↓	3.26 ↓
HGB	12.1		11.0 ↓	11.3	11.3	11.9
HCT	34.6		31.3 ↓	32.0 ↓	31.1 ↓	33.4 ↓
MCV	104.5 ↑		105.5 ↑	105.0 ↑	103.7 ↑	102.6 ↑
MCH	36.6 ↑		37.1 ↑	37.2 ↑	37.7 ↑	36.6 ↑
MCHC	35.0		35.2	35.4	36.3 ↑	35.7
RDW	15.2		15.1	15.1	15.2	15.1
MPV	7.6		9.0	9.4	8.5	9.0
Platelet	68 ↓		45 ↓	43 ↓	38 ↓	45 ↓

SAT - CR - BS 2 - BR 3A - Misc Hematology – 04

Anesthetic management of a parturient with May-Hegglin anomaly

Presenting Author: Reagan Hattaway, MD
Presenting Author's Institution: The University of Alabama at Birmingham - Birmingham, Alabama
Co-Authors: Xiao Lu Zhang, DO, PhD - University of Alabama at Birmingham

Introduction:
35-year-old G1P0010 female with May-Hegglin anomaly (MHA) presenting at 39 weeks gestation for scheduled cesarean delivery (C/S) under general anesthesia (GA).

Case One:
35-year-old parturient at 39 weeks gestation presents with a history of MHA and platelet count of 93,000. She endorsed a history of epistaxis and menorrhagia, and a historical platelet count of 50,000 to 80,000. Past surgical history is notable for a dilation and curettage under GA without complication. Prior to delivery, hematology and obstetric anesthesiology were consulted. Given her thrombocytopenia, concern for platelet dysfunction, in setting of a unique genetic variant, and patient preference the decision was made to proceed with scheduled C/S under GA. 1g tranexamic acid (TXA) was given preoperatively. Induction was complicated by a difficult airway requiring two attempts at intubation. The C/S was uncomplicated with an estimated blood loss of 800ml and minimal lochia postoperatively. Blood transfusion was not required and the patient was discharged home with oral TXA.

Discussion:
MHA is an inherited macrothrombocytopenia caused by an autosomal dominant mutation in the MYH9 gene presenting with bruising, gum bleeding, epistaxis, and menorrhagia. This provides a challenge during pregnancy due to increased risk of bleeding and hematoma formation with neuraxial anesthesia, though a systematic review reveals that most deliveries in women with MHA proceed without severe bleeding complications regardless of delivery mode.(1) Patients with MHA traditionally deliver via C/S under GA , but there are case reports documenting successful vaginal deliveries and neuraxial anesthesia without complication.(2,3,4,5)

References:
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SAT - CR - BS 2 - BR 3A - Misc Hematology – 05

Needles, Numbers, and Nuance: Two Cases of Neuraxial Anesthesia in FXI Deficiency

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Co-Authors: Caroline Berube, MD, FRCPC - Stanford University School of Medicine
Holgar Mua Fung, MD, MPH, DESAIC - Centres de Urgences de Yaounde
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Introduction:
Incidental Factor XI (FXI) deficiency is increasingly detected in pregnancy via expanded carrier screening. Bleeding phenotype correlates poorly with plasma FXI activity, and obstetric-specific thresholds for neuraxial anesthesia/analgesia (NA) are heterogeneous, creating uncertainty when offering NA for labor and cesarean delivery. A recent Delphi Consensus advocates a 50% threshold for NA (1), but this recommendation remains debated. Retrospective and single-center reports in high-prevalence population suggest thresholds as low as 33% may be acceptable in select asymptomatic patients (2,3), supporting a case-by-case multidisciplinary approach. We report two cases, at our tertiary-referral academic center, that demonstrate successful application of a multidisciplinary pathway (hematology, obstetrics, anesthesia) combining bleeding history with targeted third-trimester FXI testing to facilitate NA.

Case One:
A 43-year-old G1P0 at 35 weeks with an F11 variant identified on genetic testing had third-trimester FXI function 42% and no bleeding history. She underwent elective cesarean delivery for prior myomectomy at 37+3 weeks under a single-shot spinal. Quantified blood loss (QBL) was 1233 mL. No second-line uterotonics, tranexamic acid, or factor replacement were required. No hemorrhagic or neurologic complications occurred, and the patient was discharged on post-operative day 4.

Case Two:
A 31-year-old G1P0 identified as heterozygous on carrier testing had FXI 60% in early pregnancy that was later measured as 36% and then 42% at 35+2 weeks. She reported only minor prior bleeding (prolonged oozing after a root canal and occasional epistaxis). In spontaneous labor at 39+5 weeks, she received an uncomplicated labor epidural and delivered vaginally with a QBL of 808 mL. No prophylactic antifibrinolytics or factor replacement were given. Neurological checks were normal and she was discharged on postpartum day 2.

Discussion:
These cases highlight that early planning and multidisciplinary discussion can facilitate NA placement. Single intermediate value requires clinical context and FXI activity can fluctuate in pregnancy due to

patient and measurement (pre-analytic conditions and inter-laboratory variability) factors. Future research should evaluate the role of point-of-care viscoelastic tests (ROTEM/TEG), used in addition to FXI activity levels, to provide a dynamic, functional assessment of hemostasis prior to NA, potentially refining risk stratification beyond static FXI activity levels alone. Larger prospective studies are needed to define an obstetric-specific threshold and standardized peripartum protocols. These cases illustrate a pragmatic, case-by-case approach in select patients with third-trimester FXI activity in the 30-50% range, in whom NA was successfully received without routine prophylactic antifibrinolytics or factor replacement.

References:

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2. Blood Adv. 2023;7(10):1967–1975 3. Haemophilia. 2020;26(5):834–839

SAT - CR - BS 2 - BR 3A - Misc Hematology – 06

Anesthetic decision-making under diagnostic uncertainty in suspected pregnancy-associated thrombotic microangiopathy with intrauterine fetal demise

Presenting Author: Shingo Tanaka, MD

Presenting Author's Institution: Division of Obstetric Anesthesia, Department of Anesthesiology, Saitama Medical Center, Saitama Medical University, Japan - Kawagoe, Saitama

Introduction:
Pregnancy-associated thrombotic microangiopathy (TMA), including atypical hemolytic uremic syndrome (aHUS), is a rare but life-threatening condition that often mimics HELLP syndrome during the peripartum period. When complicated by intrauterine fetal demise (IUFD), anesthetic management must be conducted under diagnostic uncertainty while accounting for evolving coagulopathy, hemodynamic instability, and the need for urgent delivery. We report a case highlighting how anesthetic decision-making and early multidisciplinary coordination influenced peripartum management.

Case One:
A 33-year-old primigravida at 36 + 1 weeks' gestation was transferred with severe hypertension (193/115 mmHg) and IUFD. Laboratory findings demonstrated thrombocytopenia (93×10^9/L), elevated liver enzymes, acute kidney injury (creatinine 1.24 mg/dL), heavy proteinuria, and schistocytes, raising concern for pregnancy-associated TMA, including HELLP syndrome and aHUS. Given thrombocytopenia with anticipated progressive decline and microangiopathic hemolysis, neuraxial anesthesia was deferred due to the dynamic risk of spinal hematoma and the anticipated need for urgent invasive therapies. The anesthesiology team initiated intravenous fentanyl infusion for labor analgesia, maintained strict hemodynamic control, and proactively coordinated with obstetric, critical care, and nephrology teams to ensure immediate access to renal replacement therapy and plasma exchange. Controlled vaginal delivery was achieved six hours after admission. Postpartum, hepatic and renal dysfunction rapidly progressed with oliguria (AST 1050 IU/L, creatinine 3.48 mg/dL at 12 hours). Suspected aHUS prompted immediate ICU admission and initiation of hemodialysis and plasma exchange on the day of delivery, followed by transfer for complement inhibitor therapy.

Discussion:
This case illustrates the critical role of anesthesiologists in managing IUFD complicated by suspected pregnancy-associated TMA. Key anesthetic considerations included avoidance of neuraxial techniques in the setting of potentially progressive thrombocytopenia, selection of systemic analgesia to allow timely vaginal delivery, and early coordination with critical care and nephrology teams. Without early anesthesiology involvement, escalation to organ-supportive therapies might have been delayed. Proactive anesthetic-led multidisciplinary planning under diagnostic uncertainty may directly influence maternal outcomes in similar high-risk peripartum scenarios.

References:

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SAT - CR - BS 2 - BR 3A - Misc Hematology – 07

Neuraxial Denied: Anesthetic Management of Severe Pancytopenia and Presumed Myelodysplastic Syndrome in a Patient with Superimposed Preeclampsia

Presenting Author: Nicholas Mangano

Presenting Author's Institution: Stony Brook University Hospital - Stony Brook, New York

Co-Authors: Michael Lu - Stony Brook University Hospital
Genevieve Monanian - Stony Brook University Hospital

Introduction:
Pancytopenia in pregnancy is uncommon and carries high maternal-fetal risk. Causes include marrow failure syndromes, myelodysplastic syndrome (MDS), infections, autoimmune disease, and nutritional deficiencies (1). Severe thrombocytopenia increases hemorrhage risk and often precludes neuraxial anesthesia due to potential spinal hematoma (2). Perioperative care is further complicated by transfusion needs, alloimmunization, and immunosuppressive therapy (3). Superimposed preeclampsia further heightens maternal morbidity, making multidisciplinary management essential.

Case One:
A 32-year-old G1P0 at 36+6 weeks with pancytopenia, recurrent pneumonia, and heterozygous Factor V Leiden mutation presented for induction. Evaluation revealed persistent cytopenias with platelets < 50,000/μL. Bone marrow biopsy showed trisomy 11 and KMT2A clone, suggestive of MDS. She required >14 transfusions during pregnancy for anemia and thrombocytopenia. During induction, she developed severe-range pressures and was diagnosed with preeclampsia with severe features. Magnesium sulfate was started. Severe thrombocytopenia contraindicated neuraxial anesthesia; cesarean was performed under general anesthesia. Anticipating hemorrhage, large-bore IV access was secured and blood products prepared. Estimated blood loss was 1,000 mL, with intraoperative transfusion of red cells and platelets. Postoperatively, she remained hemodynamically stable with mild-range pressures and intermittent oxygen needs from pneumonia. Hematology recommended IVIG and transfusion support prior to discharge; the patient opted for outpatient transfusions. Postpartum anticoagulation was considered but deferred due to persistent platelets < 50,000/μL. She was discharged on postoperative day six with close hematology and obstetric follow-up.

Discussion:
This case illustrates anesthetic and hematologic challenges in pancytopenic pregnancies. Neuraxial anesthesia is contraindicated with severe thrombocytopenia; guidelines suggest ≥70,000/μL, with individualized consideration between 50,000–70,000/μL (2). General anesthesia was safest to avoid spinal hematoma. Transfusion targets were hemoglobin >7 g/dL and platelets >50,000/μL for surgery, higher if bleeding. Pregnancy hypercoagulability and Factor V Leiden raised thrombosis risk, but anticoagulation was withheld to prevent hemorrhage, reflecting the delicate balance of care. This case

underscores the anesthesiologist's role in anticipating hemorrhage, securing transfusion readiness, and tailoring anesthetic strategy. Multidisciplinary planning enabled safe maternal and neonatal outcomes despite overlapping hematologic, obstetric, and anesthetic risks.

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SAT - CR - BS 2 - BR 3B - Complex Cesarean – 01

Anesthetic Management for an EXIT Procedure in a Parturient With Fetal Cervical Teratoma

Presenting Author: Xinhao Liu, MD, PhD

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Co-Authors:

Introduction: The ex utero intrapartum treatment (EXIT) procedure maintains uteroplacental circulation to allow fetal airway stabilization or other critical interventions before cord clamping. Originally developed for congenital diaphragmatic hernia, its use has expanded to include large cervical or oropharyngeal masses, congenital high airway obstruction syndrome (CHAOS), and anticipated difficult neonatal airways [1, 2]. Anesthetic management is demanding, requiring uterine relaxation while minimizing maternal hemorrhage and hemodynamic instability and ensuring adequate fetal anesthesia [3]. This report describes the anesthetic management of an EXIT procedure, focusing on maternal hemodynamic stability and facilitation of fetal airway control.

Case One: A 19-year-old gravida 3 para 2002 at 38 + 1 weeks' gestation presented with a fetus diagnosed with a large cervical teratoma. Fetal MRI demonstrated a 7.0 × 6.6 × 6.0 cm cervical mass extending from the sublingual space into the superior mediastinum, with posterior displacement of the trachea, raising concern for airway obstruction. The patient was counseled and scheduled for an EXIT procedure under general anesthesia. In the operating room, standard monitors were applied, and a second large-bore IV and arterial line were placed. Following preoxygenation, anesthesia was induced and the trachea intubated uneventfully. Anesthesia was maintained with 2 MAC sevoflurane, neuromuscular blockade, and a phenylephrine infusion to support maternal blood pressure. Remifentanil infusion was initiated prior to uterine incision. Nitroglycerin was titrated to achieve uterine relaxation. Twenty-two minutes after uterine incision, the fetal head was partially delivered and amnioinfusion initiated. The fetus received intramuscular atropine and fentanyl, followed by successful video laryngoscopic intubation and neuromuscular blockade. Delivery occurred 25 minutes after head exposure. After delivery, nitroglycerin and volatile anesthetics were discontinued, and anesthesia transitioned to propofol. Estimated blood loss was approximately 1.9 L; maternal hemodynamics remained stable, and recovery was uneventful.

Case Two:

Discussion: High-dose volatile anesthesia and nitroglycerin were used to achieve uterine relaxation while phenylephrine maintained maternal blood pressure. Remifentanil provided maternal and fetal anesthesia and immobility, and fetal atropine and fentanyl were administered prior to airway manipulation. Despite significant blood loss, maternal hemodynamics remained stable with invasive monitoring and

vasopressor support. Successful fetal airway control underscores the importance of uteroplacental perfusion, adequate fetal anesthesia, and coordinated multidisciplinary management during EXIT procedures.

References: 1. Gaffuri et al., “The Ex-Utero Intrapartum Treatment Procedure.” 2.Sangaletti et al., “The Ex Utero Intrapartum Treatment (EXIT) Procedure.” 3. Braden et al., “Anesthetic Management of an Ex Utero Intrapartum Treatment Procedure.”

SAT - CR - BS 2 - BR 3B - Complex Cesarean – 02

Successful management of extended cesarean section and hysterectomy with neuraxial blockade

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Introduction: Uterine rupture is a potentially catastrophic peripartum complication requiring decisive intervention by a multidisciplinary team. Literature reports a 43.7% association of uterine rupture with abnormal placentation, with a 27% rate of cesarean hysterectomy. (1) We report a case of uterine rupture and placenta accreta leading to cesarean hysterectomy managed successfully with neuraxial anesthesia.

Case One: 35 year-old G3P2 at 32 weeks gestation presented to the ER with severe abdominal pain awakening her from sleep. Past obstetrical history was significant for 2 cesarean deliveries. Current pregnancy was complicated by gestational diabetes, complete placenta previa and placenta accreta spectrum. She was awaiting abdominal delivery at 36 weeks. On presentation, her pain was sharp, localized to the upper abdomen, exacerbated with lying flat. She denied vaginal bleeding or leakage of fluids. Vital signs were normal. An urgent CT showed hemoperitoneum with possible uterine rupture. A multidisciplinary team including OB, Anesthesia, Urology and Trauma Surgery decided on immediate surgical delivery with planned hysterectomy and postoperative ICU admission. Given maternal hemodynamic stability coupled with category 1 FHR tracings, both Anesthesia and OB teams felt neuraxial anesthesia was possible. The patient received a CSE with 12mg hyperbaric Bupivacaine, 15mcg Fentanyl, 100mcg Morphine, and 5mcg Dexmedetomidine administered intrathecally. Cystoscopy with bilateral ureteral stent placement was performed initially, followed by surgical delivery of a live newborn boy with APGAR scores of 8 and 9. Upon entry into the peritoneal cavity a 3 cm uterine rupture along the lower uterine segment was found as well as 500 mL of hemoperitoneum. The subsequent hysterectomy was complicated by bladder injury and massive hemorrhage (EBL 5243 mL) requiring MTP activation. Transfusion totalled 6 units PRBCs, 6 units FFP, 1 unit platelets and 10 units cryoprecipitate. Neuraxial anesthesia was maintained throughout the case via sequential epidural boluses of Lidocaine 2%, Bupivacaine 0.5%, and Dexmedetomidine. In addition, after delivery she received IV sedation with Midazolam and Dexmedetomidine. Phenylephrine was titrated throughout at rates of 15-50 mcg/min. The duration of the case was 7 hours. The patient was transferred to the ICU in stable condition where she had an uneventful recovery. She was downgraded on postpartum day 4, and discharged home 2 days later.

Case Two:

Discussion: This case highlights the importance of timely multidisciplinary intervention, as well as the

ability to provide safe, successful neuraxial anesthesia even in such extreme circumstances through careful preparation and close titration to effect.

References: (1) Sharon N, Maymon R, Pekar-Zlotin M, Betser M, Melcer Y. Midgestational pre-labor spontaneous uterine rupture: a systematic review. J Matern Fetal Neonatal Med. 2022 Dec;35(25):5155-5160. doi: 10.1080/14767058.2021.1875435. Epub 2021 Mar 10. PMID: 33691570.

SAT - CR - BS 2 - BR 3B - Complex Cesarean – 03

Case Report: Emergent Total Colectomy for Toxic Megacolon During Pregnancy

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Co-Authors:

Introduction: Toxic megacolon in pregnancy poses acute maternal sepsis risk with immediate fetal implications, yet guidance for anesthetic management during emergent colectomy is limited. Multidisciplinary coordination is essential for medical optimization and surgical decision-making.^1 We present a case of emergent total colectomy in a pregnant patient with refractory ulcerative colitis and suspected toxic megacolon, highlighting key intraoperative anesthetic considerations for maternal and fetal safety.

Case One: A 36-year-old G4P3003 at 24 weeks' gestation with a history of ulcerative colitis presented with worsening abdominal pain shortly after discharge from a prolonged hospitalization for a severe colitis flare. During initial admission, flexible sigmoidoscopy revealed deep ulceration extending from the rectum to hepatic flexure. Management included bowel rest, infliximab, mesalamine, and intravenous steroids. Within 24 hours of discharge, she developed fever, lethargy, escalating abdominal pain, hypotension and elevated inflammatory markers, raising concern for sepsis and toxic megacolon with impending perforation. She was transferred to a quaternary center for multidisciplinary management involving maternal-fetal medicine, gastroenterology, colorectal surgery and neonatology.

Case Two:

Discussion: Following coordinated planning, the patient underwent emergent exploratory laparotomy with total abdominal colectomy and end ileostomy under general anesthesia. Given pregnancy-related physiologic changes, intraoperative management for non-obstetric surgeries emphasizes mitigation of hypotension.^2 Intraoperative anesthetic priorities included maternal resuscitation in the setting of sepsis, maintenance of uteroplacental perfusion and preparedness for hemorrhage given extensive colonic dilation, adhesions and friable tissue. Maternal-fetal medicine performed uterine displacement to minimize aortocaval compression and support uterine perfusion.^2 Hemodynamics remained stable throughout the procedure and the patient recovered in the ICU without immediate complications. She later underwent uncomplicated induction of labor at term. This case demonstrates that with coordinated multidisciplinary planning and vigilant anesthetic management focused on maternal stabilization and uteroplacental perfusion, emergent colectomy for toxic megacolon in pregnancy can be performed while preserving maternal stability and fetal well-being.

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SAT - CR - BS 2 - BR 3B - Complex Cesarean – 04

Case Report: Anesthetic Management for Cesarean Delivery in a Pancreas-Kidney Transplant Recipient with Renal Graft Failure

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Introduction: Pregnancy in simultaneous pancreas-kidney transplant (SPKT) recipients is uncommon. It is associated with preterm delivery, low birth weight, miscarriage, graft rejection, preeclampsia, gestational diabetes, HTN, UTI, anemia, and C/S (1). We present management of a parturient with SPKT and renal graft rejection for preterm rC/S (non-reassuring FHR, hydrops).

Case One: A 39-y/o G4P0211 presented with non-reassuring FHR at 29 1/7 wks, PMH of type1 DM, nephropathy, SPKT, renal graft rejection, neuropathy, gastroparesis, vasculopathy, retinopathy, neuropathic arthropathy, seizures, CVA, anemia, and HTN, PSH of SPKT and C/S x 2. She took azathioprine, tacrolimus, hydromorphone, nifedipine, labetalol, hydralazine, gabapentin, mirtazapine, montelukast, sertraline and received hemodialysis 6 days/wk (LUE A/V fistula) but missed dialysis twice. US showed fetal hydrops and new polyhydramnios. She developed severe abdominal pain after amniocentesis; emergent C/S was performed with CSE after placing an a-line. 1U PRBCs, phenylephrine, and IV desmopressin were given and a 1120 g male infant (APGARs 2, 6) was delivered. Uterine atony required oxytocin and IM PGF2a (QBL 1596 mL). We transfused 2 more U PRBCs, and 750 mL crystalloid. Our patient developed acute hypoxia, b/l pulmonary edema, right perihilar infiltrate, and fever, requiring urgent dialysis and antibiotics on POD #2. She was discharged POD #13. Her neonate required mechanical ventilation, b/l tube thoracostomies, parenteral/enteral nutrition, photo, and thermoregulation therapy.

Case Two:

Discussion: Pregnancy in renal transplant recipients with low pre-pregnancy eGFR is associated with post-pregnancy graft dysfunction (2). Our patient developed DM at age 13 resulting in nephropathy and hemodialysis at 30; SPKT at 33. Her renal graft failed during the 3rd pregnancy requiring hemodialysis 6 days/wk. Missing dialysis along with peripartum fluid shifts prompted urgent dialysis for pulmonary edema and hypoxia. We placed CSE expecting a long duration of surgery (SPKT, C/S's, adhesions) and gave desmopressin to minimize bleeding risk (prior abdominal surgeries, uremic platelet dysfunction).

Immunosuppressive therapy with azathioprine and tacrolimus were used because of their safety profiles during pregnancy. Glucocorticoids, hydroxychloroquine, and cyclosporine, also low risk, may cause infection, hypertension, nephrotoxicity, adrenal insufficiency, wound infection, hyperglycemia, preeclampsia, premature labor (3). SMFM recommends parturients with SPKT have C/S for obstetrical/medical indications only (4). Unfortunately, SPKT recipients have a C/S rate near 70% (5). Multidisciplinary team management/coordination of care must include a transplant specialist, endocrinologist, nephrologist, SMFM, anesthesiologist, and neonatologist.

References: 1. J Nephrol 2020;33:1009-18 2. BMC Nephrol 2022;23:27 3. Obstet Gynecol 2019;133:e287-95 4. Am J Obstet Gynecol 2023;229:B10-32 5. TPRI 2020

SAT - CR - BS 2 - BR 3B - Complex Cesarean – 05

Third Trimester Polytrauma after High Speed MVC: A Lesson in Triage

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Introduction: Approximately 3-6% of pregnancies are complicated by a motor vehicle collision (MVC), with pregnant women involved in crashes experiencing significantly elevated risks of adverse pregnancy outcomes compared to those not involved in collisions [1-3]. Placental abruption is the most common pregnancy-specific complication following trauma, with pregnant women involved in MVCs demonstrating 1.43-fold increased odds of abruption compared to controls [1]. The risk of placental abruption and associated adverse outcomes after trauma increases substantially with advancing gestational age. Here we present a case of a third trimester parturient with resulting fetal demise secondary to placental abruption following an MVC.

Case One: A 26-year-old G1P0 at 30-weeks gestation sustained trauma in a MVC with brief loss of consciousness. She was transferred via helicopter to the emergency department (ED) and initially noted to be hemodynamically stable with right lower extremity and facial deformities. Due to her stability, she was not triaged to the highest emergency level despite her pregnancy. Following 50 minutes in the ED, she developed fetal bradycardia prompting emergent cesarean delivery and exploratory laparotomy. Trauma Surgery performed a FAST exam in the OR prior to induction, as they had not previously examined her in the ED. General anesthesia was induced via rapid-sequence intubation with video laryngoscopy and in-line cervical stabilization. Complete placental abruption and splenic laceration were discovered. The fetus was promptly delivered with unsuccessful neonatal resuscitation. She underwent splenectomy with damage control surgery, temporary abdominal closure, and ICU admission with definitive closure the following day. She was extubated the following day. Multidisciplinary services for maternal bereavement including spiritual services, social work, and grief counseling were provided. Subsequent imaging demonstrated diffuse injuries including bilateral ICA dissections, bilateral rib fractures with pulmonary contusions, right femoral shaft fracture and sternal fracture.

Case Two:

Discussion: Complete placental abruption following maternal trauma is associated with increased incidence of fetal mortality. Appropriate triage with a high suspicion for placental abruption is paramount, and coordination of care between specialties must be done in a timely manner. High acuity trauma centers have standardized protocols in place for maternal trauma, and the decision to proceed to the operating room versus completing the trauma imaging is determined by fetal/maternal indications. Important anesthetic considerations include hemodynamic monitoring, resuscitation, and safe securement

of the airway, often without cervical manipulation as imaging to evaluate the extent of injuries may not be known. Considerations for bereavement in the event of neonatal demise including social work, psychological and spiritual counseling should be made.

References: 1. PMID 33020077 2. PMID: 19546773 3. PMID: 24139777

SAT - CR - BS 2 - BR 3B - Complex Cesarean – 06

A case of acute kidney injury following resuscitative endovascular balloon occlusion of the aorta for management of postpartum hemorrhage due to partial placenta previa

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Introduction: Resuscitative endovascular balloon occlusion of the aorta (REBOA) is a minimally invasive technique to control bleeding distal to the occlusion site while maintaining blood flow to proximal vital organs. REBOA is used in trauma surgery as a bridge to definitive hemostasis for life-threatening, non-compressible truncal hemorrhage. In obstetrics, REBOA distal to the renal arteries prior to the aortic bifurcation (Zone 3) may be used to temporize bleeding due to postpartum hemorrhage, possibly preventing hysterectomy. However, REBOA itself may cause complications such as acute kidney injury (AKI), and indications remain under investigation.

Case One: A 34-year-old primigravid woman's pregnancy was complicated by hypertension, uterine fibroids, and partial placenta previa. Elective cesarean section was scheduled at 35 weeks. Anesthesia was managed by combined spinal-epidural anesthesia. The REBOA device was placed by fluoroscopy prior to cesarean section. After delivery of a healthy infant, bleeding from placental adhesions proved difficult to control, prompting the first balloon inflation at 20 minutes postpartum. After transitioning to general anesthesia, repeated inflations were performed until hemostasis was achieved via interventional radiology (IVR). Total blood loss was 4470 ml, with an estimated additional 2000 ml during IVR. Serum creatinine levels were already elevated on POD1, leading to a diagnosis of AKI. Creatinine levels peaked at 6.9 mg/dL on POD6. Urine output was preserved without the need for renal replacement therapy. The patient left the ICU on POD5 and was discharged home on POD15 with nephrology follow-up.

Case Two:

Discussion: Acute kidney injury is a frequently reported complication of REBOA. AKI is multifactorial but is associated with longer occlusion times and more proximal occlusion sites (Zone 1-2). Sustained occlusion causes tissue injury. Current recommendations suggest limiting occlusion time up to 60 minutes in Zone 3. In this case, the balloon was inflated five times, each for under 20 minutes. Regarding occlusion site, the balloon was initially placed in Zone 3. However, postoperative showed cranial migration of the balloon, possibly impinging on the renal arteries. Hemorrhagic shock combined with organ hypoperfusion and ischemia due to REBOA were considered the most likely causes of AKI. Preoperative MRI showed a distance of 8.5 cm from the renal arteries to the aortic bifurcation, suggesting

a small window for balloon placement in Zone 3. AKI has also been reported with Zone 3 placement. Partial inflation and additional distal perfusion monitoring may have been warranted to prevent complications. REBOA is an effective tool to control perioperative and postpartum hemorrhage. However, its use is not without significant risks, even in healthy parturients. Careful patient selection and complication prevention are essential.

References: Trauma Surg Acute Care Open 2024;9:e001267. World Journal of Emergency Surgery 2025;20:43.

SAT - CR - BS 2 - BR 3B - Complex Cesarean – 07

Recurrent Severe Postpartum Abdominal Complications After Cesarean Delivery

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Introduction: Cesarean delivery is associated with postoperative adhesions, yet severe or delayed gastrointestinal complications are rare and poorly characterized. We report a case of recurrent small bowel obstruction following repeat cesarean delivery complicated by delayed bowel perforation.

Case One: A 31-year-old G3P3003 at 39w0d gestation presented for scheduled repeat cesarean delivery. Her history was notable for asthma and two prior cesareans, each complicated by postoperative small bowel obstruction (SBO) requiring surgical intervention. Following her first delivery, she developed a closed-loop SBO, possibly related to uterine compression sutures. After her second delivery, she experienced recurrent SBO eight months postpartum, requiring laparotomy. The index cesarean delivery relevant to this presentation was performed under combined spinal-epidural anesthesia. Intraoperative findings included a small bowel adhesion to the anterior abdominal wall superior to the prior Pfannenstiel incisions. Delivery and closure were uncomplicated. On postoperative day (POD) 1, the patient developed abdominal distension, tachycardia, and worsening pain concerning for an acute abdomen. Imaging demonstrated free intraperitoneal air, prompting emergent exploratory laparotomy. Copious enteric contents were encountered, and an isolated small bowel perforation was identified at the site of the prior adhesion, with an intact hysterotomy. Following small bowel resection and abdominal washout, the incision was closed, and a wound vacuum was placed. The patient was transferred intubated to the surgical intensive care unit and extubated later that day. Her postoperative course was complicated by acute kidney injury, and she was discharged home on POD 8.

Case Two:

Discussion: This case highlights a rare but severe complication of repeat cesarean delivery in which adhesive disease from prior operations culminated in delayed bowel perforation. Although postoperative adhesions are the leading cause of SBO, there remains a dearth of literature detailing patient-level risk factors for SBO following a first cesarean delivery or for delayed bowel perforation after cesarean. SBO after cesarean delivery has an estimated incidence of approximately 0.1%, and predictors of progression to ischemia or perforation remain poorly defined, particularly in patients without known inflammatory or connective tissue disorders. Consequently, preoperative risk stratification is substantially limited in parturients, and recognition of risk is often retrospective, emerging only after an initial obstructive event. This limitation helps explain why cesarean-associated SBO may present with advanced pathology, including ischemia or perforation, underscoring the need for heightened postoperative vigilance rather than reliance on preoperative prediction.

References: 1. J Gastrointest Surg 2010;14:1619–1628

SAT - CR - BS 2 - BR 3B - Complex Accreta – 01

Anesthetic Management of Cesarean Delivery in a Heterotopic Twin Pregnancy with Extrauterine Placenta Percreta

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Introduction:
Heterotopic Twin Pregnancy (HTP), the coexistence of intrauterine and extrauterine gestations, is rare and carries substantial maternal risk, especially with invasive placentation. Reports on anesthetic management of cesarean delivery (CD) in HTP are limited [1]. We report anesthetic management for CD in an HTP complicated by extrauterine placenta percreta.

Case One:
A 30-year-old G8P5116 with chronic hypertension, seizure disorder, systemic lupus erythematosus, asthma, and psychiatric comorbidities was diagnosed at 20 weeks' gestation with HTP. Imaging showed an extrauterine fetus posteroinferior to the uterus with placental implantation in the right cul-de-sac, characterized by features of placenta accreta spectrum (PAS) with invasion of adjacent pelvic organs. The intrauterine fetus had a posterior placenta without previa or invasive features. After demise of the extrauterine fetus at 26 weeks, the pregnancy was continued with close maternal surveillance. After multidisciplinary planning and discussion, CD was scheduled at 34 weeks' gestation under a combined spinal–epidural (CSE) technique with readiness for conversion to general anesthesia as needed. Preoperatively, an arterial line and two large-bore IVs were placed. Blood products, fibrinogen concentrate, tranexamic acid, and cell salvage were readied in accordance with obstetric hemorrhage management principles [2]. A CSE was performed at the L2–L3 interspace using intrathecal hyperbaric bupivacaine with fentanyl, morphine, and clonidine. Hemodynamics were maintained with crystalloid co-loading and a phenylephrine infusion. A Resuscitative Endovascular Balloon Occlusion of the Aorta (REBOA) was placed prior to surgical incision as a hemorrhage mitigation strategy. A classical uterine incision was used to deliver the viable neonate, followed by removal of the demised extrauterine fetus; the extrauterine placenta was left undisturbed in situ. General anesthesia was initiated after delivery of the intrauterine fetus due to patient discomfort with prolonged supine positioning. Hemostasis was achieved without the need for REBOA deployment. Estimated blood loss was 1.6 L and was managed with crystalloid and cell-salvaged blood. The patient remained hemodynamically stable and had an uncomplicated postoperative course.

Discussion:
Heterotopic Twin Pregnancy with suspected extrauterine PAS poses an exceptional anesthetic challenge,

necessitating meticulous planning and multidisciplinary coordination. Preparation for massive obstetric hemorrhage, including invasive monitoring, vasopressor support, antifibrinolytic therapy, cell salvage, and adjunctive techniques such as REBO may improve maternal outcomes [3,4]. This case underscores the central role of anesthesiology in risk stratification, shared decision-making, and perioperative management of rare, high-risk obstetric conditions.

References:

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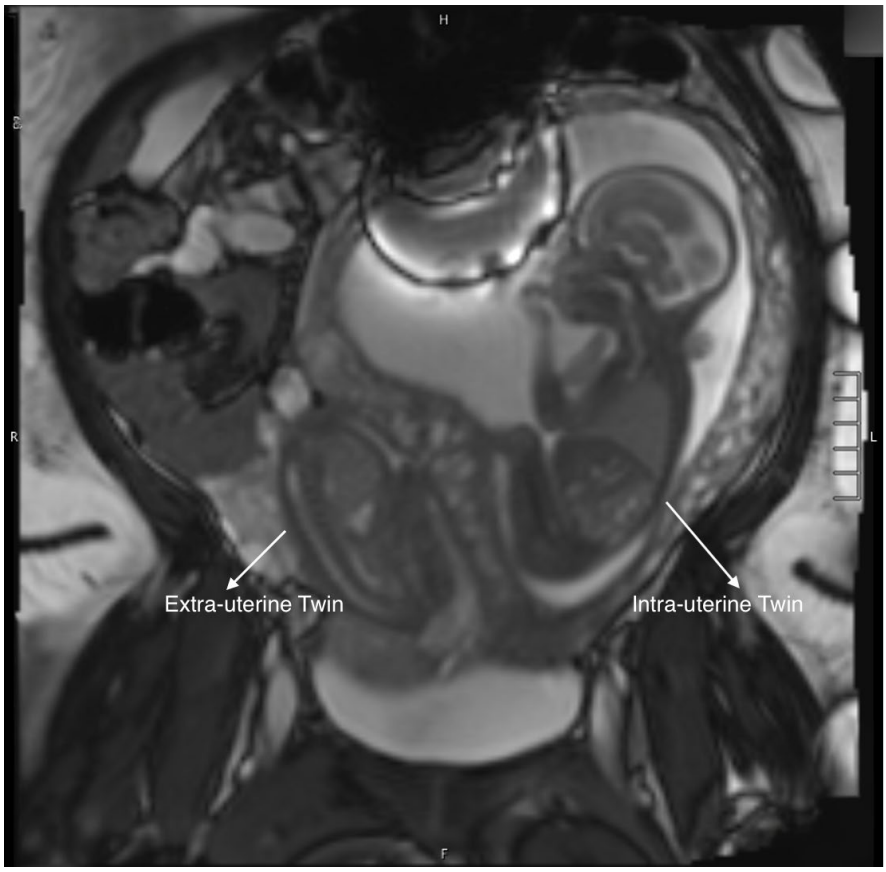
4. Salvagno IJOA 2024



SAT - CR - BS 2 - BR 3B - Complex Accreta – 02

Anaesthetic considerations in rudimentary horn twin pregnancy with placenta accreta - a case report

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Co-Authors: Ahmed Abdelbar - Guy's and St Thomas' Hospital NHS Trust

Introduction:
Pregnancy in a non-communicating rudimentary uterine horn combined with placenta accreta is a very rare, life-threatening condition (approximately 11.9% with prevalence of accreta in such cases).1-2 We present a case of a twin pregnancy that highlights the complex surgical and anaesthetic challenges that can arise.

Case One:
A 51 year old woman presented with dull right upper quadrant pain at 20 weeks gestation. An MRI scan identified a DCDA pregnancy with Twin A noted to be intrauterine and Twin B located within the rudimentary horn of a unicornuate uterus, with evidence of placenta accreta. Her surgical history included a caesarean delivery, laparoscopic ectopic pregnancy and open myomectomy. Her medical history included type 2 diabetes mellitus, chronic anaemia and hypertension. Following a multidisciplinary team (MDT) discussion and patient consent, a plan was made for selective reduction of Twin B with fetocide to allow devascularisation within the rudimentary accreta horn. Followed by a planned caesarean section at 32 -34 weeks in a Hybrid theatre, under a combined spinal epidural with the use of a Resuscitative endovascular balloon occlusion of the aorta (REBOA) and the support of interventional radiology. The patient underwent a successful fetocide of twin B at 21 weeks gestation and the placenta began evoluting. Two weeks later the patient developed worsening abdominal pain and hypovolaemic shock requiring an emergency midline laparotomy under general anaesthesia, which revealed a 2.7L intraperitoneal blood loss from a placenta accreta requiring rudimentary horn excision and omentectomy and delivery of Twin A.

Discussion:
Rudimentary horn pregnancy (RHP)with accreta arises due to the rudimentary horn failing to develop properly, making it less elastic and thinner, which causes the placenta to invade the muscle wall (accreta/percreta) to seek blood supply. While RHP is rare, rupture often occurs between 10–20 weeks, and the presence of placenta accreta increases the severity of haemorrhage. It is critical that it is diagnosed within the first-trimester to prevent rupture. Upon diagnosis, immediate surgical excision of the rudimentary horn is required to prevent catastrophic bleeding. The anaesthetic implications of RHP with accreta with a viable intrauterine pregnancy include awareness of the complications that may arise due to potential risk of horn rupture, major haemorrhage and infection. Management of these cases in a tertiary

centre with a specialist MDT is key. It is essential to be prepared for major haemorrhage and postoperative critical care admission.

References:

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2. Henriet E et al. Pregnant Noncommunicating Rudimentary Uterine Horn with Placenta Percreta. Journal of the society of laparoscopic and robotic surgeons 2008; 12: 101-103.

SAT - CR - BS 2 - BR 3B - Complex Accreta – 03

A Case of Collaterals – Extensive Cervical and Vaginal Varices in a Placenta Accreta Case

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Introduction:
Placenta accreta spectrum (PAS) is associated with increased morbidity and mortality due to risk of life-threatening hemorrhage given abnormal trophoblastic invasion, disrupting normal uterine architecture and venous drainage1. In cases of placenta previa, the low-lying placenta creates increased venous congestion in the lower uterine segment and cervix. When PAS coexists with placenta previa, extensive cervical and vaginal varices can develop, representing an independent risk factor for massive hemorrhage2. Due to extensive collateral blood supply, uterine artery clamping during hysterectomy may not be sufficient to control bleeding during these cases. Prophylactic bilateral internal iliac balloon placement by interventional radiology may reduce bleeding risk. Additionally, when catastrophic hemorrhage is anticipated, the decision to avoid neuraxial catheter placement may be prudent to mitigate the risk of epidural hematoma.

Case One:
A 38-year-old female G3P2 at 35w3d with two prior cesarian deliveries presented with anterior placenta previa with placenta accreta. Imaging demonstrated a markedly bulging lower uterine segment with extensive cervical and vaginal varices. A cesarean hysterectomy was planned in a hybrid operating room (OR) with interventional radiology (IR) for bilateral internal iliac artery balloon placement given the concern for catastrophic bleeding secondary to the number of varices and collateral supply. Prior to surgery, the patient had an arterial line and central line placed. Once in the OR, a single shot spinal was placed, with a T4 level achieved. She had bilateral ureteral stents placed by urology, followed by internal iliac artery balloon placement by IR. Time under spinal was verging on two hours at this point, but sensation to pinprick remained T4 and the patient expressed a strong preference to meet her baby. Cesarean was successfully performed under spinal, with induction and intubation a few minutes after delivery. This patient still bled 1.5L in 10 minutes with balloons inflated, which highlights the degree of blood supply originating from collateral circulation. Total estimated blood loss during the case was 3.2L. She was transfused in a controlled manner throughout the case, transferred to ICU postoperatively, and extubated later that evening without complications.

Discussion:
PAS cases pose significant risks. As incidence increases, measures to improve outcomes are of imminent importance. Internal iliac balloon placement is minimally invasive and may minimize blood loss during cases where significant hemorrhage is anticipated, such as those with extensive collateral circulation. Careful consideration is required with respect to anesthetic technique, particularly with

increased risk of neuraxial hematoma in cases with anticipated massive hemorrhage and subsequent risk for coagulopathy.

References:

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2. Kamiya A, et al. Gynecol Obstet Invest. 2025:1-19.

SAT - CR - BS 2 - BR 3B - Complex Accreta – 04

Placenta Percreta involving the bladder requiring massive transfusion protocol

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Introduction:
Placenta accreta (PAS) is the abnormal invasion of trophoblast into the uterine myometrium. The most common risk factor of PAS is previous c/s. Other factors are uterine surgeries. PAS rates are rising due to increasing rates of c/s, from 1 in 30,000 pregnancies in the 1960s to as high as 1 in 272 pregnancies (1). We present a case of a 37 y/o G6P4013 with placenta percreta involving the bladder.

Case One:
A 37 y/o G6P4013 PMH of two c/s and D&C was diagnosed with placenta percreta. Plans were made for elective c/s with hysterectomy with MFM, OB, gyn/onc, and urology at 34w with a planned team. The patient presented with hematuria and vaginal bleeding at 33w3d. Delivery was expedited to 33w6d, requiring different surgeons in each specialty and OR time. Plan was CSE for infant delivery, followed by GA for hysterectomy. Vascular access was a 16g and 18g IV. EBL was 450 mL at the conclusion of hysterotomy closure. GA was induced via RSI and a 6.5 ETT. Additional 14g IV catheter and radial a-line were placed. There were extensive adhesions and obliterated tissue planes. Multiple cystotomies were created during separation of the uterus, placenta and bladder. Blood loss was significant and consistent. Massive transfusion protocol was needed, and a Belmont was used for product administration through the 14g IV. Nadir labs were hgb 8.0, plt 28, INR 1.59, PTT 71, and fibrinogen 96. In total, 24 pRBCs, 17 FFPs, 5 pooled platelets, 3 pooled cryoprecipitate, 3g tranexamic acid, 4g fibrinogen concentrate, and 14L crystalloid were given. After 7 hours of operative time, EBL was nearly 17L. A general surgeon performed packing and temporary abdominal closure. Patient was moved to radiology for embolization. During this part, 1 pRBC, 1 pooled platelets, and 1 pool cryoprecipitate were given. The patient was transferred to SICU ventilated and sedated. There, initial labs were notable for INR 1.10, PTT 29, fibrinogen 297, hgb 9.0, plt 65, pH 7.45, and lactate 4.3. Thromboelastography was normal. Due to thrombocytopenia, the epidural remained in. She returned POD1 for abdominal closure and extubation. On POD2 the patient left the SICU and her epidural was removed on POD3. The patient was discharged on POD5.

Discussion:
PAS has significant rates of morbidity and mortality, especially if not diagnosed in the antenatal period. Placenta percreta are at the highest risk given involvement of adjacent organs. Patients with PAS should

deliver at level III-IV centers with resources and expertise. A multidisciplinary team comprising of anesthesia, OB, gyn/onc, MFM, urology, ACS were critical to the successful outcome in this case. Careful team selection and communication should be conducted prior to the scheduled surgery. Contingency plans were made in the event of early delivery, which was the case. Due to the expedited c/s, arranging for staff and OR time posed logistical concerns but was achieved.

References:

J Matern Fetal Neonatal Med. 2016;29(7):1077-82

SAT - CR - BS 2 - BR 3B - Complex Accreta – 05

What Caused the Bleed - Placenta Accreta in the Setting of Factor V Leiden

Presenting Author: Miranda Marcucci, DO

Presenting Author's Institution: Allegheny Health Network - Presto, Pennsylvania

Introduction:
The term placenta accreta encompasses a spectrum of pathologies - accreta, increta, and percreta, with each defined based on the degree of placental invasion into the myometrium. Several well-known risk factors associated with its development exist, including placenta previa - particularly in the presence of a low uterine scar, prior cesarean delivery, maternal age, multiparity, smoking, and hypertensive disorders. As a result of abnormal implantation, hemorrhage risk is high at the time of placental delivery, and often, hysterectomy is required, in addition to transfusion of blood products. Antepartum care and surveillance becomes increasingly important in these cases to avoid further, potentially fatal, outcomes.

Case One:
A 38-year-old G3P1011 female with significant PMH of Factor V Leiden heterozygosity, scoliosis, GERD, and fibromyalgia was admitted at 34 weeks after IOL in the setting of PPROM. Obstetric history notable for a miscarriage at only a few weeks' gestation with subsequent conception one month later. She underwent LTAC secondary to development of chorioamnionitis with Category II tracings and fetal tachycardia. Less than one month after this delivery, the patient was found to have a right great saphenous vein thrombus and was treated with LMWH for six weeks. Eventually, a diagnosis of Factor V Leiden was made. In this third pregnancy, patient was maintained on prophylactic LMWH through 26 weeks gestation for FVL and prior placenta previa had resolved. She was induced for TOLAC and an uncomplicated epidural was placed. FHR tracing progressed to Category III with deep decelerations. Decision was made to proceed with an emergent cesarean section, and GYN ONC was called for assistance due to suspected uterine rupture with multiple extensions and persistent bleeding. MTP was initiated and a hysterectomy was performed. Surgical pathology was consistent with placenta accreta. Although the patient was transferred out of the ICU on POD#2 and discharged on POD#4, she was readmitted seven days later and diagnosed with septic thrombophlebitis and gonadal vein thrombosis.

Discussion:
An already life-threatening pathology like accreta can be further complicated by hematologic comorbidities including hemophilias, vWD, and Factor V Leiden. The latter, as seen in this patient, exacerbates the already hypercoagulable state of pregnancy with those affected requiring antithrombotic therapy and carrying a greater risk of complications for both mother and fetus. This case calls attention to the antepartum and intrapartum care of such individuals, specifically in minimizing hemorrhagic risk and optimizing mother and fetal health.

References:

1. Belfort M.A., Placenta accreta, American Journal of Obstetrics and Gynecology, Volume 203, Issue 5, 2010, Pages 430-439, ISSN 0002-9378

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SAT - CR - BS 2 - BR 3B - Complex Accreta – 06

Coordinated Multidisciplinary Management of Placenta Percreta With Cervical Invasion

Presenting Author: Neveada Raventhiranathan, MD

Presenting Author's Institution: Stony Brook University Hospital - Stony Brook, New York

Co-Authors: Vanathi Ganesan, MD - Stony Brook University Hospital
Anna Kogan, DO - Stony Brook medical center

Introduction:
Placenta accreta spectrum (PAS) disorders are associated with significant maternal morbidity due to the risk of massive obstetric hemorrhage, necessitating careful multidisciplinary planning and anesthetic management. We present a case of placenta percreta managed in a hybrid operating room at the threshold of fetal viability.

Case One:
A 37-year-old gravida 2 para 1 woman at 22 weeks and 6 days' gestation presented with painless vaginal bleeding due to placenta previa. Her obstetric history was notable for a prior cesarean delivery for breech presentation at term. During the current pregnancy, imaging demonstrated an anterior placenta previa with concern for placenta accreta spectrum, and a shortened cervix managed with vaginal progesterone. The patient experienced recurrent episodes of vaginal bleeding requiring hospital admission for close monitoring and blood transfusions. Pelvic magnetic resonance imaging revealed findings consistent with placenta percreta involving the anterior lower uterine segment, with suspected invasion into the anterior cervical stroma and no evidence of bladder involvement. Given the elevated risk of hemorrhage, a multidisciplinary planning meeting was held involving maternal-fetal medicine, neonatology, gynecologic oncology, anesthesiology, urology, and interventional radiology to determine the safest approach to delivery. The patient was counseled extensively and understood that delivery would necessitate cesarean hysterectomy. Delivery was planned in a hybrid operating room with urology and interventional radiology present. However, at 23 weeks and 3 days' gestation, the patient developed increasingly frequent bleeding, prompting the decision to proceed with urgent cesarean delivery. Prior to surgery, a left radial arterial line and a right internal jugular central venous catheter were placed. Under conscious sedation, the urology team inserted bilateral ureteral stents and a Foley catheter. Interventional radiology subsequently placed prophylactic bilateral anterior division hypogastric artery balloons followed by gel foam embolization. Distal lower-extremity perfusion was confirmed clinically and with Doppler assessment. The patient was then induced, intubated, and prepared for surgical delivery.

Discussion:
PAS disorders are associated with a high risk of postpartum hemorrhage, with reported average estimated blood loss approaching two liters[1]. As the incidence of PAS continues to rise, optimal

anesthetic and multidisciplinary management during delivery is critical to minimizing hemorrhage and postoperative complications[2]. This case highlights effective intraoperative communication and team-based decision-making, including anticipatory planning for interventional radiology support and reassessment for ongoing hemorrhage, which together contributed to effective hemorrhage control and a favorable postoperative outcome.

References:

1.Obstet Gynecol. 2015;125(3):683–9.

2.Obstetrics & Gynecology 142(1):p 31-50

SAT - CR - BS 2 - BR 3B - Complex Accreta – 07

General Anesthesia for Cesarean Delivery Complicated by Placenta Accreta and Fetal Omphalocele

Presenting Author: Xinhao Liu, MD, PhD

Presenting Author's Institution: Montefiore Medical Center - Harrison, New York

Co-Authors: Shamantha Reddy, MD, FASA, MD - Montefiore Medical Center

Introduction:
Morbidly adherent placenta is associated with significant maternal hemorrhage and anesthetic risk, particularly in patients with multiple prior cesarean deliveries [1]. Neuraxial anesthesia is often preferred; however, general anesthesia may be indicated when severe hemorrhage, uterine manipulation, or fetal conditions requiring controlled delivery are anticipated [2]. Giant fetal omphalocele presents additional challenges, necessitating careful coordination to optimize both maternal hemodynamics and neonatal outcomes.

Case One:
A 33-year-old gravida 6 para 4014 at 36 weeks and 4 days' gestation (95 kg) presented for a scheduled fourth repeat cesarean delivery for suspected focal placenta accreta, with a fetus prenatally diagnosed with a giant omphalocele. Preoperative hemoglobin was 12 g/dL, platelets 210 × 10^9/L, and coagulation studies were normal. Vital signs were stable on arrival. Given anticipated hemorrhage and the need for controlled neonatal delivery, general anesthesia was chosen. Following preoxygenation, anesthesia was induced with lidocaine 100 mg, propofol 200 mg, and succinylcholine 100 mg, and the trachea was intubated uneventfully using video laryngoscopy. Anesthesia was maintained with sevoflurane (~2.3%) and a low-dose propofol infusion (25 μg/kg/min), with intermittent rocuronium. Fentanyl 100 μg was administered prior to incision, and a phenylephrine infusion was initiated. Sevoflurane was increased to 4% to facilitate uterine relaxation. After delivery of the neonate, sevoflurane was discontinued and anesthesia transitioned to propofol infusion at 150 μg/kg/min. Uterotonics included oxytocin 30 units, tranexamic acid 1 g, methylergonovine 0.2 mg IM, and carboprost 0.25 mg IM. Significant hemorrhage prompted massive transfusion, including 4 units of packed red blood cells, platelets, fresh frozen plasma, cryoprecipitate, 8 L of crystalloid, and 500 mL of albumin. Estimated blood loss was 3,500 mL. Neuromuscular blockade was reversed with sugammadex 400 mg, and hydromorphone 1 mg was administered. Postoperative hemoglobin was 9 g/dL, platelets 104 × 10^9/L, and coagulation parameters remained stable. The patient was hemodynamically stable at the conclusion of surgery.

Discussion:
This case highlights anesthetic management of cesarean delivery complicated by suspected placenta accreta and a giant fetal omphalocele. General anesthesia enabled rapid airway control, uterine relaxation with high-dose volatile anesthetics, and a controlled setting for neonatal management.

Transition to total intravenous anesthesia after delivery minimized uterine atony. Early activation of massive transfusion and multimodal uterotonic therapy were essential for hemorrhage control, underscoring the importance of individualized anesthetic planning and multidisciplinary coordination in complex obstetric cases.

References:

1. Obstet Gynecol. 2018 Dec;132(6):e259-e275.

2. Anesthesia & Analgesia. 2013;117(2):348–354.

SAT - RA - BS 2 - BR 1 - Hemorrhage – Transfusion – 01

Blood Transfusion Protocol Significantly Reduces Blood Product Waste

Presenting Author: Kristen E. Harris

Presenting Author's Institution: Vanderbilt University School of Medicine - Nashville, Tennessee

Co-Authors: Kaycie Atchison, MCR, MLS(ASCP)CM, CPHQ - Quality, Safety & Risk Prevention, Vanderbilt University Medical Center
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Jonathan Tucci, MD, PhD - Vanderbilt University Medical Center

Abstract :

Background:
Obstetric hemorrhage is a leading cause of maternal morbidity and mortality worldwide.[1] Effective maternal resuscitation reduces maternal mortality, making obstetric massive transfusion protocols (MTP) the standard of care.[2] Per the recommendations of the American College of Obstetricians & Gynecologists (ACOG), Obstetric MTPs provide immediate access to red blood cells (RBCs), fresh frozen plasma (FFP), and platelets in a 1:1:1 ratio.[3] More important than the ratio itself is the implementation of a standard protocol prioritizing early transfusion, as maternal vital signs and labs may significantly lag behind clinical need.[4] However, up to 33% of blood products issued during MTP activation may go unused and ultimately be wasted.[5] We developed and implemented an OB Fast Pack (OBFP) to reduce blood product waste for obstetric patients experiencing an intrapartum or postpartum hemorrhage who had not yet met criteria for OB MTP activation.

Methods:
In December 2024, we implemented the OBFP, a resuscitation protocol enabling rapid ordering of a blood product cooler containing red blood cells, fresh frozen plasma, and cryoprecipitate in a 2:2:1 ratio, with optional fibrinogen supplementation. Patients with ongoing hemorrhage were escalated to full obstetric MTP activation. Compared with standard MTPs, OBFP provides immediate availability while limiting excess product allocation, which is useful in early hemorrhage when the duration of bleeding is unknown. Our blood bank quality team measured utilization and waste rates for red blood cells, plasma, platelets, and cryoprecipitate, as well as the number of massive transfusion protocol activations, during the first year of the initiative.

Results:
Following implementation of the OBFP protocol, the number of OB MTP initiations decreased by 52%. In parallel, blood product waste associated with OB MTPs was eliminated, representing a 100% reduction, driven entirely by the elimination of platelet and cryoprecipitate waste. While small amounts of waste occurred with OBFP utilization, OBFP-associated waste was 79% lower than that observed with OB MTP

use in the pre-implementation period.

Conclusion:
Implementation of the OBFP protocol significantly reduced blood product waste while preserving rapid access to transfusion for obstetric patients with intrapartum or postpartum hemorrhage. By providing a structured alternative to immediate MTP activation, OBFP promotes more judicious blood product utilization without compromising patient safety. Strategic inclusion of pathogen-reduced cryoprecipitate, which offers greater reuse flexibility, further reduced waste while maintaining effective hemostatic resuscitation. This approach represents a cost-conscious, scalable refinement in obstetric hemorrhage management that optimizes resource utilization.

References:

1. JAMA 2025;333:1570–71

2. Am J Obstet Gynecol 2015;212:272–80

3. Am Coll Obstet Gynec.Ob hem.2025

4. Obstet Gynecol 2017;130:e168–86

5. Transfusion 2017;57:45–52

OFB.Figure.v2.1.27.26.pdf

SAT - RA - BS 2 - BR 1 - Hemorrhage – Transfusion – 02

Association of patient characteristics with blood loss during planned cesarean hysterectomy for placenta accreta spectrum: a single-center study

Presenting Author: Michael P. Hofkamp, MD

Presenting Author's Institution: Baylor College of Medicine - Temple, Texas

Co-Authors: Jessica Ehrig, MD - Baylor Scott & White Medical Center-Temple
Allison A. Mootz, MD - UT Southwestern Medical Center
Diana Villazana-Kretzer, DO - Baylor Scott & White Medical Center-Temple

Abstract :

Objective:
In 2018, our hospital adopted a checklist and created a multidisciplinary team to care for patients with placenta accreta spectrum (PAS) who underwent planned cesarean hysterectomy at the time of cesarean delivery (C-HYST). The objective of our study was to determine which patient characteristics were associated with blood loss during C-HYST after adoption of this checklist and multidisciplinary team.

Study Design:
We used a retrospective observational study design. Patients who had planned C-HYST at our hospital for PAS from 2019 to 2024 were included in the study. We defined high blood loss during C-HYST as a quantitative blood loss (QBL) greater than 1500 ml. We performed a bivariate analysis between the high and low blood loss cohorts. We then performed a bivariate logistic regression using the covariates of age and preoperative diagnosis of placenta percreta to predict which patients would have high blood loss.

Results:
There were 71 patients in the study who had a QBL range from 200 to 6100 ml (median 900 ml (IQR 500-1500 ml)). 17 and 54 patients had high (>1500 ml) and low (≤ 1500 ml) blood loss, respectively. Patients with high blood loss had a mean age of 35 +/- 4 years compared to 32 +/- 4 years for the low blood loss cohort (p=0.03). There were five (29%) patients with a preoperative diagnosis of placenta percreta in the high blood loss cohort compared to five (9%) patients in the low blood loss cohort (p=0.04). Complete data for the cohorts are presented in *Table 1*. A bivariate logistic regression that used the covariates of age and preoperative placenta percreta diagnosis found that preoperative placenta percreta diagnosis (aOR 4.96; 95% CI 1.14-21.58; p=0.03) and a two-year increase in age (aOR 1.38; 95% CI 1.04-1.83; p=0.03) were independently associated with a QBL greater than 1500 ml. The c-statistic of this bivariate logistic regression model was 0.73.

Conclusion:
After adoption of a checklist and creation of a multidisciplinary team, patients with a preoperative diagnosis of placenta percreta who underwent planned C-HYST were approximately five times more likely

to have a QBL greater than 1500 ml compared to patients who did not have that diagnosis. A two-year increase in age was independently associated with an approximately 40% increase in the risk of having a QBL greater than 1500 ml. A previous study reported that previous cesarean delivery (CD) was a moderate risk factor for postpartum hemorrhage among patients with PAS.[1] In our study, previous CD or previous abdominal surgery was not associated with high blood loss. Also, urgency of CD and the year that the C-HYST was performed was not associated with high blood loss and we attribute these findings to the effectiveness of our checklist and multidisciplinary team. Results from this study could potentially inform patients and clinicians on blood loss during planned C-HYST at our hospital.

References:

1. BMC Pregnancy Childbirth 2023;23:786

Table 1. c-hyst blood loss.pdf

SAT - RA - BS 2 - BR 1 - Hemorrhage – Transfusion – 03

Platelet dysfunction in postpartum hemorrhage and transfusion approaches assessed in a microfluidic platform

Presenting Author: Emily Mihalko, PhD

Presenting Author's Institution: University of Pittsburgh - Pittsburgh, Pennsylvania

Co-Authors: Morgan Mollen - University of Pittsburgh
Matthew Neal, MD FACS - University of Pittsburgh
Riya Sharma - University of Pittsburgh
Susan Shea, PhD - University of Pittsburgh
Hyagriv Simhan, MD MS - University of Pittsburgh

Abstract :

Introduction:
Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity. Although anemia is associated with increased likelihood of transfusion, it does not fully explain hemostatic failure during PPH. Increasing evidence suggests that early obstetric coagulopathy, including impairments in platelet-fibrin interactions and clot propagation, is heterogenous and etiology-dependent, with impairments exacerbating bleeding even before substantial hemoglobin declines. Observations that antifibrinolytic therapies may be less effective in anemic states further highlight the limitations of fibrin-centric models and underscore the importance of platelet-dependent mechanisms in primary hemostasis. Therefore, this study utilized a microfluidic platform to better characterize platelet function during severe PPH as well as transfusion product efficacy.

Methods:
Citrated PPH whole blood samples (n=3 technical, 2 biological) were collected (blood loss > 1000mL or blood loss accompanied by hemodynamic instability) prior to hemostatic resuscitation and compared to healthy non-pregnant controls. Blood was perfused through a collagen-coated microfluidic device with stenosed flow chambers to induce high shear flow ($3500s^{-1}$). Platelets were stained, imaged in real-time, and quantified with mean fluorescent intensity (MFI) and area under the curve (AUC). To model anemia, citrated healthy whole blood (n=3-7/group) was reduced to 50% hematocrit (HCT) via centrifugation workflows. Complete blood counts (CBC) and thromboelastography (TEG) were conducted. Simulated transfusion with lactated ringer's (LR), isolated autologous RBCs (RBC_a), isolated RBCs from a whole blood unit (WBU) (RBC_{WBU}), and an intact WBU were evaluated (1:5 v/v intervention:anemia). Microfluidics were performed as above, and a visual occlusion time (OT) was determined. Analyses involved two-tailed T-tests or one-way ANOVA.

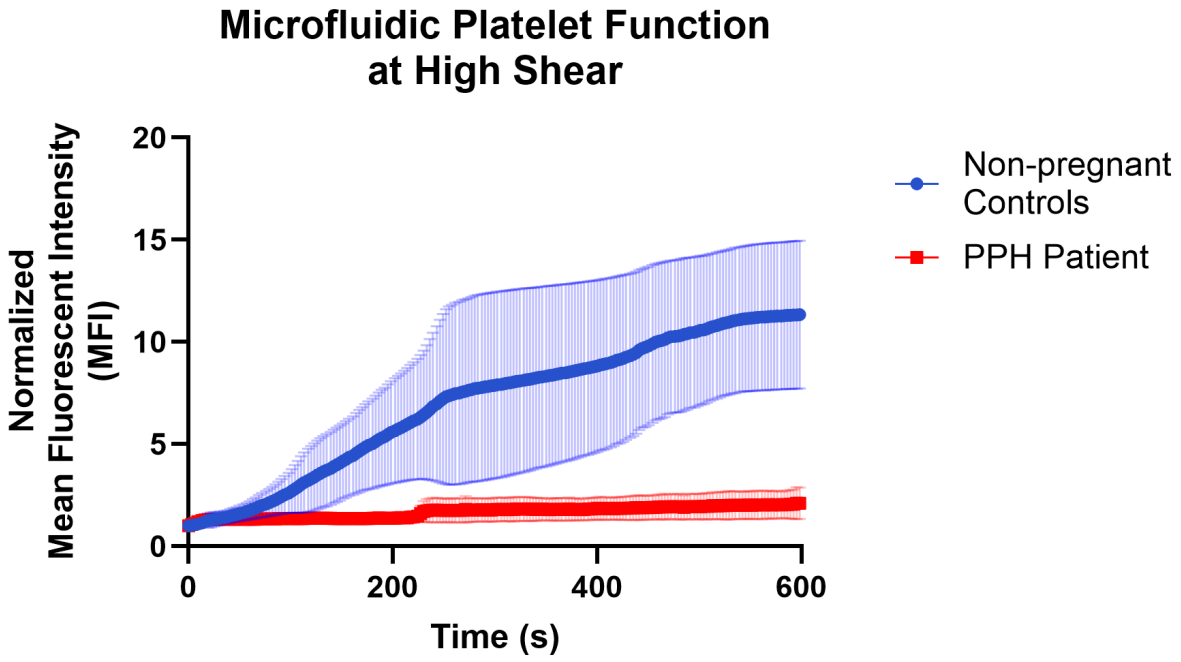
Results:
Platelet deposition in PPH was significantly impaired as shown in the figure. In the anemia model, significant

decreases in RBC (3.98 ± 0.14 vs 1.68 ± 0.34 x10 cells/uL) and hemoglobin (11.5 ± 0.6 vs 4.9 ± 0.9 g/dL) ($p < 0.0001$ for both) were observed and no clinically meaningful differences were detected by TEG. In the microfluidic device, OT was significantly longer for the anemia model (1188 ± 120 vs 672 ± 76 s; $p < 0.01$). The shortest occlusion time was observed with the WBU resuscitation group despite no changes in platelet count. Distribution of platelets from the WBU and anemia sample was observed.

Conclusions:

PPH may be exacerbated by an acute platelet dysfunction that is yet to be fully investigated, potentially involving a pathology of platelet adhesion mechanisms. In an anemia model, microfluidic assays indicate better hemostatic resuscitation with intact whole blood compared to isolated RBC groups and LR, potentially due to RBC dysfunction during isolation or dilution of mechanistically critical hemostatic factors at high shear.

References:



SAT - RA - BS 2 - BR 1 - Hemorrhage – Transfusion – 04

Quantra QStat Characteristics in Obstetrics versus a Cardiac Surgery Control Group

Presenting Author: Austin Smith, MD

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Jenna Khan, MD - University of Virginia
Nicholas Larkey, PhD - University of Virginia
Charbel Marche, BS, MS - University of Virginia
Mohamed Tiouririne, MD - University of Virginia

Abstract :

Introduction:
The Quantra QStat (Hemosonics Corporation, Durham, NC) just received FDA approval for obstetrics in September 2025,[1] as such validation studies in this population are limited.[2] The aim of this study was to describe operating characteristics of Quantra QStat platelet contribution to clot stiffness (PCS) in obstetrics, and to explore the interaction of fibrinogen contribution to clot stiffness (FCS) in this population uniquely characterized by hyperfibrinogenemia. We hypothesized that the PCS thresholds would be higher in obstetrics than in cardiac surgical patients, and that a higher PCS would be observed in patients with high FCS.

Methods:
This was a single-center retrospective cohort study enrolling 71 consecutive obstetrics patients on admission from November 2023 to March 2025. 11 patients were excluded due to not being third trimester, bleeding, recent anticoagulant use (Enoxaparin), or due to missing Quantra results, leaving 60 patients for analysis. The control group comprised 388 post- cardiopulmonary bypass Quantra QPlus collections from 511 consecutive patients undergoing STS-indexed cardiac surgery from February 2024 to February 2025 (the first year of routine Quantra QPlus application at our institution). Receiver operating characteristics were applied to the experimental group and the control group independently. Obstetrics subgroups were constructed for patients with FCS ≤4.2 hPa and >4.2 hPa.

Results:
For cardiac surgical patients, a PCS of 15.70 to 18.05 was able to discriminate platelet levels from < 150k/uL to < 250k/uL with an area under the curve (AUC) of 0.89 to 0.92. For obstetrics patients, a PCS of 21.55 hPa to 30.15 hPa was able to discriminate these platelet levels (AUC, 0.78 to 0.85). In the subset of obstetric patients with FCS ≤4.2 hPa, a PCS of 21.45 hPa to 22.55 hPa was able to discriminate these platelet levels (AUC, 0.70 to 0.90). In the subset of obstetric patients with FCS >4.2 hPa, a PCS of 22.05 hPa to 30.20 hPa was able to discriminate these platelet levels (AUC, 0.73 to 0.97).

Conclusions:

Compared to cardiac surgical controls, obstetrics patients with normal fibrinogen (FCS < 4.2 hPa) have PCS thresholds that are approximately 5hPa (range: 4.5 – 5.75 hPa) higher. The inclusion of hyperfibrinogenemic obstetric patients (FCS >4.2) may yield PCS thresholds 10+ hPa higher (range: 6.35 – 12.15 hPa) for the same platelet count. In obstetrics patients, regardless of FCS level, it appears that a PCS of approximately 22hPa is reasonable for discrimination of platelet levels < 150ku/L.

References:

1. FDA Grants HemoSonics 510(k) Clearance to Expand Use of Its Quantra Hemostasis System to Obstetric Procedures. HemoSonics. Available at: https://hemosonics.com/news/fda-grants-hemosonics-510k-clearance-to-expand-use-of-its-quantra-hemostasis-system-to-obstetric-procedures/. Accessed January 26, 2026.

2. Int J Obstet Anesth 2025;62:104325.

Table Submission.pdf

SAT - RA - BS 2 - BR 1 - Hemorrhage – Transfusion – 05

Effect of intraoperative uterine artery embolization on transfusion requirements during cesarean section for suspected placenta previa and placenta accrete spectrum

Presenting Author: Yoon Ji Choi

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Co-Authors: Sang-Hwan Do - Department of Anesthesiology and Pain Medicine, Seoul National University College of Medicine
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Hee-Sun Park - Department of Anesthesiology and Pain Medicine, Asan Medical Center, University of Ulsan College of Medicine

Abstract :

Introduction:
Placenta accrete spectrum disorder (PAS) is the leading cause of postpartum hemorrhage and frequently requires maternal blood transfusion. Intraoperative uterine artery embolization (UAE) had been used to reduce blood loss in patients at high risk for PAS. The aim of this study was to compare the effectiveness of prophylactic intraoperative UAE versus postpartum UAE in parturients undergoing cesarean section for suspected placenta previa with or without PAS.

Methods:
This retrospective study included parturients with suspected PAS who underwent prophylactic intraoperative UAE during cesarean section (PEP group, n=34). For comparison, a conventional group (n=37) was identified from patients who underwent postpartum UAE following cesarean section between 2019 and 2025. The primary outcome was the total amount of red blood cell transfusion (RBC). Secondary outcome included RBC and fresh frozen plasma (FFP) volume within 24 hours, total volume of FFP and other blood products; massive transfusion within 24 hours (≥ 8 units of RBCs); estimated blood loss; other perioperative outcomes intraoperative hypotension episodes (mean blood pressure < 65 mmHg), length of hospital stay, delayed postpartum hemorrhage (PPH), hysterectomy, admission to intensive care units, and readmission). Multivariable negative binomial and logistic regression analyses were performed to evaluate the association between intraoperative embolization and transfusion

requirements, adjusting for relevant clinical covariates such as maternal age, gestational age, body mass index, placenta location, composite risk factors and parity.

Results:
Maternal age was significantly lower in the PEP group (P=0.019), and antenatal bleeding after 34 weeks and prenatal suspicion of PAS was more frequent in the PEP group. The PEP group required significantly fewer RBC units compared with the conventional group (median [Q1, Q3]: 4 [2, 11] vs 10 [6.5, 21], P = 0.003). The incidence of massive transfusion was 27.6% lower in the PEP group (P=0.016). The incidence of UAE failure (P=0.023) were also significantly lower in the PEP group. Intraoperative hypotension episodes and the area under the hypotensive threshold were significantly low in the PEP group. In multivariable analysis, intraoperative UAE independently reduced RBC transfusion (adjusted incidence rate ratio [IRR], 0.34; 95% confidence interval [CI], 0.22–0.53, P < 0.001). Absence of prenatal PAS also demonstrated reduced RBC requirements (IRR = 0.31, 95% CI, 0.21–0.47, P < 0.001).

Conclusion:
Prophylactic intraoperative UAE may provide benefit in reducing transfusion requirements patients with high-risk obstetric hemorrhage due to abnormal placentation. From anesthesiologist's perspective, achieving early hemostatic control can lessen the intensity of perioperative resuscitation, decrease reliance on massive transfusion, and support more stable intraoperative management during cesarean delivery.

SAT - RA - BS 2 - BR 1 - Efficiency, Education, Access – 01

Optimizing Obstetric Pre-Admission Unit Efficiency and Enhancing Patient Experience through an AI-Powered Chatbot

Presenting Author: Mostafa Abbasi Dezfouly, MD, Bsc

Presenting Author's Institution: University of Ottawa - Ottawa, Ontario

Abstract :

Purpose:
To determine if implementation of a Large Language Model-based digital assistant in the Pre-Admission Unit of Canadian academic hospitals can impact patient satisfaction and improve the effectiveness of patient education in obstetrics.

Methods:
This Qualitative Action Research study was developed in two phases.

Phase 1 – Development of chatbot and knowledge base creation (Complete): To develop a database of obstetric anesthesia literature, review of obstetric anesthesia literature through various medical databases focusing on key articles, guidelines and authoritative sources was performed to create a well curated foundation of literature to form the foundational knowledge. A list of 50 frequently asked questions (FAQs) was compiled from common patient concerns and used to train a ChatGPT-based chatbot. Ten AI-generated responses were randomly selected and rated for accuracy and relevance by expert anesthesiologists.

Phase 2 – Patient interaction and evaluation of shared information (Complete): Inclusion criteria were patients aged ≥18 scheduled for a PAU encounter before delivery at a tertiary academic hospital in Canada. This project included a sample of at least 20 patients calculated based on the number of participants required to exhaust novel insight about the applied intervention based on the principle of saturation in Qualitative Research[1]. Eligible patients were approached by a Co-PI by phone or in person for consent. Participants completed either an in-person or virtual interview and generated one peripartum question (optional follow-up permitted). Prior to question generation, example FAQs from the literature were shown. After the appointment, participants completed a questionnaire rating satisfaction.

Results:
Five clinicians rated 10 answers each (n=50) and 24 patient survey responses were included. Clinicians rated chatbot responses favorably (mean appropriateness score 7.9/10). Patients rated the chatbot favorably for answering their initial question (4.8/5), accessibility (4.6/5), and contribution to understanding (4.5/5).

Conclusion:
Clinicians generally agreed the chatbot provided appropriate responses, with intermittent need for clarification. Patients reported high satisfaction and perceived the chatbot as a useful adjunct to the PAU visit for obstetric anesthesia education. Future work will focus on improving the chatbot and implementing it as a patient-accessible PAU tool.

References:

1. BMC Med Res Methodol 2018;18:235

SAT - RA - BS 2 - BR 1 - Efficiency, Education, Access – 02

Understanding Public Interest in Epidural Anesthesia for Labor: A 10-Year Google Trends Study

Presenting Author: Tarick E. Ahmad, BS

Presenting Author's Institution: Albany Medical College - Albany, New York

Co-Authors: Ammaar Mohammad, BS - Albany Medical College
Margaret O'Donoghue, Associate Professor of Anesthesiology - Albany Medical Center
Tejash E. Sikka, BS, MSBA - Albany Medical College

Abstract :

Introduction:
In the United States, epidural anesthesia is the most prevalent form of labor analgesia and its public understanding has largely been understudied. This project examines national trends from the last decade in Google searches regarding epidurals.We hypothesized that search interest in epidural safety, adverse effects, and logistics has increased over time, reflecting patient concerns and shifts in patient education delivery following the COVID-19 pandemic.

Methods:
This retrospective longitudinal study used Google Trends to assess public interest in epidural anesthesia for labor over a 10-year period from May 2015 to May 2025. The 50 most commonly searched questions regarding epidural during labor were identified. Relative search volume (RSV) for each search term was collected. The mean RSV was calculated for each search term across the previous ten years. A one-way analysis of variance (ANOVA) was performed to compare mean RSV between the search terms with a significance threshold of < 0.05. To assess the quality of online information, the top five search results for each of the ten most frequently searched terms were evaluated using the Global Quality Score (GQS), a five-point scale in which higher scores indicate higher-quality information (5 = high quality and 1 = low quality).

Results:
During the past 10 years from May 2015 to May 2025, the mean RSV for “epidural during labor” increased significantly (2015: 50; 2025: 89), reflecting surging public interest in epidural anesthesia for labor. Among the top 50 epidural-related search terms, “epidural side effects” and “is epidural safe for baby” had the highest mean RSVs, while other frequently searched topics included “epidural not working,” “epidural during labor,” “can epidural cause back pain,” “how much does an epidural cost,” “how long does epidural last,” “when to ask for epidural,” “is epidural safe,” and “epidural vs natural birth” (78.29 vs 75.84 vs 74.60 vs 62.34 vs 60.97 vs 57.73 vs 56.82 vs 51.61 vs 51.20 vs 47.36; $p < 0.001$). Quality

assessment showed that certain associated topics, such as “epidural during labor” and “how long does an epidural last,” were associated with high-quality online information (mean GQS ≥ 4.5), while cost-related and anecdotal questions tended to yield lower-quality resources (mean GQS ≤ 2.0).

Discussion:

Over the last ten years and especially through COVID, there has been an increase in the public's awareness of epidural anesthesia as evidenced by increasing searches on the topic, specifically with regards to side effects, safety and effectiveness. However, even amongst the most searched concerns, particular topics lack patient-informative material. We plan to elevate our research by conducting a statewide survey to determine how OB departments are currently providing patient education and if information quality changes occurred post-pandemic.

References:

1. PLoS One 2014;9:e109583

Search Term	Mean RSV	Mean GQS
epidural side effects	78.29	3.6
is epidural safe for baby	75.84	3.2
epidural not working	74.6	2.8
epidural during labor	62.34	4.2
can epidural cause back pain	60.97	2.8
how much does an epidural cost	57.73	1.8
how long does epidural last	56.82	4.8
when to ask for epidural	51.61	2.6
is epidural safe	51.2	3.8
epidural vs natural birth	47.36	3.8

Table 1. Top Epidural-Related Search Terms and Information Quality

SAT - RA - BS 2 - BR 1 - Efficiency, Education, Access – 03

Online Patient Resources for Cesarean Delivery: Are Pain and Anesthesia Prioritized in Education?

Presenting Author: Kalli Fautsch, MD

Presenting Author's Institution: Mayo Clinic - Rochester, Minnesota

Co-Authors: Ryan D'Souza, MD - Mayo Clinic
Kalli J. Fautsch, MD - Mayo Clinic
Molly Kraus, MD - Mayo Clinic

Abstract :

Introduction:
Cesarean delivery (CD) is one of the most frequently performed surgical procedures in the United States. Anesthesia and pain management are essential to maternal safety, recovery, and birth satisfaction. Shared decision-making requires access to accurate, comprehensive education. As patients increasingly rely on online resources, we aimed to assess the quality and readability of publicly available resources with a specific focus on content addressing anesthesia options, risks, and pain management for CD.

Methods:
A cross-sectional analysis of publicly available online websites related to CD was performed. A systematic internet search was conducted using Google, Bing, and Yahoo, capturing the first 30 results from six common search terms. Eligible websites were open-access and patient-focused. Clinician-focused content, duplicates, and multimedia-only resources were excluded. Websites were evaluated using predefined binary criteria across four domains (accountability, interactivity, structure, and content), generating domain-specific and total quality scores. Standardized quality instruments (DISCERN, JAMA benchmarks) and readability metrics (Flesch–Kincaid grade level [FKGL], SMOG Index) were collected. Descriptive and univariate statistics were performed.

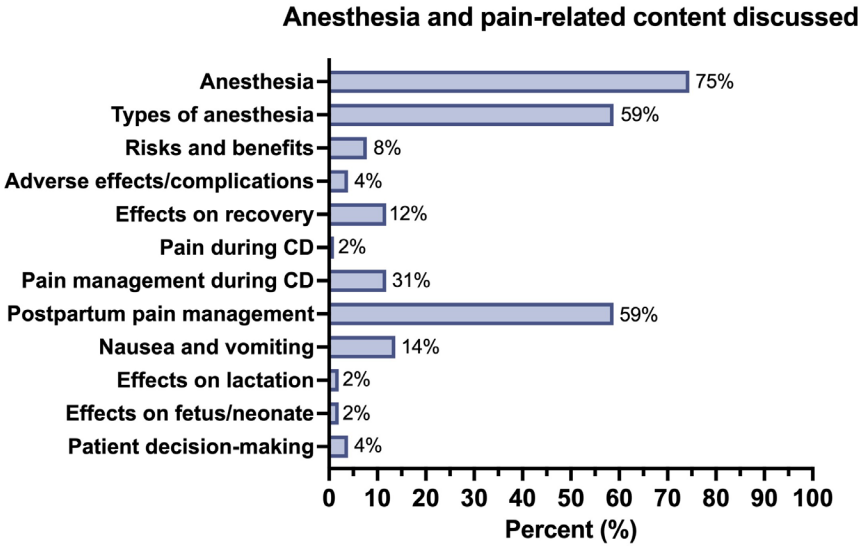
Results:
Fifty-one websites were analyzed and categorized as healthcare-affiliated (47.1%), open-access (43.1%), or government sources (9.8%). Overall quality was low (mean score 9.9 ± 4.8 of 32). Accountability was poor (4.0 ± 3.3 of 11), with authors identified on 29.4% of websites and citations on 35.3%. Interactivity was minimal (0.47 ± 0.61 of 6). Structural website features were more consistent (2.6 ± 0.6 of 4), with all sites using headings and 76.5% free of advertisements. Anesthesia-related content quality was poor (2.8 ± 2.1 of 11). While 74.5% mentioned anesthesia and 58.8% specified types, only 7.8% discussed risks and benefits, 2% addressed fetal/neonatal effects, and 2% discussed patient decision-making. Potential for pain during CD was not addressed, with most sites emphasizing the procedure to be pain-free or

mentioned a tugging sensation. FKGL and SMOG readability scores demonstrated the majority of websites required a high school or college reading level. Using DISCERN criteria, 63.5% of websites were rated poor, and no websites met criteria for excellent quality. Websites infrequently met adequate JAMA benchmarks for quality (7/51 websites met $\geq$ 3 of the 4 criteria).

Conclusion:

Publicly available online patient education resources for CD demonstrated poor overall quality. Content related to anesthesia, pain expectations, and pain management was exceedingly low. Readability exceeded the recommended 6th-grade or lower reading level. These findings highlight a gap in accessible, patient-centered education regarding anesthesia options and pain management. Higher-quality resources are necessary to improve informed shared decision-making and patient expectations.

References:



SAT - RA - BS 2 - BR 1 - Efficiency, Education, Access – 04

Accuracy and Quality of Social Media YouTube, TikTok, and Facebook on Cesarean Anesthesia

Presenting Author: Yoojin Kang, MD

Presenting Author's Institution: Department of Anesthesiology, Cedars-Sinai Medical Center - Los Angeles, California

Co-Authors: Donald Lee, MD - Department of Anesthesiology, Cedars-Sinai Medical Center

Abstract :

Introduction:
Over 74% of 18-29 year olds use social media to find health information.[1] Over 90% of parturients use the internet for health information.[2] Pain during cesarean delivery occurs in ~15% of surgeries, with public awareness growing.[3] We measured the accuracy and reliability of information on social media about cesarean anesthesia.

Methods:
This study is IRB exempt. The social media platforms YouTube (YT), TikTok (TT) and Facebook (FB) were queried with 7 terms for cesarean anesthesia in November 2025. Videos were limited to English-language, audio-visual content, cesarean anesthesia (neuraxial or general). Primary outcomes examined the quality of content. Answers were graded for accuracy and quality (understandability and actionability) using the AHRQ Patient Education Materials Assessment Tool (PEMAT-A/V) and reliability with mDISCERN.[2,4,5] Readability level was measured using widely validated indices.[2] Secondary outcomes included video uploader type and AI generation. Videos were screened for potential AI generation.[6] Statistics were performed using ANOVA for independent measures and Chi-Square, interrater reliability with Krippendorfs Alpha, P< .05 significant.

Results:
Videos meeting criteria and analyzed by authors were YT=60, TT=44, FB=40. Health care providers were the uploader in >70% of videos across platforms, P=NS. The average video length was YT(2.4 min), TT (1.8 min) and FB (1.6 min), P=NS. PEMAT understandability scores were moderate and similar in all platforms (YT 48.3; TT 45.2; FB 46.4), while actionability was consistently low (4.7, 4.2, 4.6), P=NS. mDISCERN showed low reliability, similar in all platforms (YT 1.2; TT 1.2; FB 1.1), P=NS. Readability grade level was above college graduate for all platforms. Content accuracy was surprisingly high (YT 96.1%, TT95.9%, FB 97.3%), P=NS. See Table. Videos flagged as AI generated were YT17%, TT18%, FB 5%, P=NS. Interrater reliability was 98%. Pain during cesarean was mentioned in YT 18%, TT 18% and FB 20%, P=NS.

Discussion:

Social media platforms are rapidly evolving and are used by a majority of people as a major source of medical information. A surprisingly high number of healthcare professionals provided information on cesarean anesthesia on YT, TT and FB. The information on cesarean anesthesia was accurate, although of low understandability and reliability. For patients to make better informed decisions, medical information requires accuracy, quality, and readability to meet standards set by AHRQ.[2] As social media evolves, companies providing these platforms should help address the accuracy, quality and readability of information. We need better quality information about cesarean anesthesia on social media.

References:

1. KFF Health Information and Advice on Social Media 2025

2. Lee IJOA 2025 PMID39754839

3. Zakowski Anesthesiology 2024 PMID38597801

4. Shoemaker 2014 PMID24973195

5. Bak IJOA 2025 PMID39955843

6. https://scanner.deepware.ai/

Table 1. Content quality, accuracy and readability by platform

Measure	YouTube (n=64) Mean ± SD[2]	TikTok (n=44) Mean ± SD[2]	Facebook (n=40) Mean ± SD[2]	p-value
Contect quality				
PEMAT Understandability (%)	48.28 ± 11.45	45.24 ± 10.55	46.40 ± 11.20	0.372
PEMAT Actionability (%)	4.72 ± 18.44	4.17 ± 15.72	4.58 ± 16.45	0.986
mDISCERN	1.2 ± 0.58	1.16 ± 1.11	1.08 ± 0.27	0.76
Accuracy				
% correct	96.13 ± 9.06	95.90 ± 9.84	97.34 ± 14.70	0.815
Number of statements	14.1 ± 8.83	10.5 ± 4.7	11.6 ± 8.6	0.058
Readability				
ARLCC	39.36 ± 15.49	30.25 ± 7.62	34.07 ± 14.24	0.0026
ARI	89.60 ± 50.63	59.91 ± 25.05	72.23 ± 47.34	0.0028
GFI	49.60 ± 22.29	37.48 ± 12.20	42.66 ± 20.09	0.0064
FKGL	73.37 ± 39.55	50.02 ± 19.32	59.81 ± 36.93	0.0026
SMOGI	38.31 ± 13.18	30.59 ± 7.68	33.81 ± 11.67	0.003

SAT - RA - BS 2 - BR 1 - Efficiency, Education, Access – 05

Patterns of intravenous access used for labor and delivery at Society for Obstetric Anesthesia and Perinatology Centers of Excellence – a cross-sectional survey study

Presenting Author: Lauren De La Ossa, MD

Presenting Author's Institution: Hospital of the University of Pennsylvania - Philadelphia, Pennsylvania

Co-Authors: Allison Lee, MD, MS - Hospital of the University of Pennsylvania
James Miranda, MD - Department of Anesthesia and Critical Care, University of Pennsylvania, Philadelphia, PA, USA

Abstract :

Background:
Peripartum care typically involves establishing intravenous (IV) access as a standard safety measure, since it facilitates the administration of fluids and medications, which may be lifesaving, including antibiotics, vasopressors, and blood products. There is uncertainty about how frequently parturients undergo this intervention. How labor and delivery units define and approach sufficiency of IV access is also unclear. To understand current practice norms, we surveyed labor and delivery units designated by the Society for Obstetric Anesthesia and Perinatology (SOAP) as Centers of Excellence (CoEs). The rationale for surveying this population was the assumption that their practices surrounding IV access would mirror the excellence observed in other areas.

Our primary objective was to characterize how CoEs approach IV access for childbirth. We hypothesized that units without policies detailing a minimum level of IV access for labor and delivery would be more likely to report use of a single 20-gauge IV for both vaginal and cesarean delivery compared with those units with such policies.

Methods:
Cross-sectional web-based survey of Obstetric Anesthesia directors (or their designees) at SOAP CoEs in February 2025. The survey asked respondents to describe their existing division policies and practices related to venous access for labor and delivery. The primary outcome was the rate at which respondents reported “commonly” using a single 20-gauge IV or smaller for vaginal or cesarean delivery. Secondarily we sought to understand how clinical contexts like elevated hemorrhage risk and difficult venous access influenced decision-making. We asked about their perceptions regarding how a society guideline recommending a standardized approach to venous access might impact care of parturients.

Results: We received responses from 38 of 83 CoEs (46% response rate, Table 1). 26 reported adherence to a policy defining a minimum appropriate level of IV access for childbirth. Units without a

policy reported use of a single 20-gauge IV for childbirth by any mode of delivery nearly twice as often as those with policies. The perceived impact of a society guideline to standardize the approach to IV access for labor and delivery was mixed, with some suggesting it may improve interdisciplinary communication and others expressing concern about unintended potential consequences.

Conclusions:

Despite the frequency and morbidity associated with conditions like major obstetric hemorrhage and obstetric sepsis, labor and delivery units frequently reported using only a single 20-gauge IV catheter for childbirth. This is especially true of those without policies related to IV access. A society guideline related to approaching IV access for labor and delivery may help standardize care, but should incorporate stakeholder perspectives.

References:

Table: Prevalence of policies related to IV access, practice patterns, and prevalence of assistive devices for IV placement

Type of policy related to IV access for labor and delivery	Number with policy / total number of respondents (%)
Policy specifying minimum level of IV access needed for routine labor and delivery by any means	24/38 (63.2%)
Risk stratification tool to identify parturients at high risk of postpartum hemorrhage	37/38 (97.3%)
Policy specifying minimum level of IV access needed when postpartum hemorrhage risk is high	29/38 (76.3%)
Policy detailing how to approach IV access in parturients where it is known to be difficult	15/38 (39.5%)

			Unit policy detailing minimum IV access appropriate for childbirth	
			Yes (n=24)	No/Unsure (n=14)
VD	Single 20-gauge IV or smaller commonly used for delivery	Yes	3 (12.5%)	3 (21.4%)
		No	21 (87.5%)	11 (78.6%)
	Multiple IVs commonly used for delivery	Yes	8 (33.3%)	1 (7.1%)
		No	16 (66.7%)	13 (92.9%)
CD	Single 20-gauge IV or smaller commonly used for delivery	Yes	3 (12.5%)	3 (21.4%)
		No	21 (87.5%)	11 (78.6%)
	Multiple IVs commonly used for delivery	Yes	8 (33.3%)	2 (14.3%)
		No	16 (66.7%)	12 (85.7%)

Type of assistive device / personnel reportedly available	Number with / total number of respondents (%)
Ultrasound with vascular probe	33/38 (86.8%)
Nurses trained in ultrasound IV access	9/38 (23.7%)
Anesthesia providers trained in ultrasound IV access	34/38 (89.5%)
Vein illuminator	13/38 (34.2%)
Vascular access team	23/38 (60.5%)

IV = intravenous; VD = Vaginal Delivery; CD = Cesarean Delivery

SAT - RA - BS 2 - BR 2 - Refining Hemorrhage Management – 01

Impact of Maternal Vulnerability on Hemorrhage Severity in Placenta Accreta Spectrum at a High-Volume Referral Center

Presenting Author: Ross Bakhtari, MD MPH

Presenting Author's Institution: UC Los Angeles - Los Angeles, California

Abstract :

Background:
Placenta accreta spectrum (PAS) is associated with severe obstetric hemorrhage, yet blood loss varies widely even among patients with similar disease severity managed with standardized care. Although placental anatomy guides operative planning, the role of maternal comorbidities and pregnancy characteristics in determining hemorrhage severity after PAS diagnosis is less well defined. Improved perioperative risk stratification may inform anesthetic planning, transfusion preparedness, and postoperative disposition.

Methods:
We conducted a retrospective cohort study of patients with surgical pathology–confirmed PAS delivered at a tertiary referral center between 2015 and 2025. Hemorrhage severity was assessed using estimated blood loss (EBL), analyzed both as a continuous variable (log-transformed) and as a binary outcome defining massive hemorrhage (EBL ≥2.5 L). Candidate predictors were selected a priori using a two-tier framework. Primary models incorporated clinically actionable preoperative variables, while secondary analyses evaluated delivery-context factors, including urgency, scheduling status, and timing. Multivariable linear and logistic regression models were constructed with attention to event distribution and clinical interpretability.

Results:
Eighty-seven patients were included. Median EBL was 1,500 mL (IQR 1,000–3,000; range 250–20,000 mL), and 29% experienced massive hemorrhage, demonstrating marked heterogeneity despite standardized multidisciplinary care.

In continuous analyses, later gestational age at delivery and placenta percreta were independently associated with increased blood loss, with mean EBL increasing by approximately 4% per additional week of gestation. Maternal hypertension and higher body mass index (BMI) were associated with greater blood loss in univariable analyses, though these effects attenuated after multivariable adjustment.

When hemorrhage was analyzed as a binary outcome, maternal hypertension and obesity (BMI ≥35) remained independently associated with increased odds of massive hemorrhage, along with placental invasion depth. Antenatal vaginal bleeding showed a directional association but did not improve model

fit. Delivery-context variables—including nighttime, urgent, or unscheduled delivery—were not independently associated with hemorrhage severity or transfusion requirements.

Conclusions:
Hemorrhage severity in PAS is heterogeneous and not fully explained by placental anatomy alone. Maternal comorbidities, particularly hypertension and obesity, identify patients at increased risk for extreme hemorrhage and may warrant incorporation into perioperative risk stratification. Use of both continuous and threshold-based hemorrhage measures provided complementary insights into factors associated with incremental versus catastrophic blood loss, supporting a multifactorial approach to anesthetic planning and resource allocation at specialized centers.

References:

1. Int J Gynaecol Obstet. 2019.

SOAP_PAS_Figure1.pdf

SAT - RA - BS 2 - BR 2 - Refining Hemorrhage Management – 02

Preoperative Risk Stratification in Suspected Placenta Accreta Spectrum

Presenting Author: Emily M. Boyd, MD

Presenting Author's Institution: UCSF - San Francisco, California

Co-Authors: Arianna Cassidy, MD - UCSF
Megan Lobel, MD - University of California San Francisco

Abstract :
Placenta accreta spectrum (PAS) is a pathologic adherence of the placenta to the uterine wall, affecting approximately 1 in 313 cesarean deliveries in the United States. PAS is associated with a markedly increased risk of maternal mortality and morbidity including severe hemorrhage, coagulopathy, and shock. We hypothesized that a stratified multidisciplinary preoperative risk assessment integrating clinical risk factors and antenatal imaging can effectively predict operative and physiologic complications. This can be used to inform future anesthetic planning for patients with suspected PAS.

We describe a standardized protocol for evaluation and management of patients with suspected PAS at a tertiary care center. Patients were referred for PAS evaluation based on established risk factors, including prior cesarean delivery, prior uterine procedures, and/or placenta previa. All patients underwent a maternal–fetal medicine (MFM) consultation followed by antenatal imaging with ultrasound (US) and magnetic resonance imaging (MRI) to identify a diagnosis of normal (low suspicion), myo-adherent (moderate/severe suspicion, accreta), myoinvasive (increta), or serosal invasion (percreta). US served to assess placental location and high risk features such as vascular lacunae, abnormal blood flow, and retroplacental myometrial thickness. MRI was used to further characterize placental features and abnormalities, such as heterogeneity, presence of lakes and bands, bulging of lower uterine segment, myometrial thinning or invasion, extrauterine invasion, and evidence of hemorrhage. Patients with continued suspicion for PAS underwent multidisciplinary case review involving obstetrics, anesthesiology, radiology, interventional radiology, and surgical subspecialists as indicated to develop an individualized delivery plan.

We performed a secondary analysis of a retrospective cohort of these patients evaluated and surgically managed for suspected PAS between 2018 and 2022. The primary outcome was a composite of adverse maternal outcomes: hemorrhage, intraoperative transfusion and postoperative ICU admission. Secondary outcomes included individual adverse events, estimated blood loss, and units of red blood cells transfused.

Among 76 patients, multidisciplinary evaluation identified a spectrum of anticipated case complexity; 51 patients (67%) were assessed as at least moderate/severe suspicion of PAS. These patients had increased risk of composite adverse outcomes (aOR 8.65, 95% CI 1.65–45.30), specifically hemorrhage

(aOR 13.50, 95% CI 2.32–78.58), intraoperative transfusion (aOR 4.91, 95% CI 1.17–20.60), and higher median transfusion volume (2 vs. 0 units, p=0.004).

Multidisciplinary preoperative evaluation for suspected PAS, including specialist obstetric consultation and standardized imaging, effectively predicts peri-operative complications and can be used to inform anesthetic planning.

References:

1. Front Surg 2024;11:1347549

2. Obstet Gynecol 2018;132:e259–75

Figure 1.pdf

SAT - RA - BS 2 - BR 2 - Refining Hemorrhage Management – 03

Revisiting the Adoption of a Hemorrhage Bundle at a Single Tertiary Center: A Delphi Survey Assessment of Compliance and Continued Barriers to Implementation

Presenting Author: Yalda Toofan, MS, MD

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

Co-Authors: Daniela A. Carusi, MD, MSc - Brigham & Women's Hospital
Karen Manganaro, DNP, RNC-OB, FAWHONN - BWH
Noor A. Raheel, MD, MPH - Brigham and Women's Hospital

Abstract :

Background:
Hemorrhage is the leading cause of severe maternal morbidity and preventable mortality. In 2015, the National Partnership for Maternal Safety (NPMS) released a consensus bundle on obstetric hemorrhage outlining critical clinical practices that should be implemented in every maternity unit.[1] In 2019 we conducted a sequential Delphi survey across disciplines on our labor and delivery unit to identify practice deficiencies and perceived barriers to bundle implementation. We hypothesize that 7 years later, barriers persist for the implementation of various bundle elements. Recognizing persistent barriers may enable focused prioritization. Here we present a re-evaluation of compliance with the NPMS hemorrhage bundle at a tertiary center.

Methods:
A repeat prospective, cross-sectional, consensus-building Delphi study was conducted among a multidisciplinary expert panel of anesthesiologists, obstetricians, and nurses using 3 sequential questionnaires. The first round identified bundle elements determined as not currently adequate, and barriers to implementation. The second round established consensus within a professional group; barriers and recommendations were elicited from each specialty. The final round revealed responses about persistent barriers from across specialties, culminating in a final consensus. Results were compared to our 2019 survey.

Results:
Of 38 experts who volunteered to participate, a total of 33 experts (87%) ultimately completed the survey (14/14 anesthesiologists, 7/8 obstetricians, and 12/16 nurses). Of the 13 bundle elements, 8 (61.5%) were described as persistently deficient by a provider in at least 1 discipline, compared to 100% of elements deemed deficient in 2019. Since 2019, successful implementation was achieved for 3 previously deficient elements, including immediate access to hemorrhage medications, assessment of hemorrhage risk, and establishing a response team to call when help is needed. However, 5 deficiencies were persistent by consensus: establishing a culture of huddles/post-event debriefs, support programs

for patients and staff for all significant hemorrhages, obstetric hemorrhage emergency management plan with checklists, measurement of cumulative blood loss, and unit education on protocols and unit-based drills. Barriers to implementation are in the Table.

Conclusions:
Despite improvement, persistent deficiencies in the NPMS hemorrhage bundle persist at our tertiary center. The Delphi technique provides a powerful tool to reveal successes and persistently deficient PPH bundle elements, and perceived barriers to implementation. For elements persistently deficient after 7 years, focused effort can explore new strategies for effective implementation. As maternal hemorrhage is the leading cause of preventable morbidity, addressing persistent deficiencies in preparedness and response is warranted.

References:
1. Anesth Analg. 2015 Jul; 121(1):142-48.

PPH_Abstract_Figure.pdf

SAT - RA - BS 2 - BR 2 - Refining Hemorrhage Management – 04

Timing is everything: An evaluation of best practices for quantitation of blood loss after vaginal delivery

Presenting Author: Pin Jung Cheng, MD

Presenting Author's Institution: Harvard T.H. Chan School of Public Health - boston, Massachusetts

Co-Authors: Noor A. Raheel, MD, MPH - Brigham and Women's Hospital

Abstract :

Background:
Late recognition of postpartum hemorrhage (PPH) is a predominant driver of maternal morbidity, and quantitative blood loss (QBL) has been shown to improve early PPH detection compared to visual estimation of blood loss.[1,2] However, late QBL measurements after delivery may perpetuate delayed recognition. Electronic QBL devices (Stryker, Kalamazoo, MI) are immediately available in every labor room at our tertiary center, and QBL is performed by labor and delivery nurses after every vaginal delivery. We hypothesize that QBL by gravimetry may occur late at a single time point, limiting the utility of QBL for earliest detection of PPH after vaginal delivery.

Methods:
We conducted a retrospective observational study of patients who underwent vaginal delivery with a QBL≥500 mL at a single center between September 15 and December 14, 2025. For each delivery, time-stamped gravimetric measurements were retrospectively analyzed in relation to time of delivery. Optimal (vs. delayed) QBL was defined as serial (vs. singular), and initiated early (vs. late), respectively. “Serial” QBL was defined a priori as ≥3 gravimetric postpartum measurements**,** and “early” defined as initiation within 15 minutes of delivery**.**[3] Median within-case measurement intervals were calculated among serial cases. The relationship between serial measurement and total QBL was assessed by linear regression with log-transformed total QBL. Descriptive analyses were performed.

Results:
A total of 101 PPH cases were identified for analysis. Serial gravimetric QBL measurement was observed in 18 cases (17.8%). The first QBL measurement occurred within 15 minutes of delivery in only 11 cases (10.9%). Among cases with serial measurement, the median between-measurement interval was 6.5 minutes (IQR 7.5 minutes). Figure 1 illustrates representative QBL measurement patterns we identified from an optimal (serial, early) QBL vs. a delayed (singular, late) QBL measurement.

In an exploratory analysis, early serial measurement showed a non-significant trend toward higher total QBL (95% CI -0.08 to 0.60), likely reflecting provider response to clinically apparent hemorrhage.

Conclusion:
In our contemporary practice, we found that optimal QBL - timely and serial gravimetric measurements -

was infrequently performed after vaginal delivery associated with PPH. These findings suggest substantial opportunity for obstetric anesthesiologists to work in a multidisciplinary way with nursing colleagues to enhance how QBL devices are operationalized. Prompt initiation and serial measurements of QBL may better support early recognition of and interventions for PPH. Post-refinement impact on PPH-related outcomes will be warranted.

References:

1. Coviello et al, Am J Perinatol 2019

2. Lumbreras-Marquez et al, Anesth Analg 2020

3. Mammoliti KM et al. *Lancet Glob Health*. 2025

Figure1 QBL.pdf

SAT - RA - BS 2 - BR 2 - Refining Hemorrhage Management – 05

Real-Time Risk Prediction of Postpartum Hemorrhage: An Online Tool for the Labor & Delivery Time Course

Presenting Author: Mahesh Challapalli, BS

Presenting Author's Institution: University of Arizona, College of Medicine - Phoenix, Arizona

Co-Authors: Benjamin M. Hyers, MD - Icahn School of Medicine at Mount Sinai
Andrew Warburton, MD - Icahn School of Medicine at Mount Sinai

Abstract :

Introduction:
Postpartum hemorrhage (PPH), defined as blood loss exceeding 1000 mL following delivery, remains a leading cause of maternal morbidity and mortality worldwide, accounting for approximately 25% of maternal deaths globally. Early identification of patients at elevated risk could enable timely interventions and improve outcomes. Existing risk stratification approaches often rely solely on antepartum history gathered at admission, with limited use of dynamic physiological changes and clinical interventions occurring throughout labor and delivery. In contrast, experienced clinicians continuously utilize all available clinical information to internally estimate the risk of serious adverse events as patients progress through care, an approach that often performs well but is difficult to standardize. We developed a real-time prediction tool that mimics this clinician behavior, dynamically updating PPH risk estimates by combining antepartum historical factors with evolving clinical observations including laboratory values, administered medications, and vital signs.

Methods:
We utilized the MIMIC-IV clinical database from Beth Israel Deaconess Medical Center, identifying 1,489 delivery encounters with documented PPH status. Our model employs Raindrop, a graph-guided neural network architecture designed for irregular multivariate time series classification. Unlike traditional models requiring fixed-interval observations, Raindrop accommodates the inherently irregular timing of clinical measurements characteristic of labor and delivery data. The model incorporates 40 clinical features including laboratory values (hemoglobin, platelet count, coagulation studies, lactate), medication administrations (oxytocin, misoprostol, magnesium sulfate), and seven static demographic variables (age, BMI, prior cesarean section, prior PPH). Data was split 80/20 for training and testing with stratification by outcome.

Results:
PPH prevalence was 9.5% (n=142). On the held-out test set of 299 patients, the model achieved an area under the receiver operating characteristic curve (AUROC) of 0.758 and an area under the precision-recall curve (AUPRC) of 0.400. The model demonstrated appropriate discrimination across different test

patients, with predictions responsive to both static risk factors (prior PPH, elevated BMI) and dynamic clinical changes (declining hemoglobin, escalating uterotonic administration).

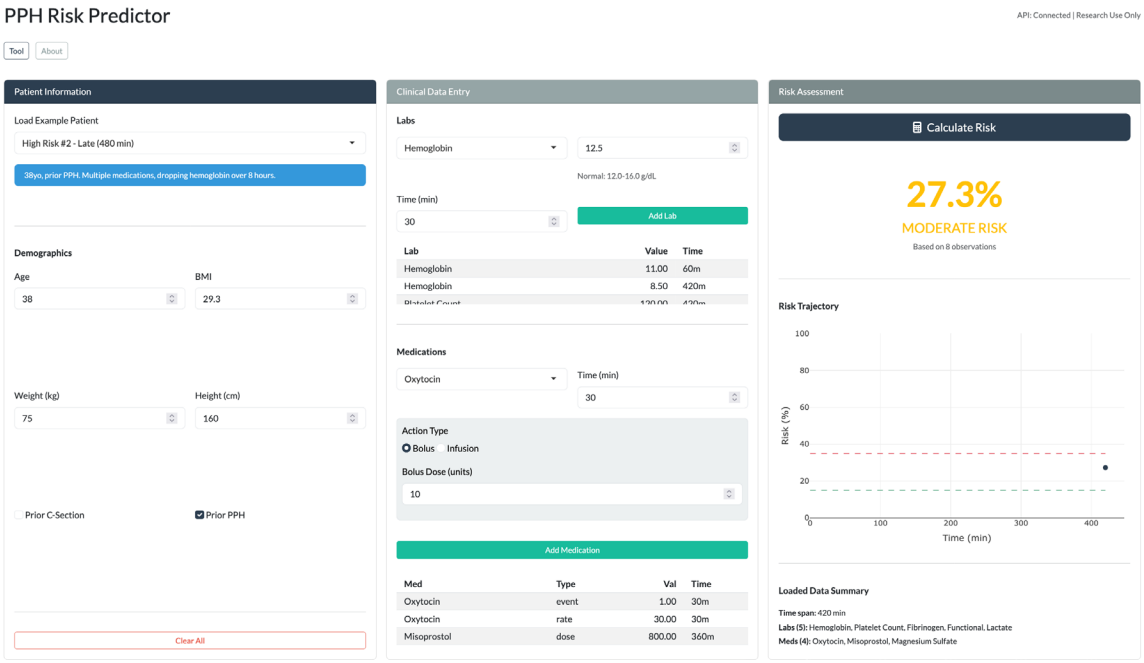
Discussion:

We present a functional online tool giving real-time PPH risk estimation throughout a patient's labor and delivery time course. Limitations include single-center derivation and retrospective design. This work demonstrates the feasibility of dynamic risk assessment in obstetric care using modern machine learning techniques. Our tool is available online at https://pph-predictor.applied-hemostasis.com/.

References:

1. Obstet Gynecol 2024;143:571

2. Curr Opin Anesthesiol 2022, 35:317



SAT - RA - BS 2 - BR 2 - Leadership - Education For All – 01

Eating in Labor: A Cross-Sectional Survey of Obstetric Providers via Social Media

Presenting Author: Shelby A. Crants, MD
Presenting Author's Institution: Mass General Brigham - Boston, Massachusetts
Co-Authors: Christina Amutah, MD - Mass General Brigham

Abstract :

Introduction:
The American Society of Anesthesiologists recommends shared decision-making for oral intake prior to active labor and clear liquids in active labor given increased aspiration risk in pregnancy and no clear evidence of improved obstetric outcomes with solid food consumption.[1] Many labor and delivery (L&D) units restrict diets for laboring patients in accordance with these guidelines, though practices vary widely.[2] Patients with preeclampsia with severe features (PET) receiving magnesium for seizure prophylaxis are also often subject to dietary restrictions secondary to concerns regarding aspiration risk in the event of eclampsia, though this is increasingly rare with magnesium therapy and there is no evidence to support restricting diet in these patients.[3] Many patients report significant distress associated with diet restrictions on L&D, and there is limited data regarding current dietary practices and provider perspectives on oral intake in labor. We hypothesize that the majority of obstetric providers will support liberalizing dietary intake for laboring patients and PET patients on magnesium.

Methods:
We conducted a cross-sectional survey of obstetric providers on policies and beliefs relating to dietary restrictions on L&D for patients in labor and patients with PET with severe features receiving magnesium using social media (TikTok, Instagram, and Facebook) for participant recruitment. The survey was distributed via Qualtrics, and responses were collected over four weeks.

Results:
69 responses were obtained from providers across 12 states and 2 countries, with most responses from obstetrician-gynecologists (41%) and L&D nurses (43%). Respondents included providers across all age groups and reflected a variety of racial, ethnic, and educational backgrounds. 87% of respondents reported diet restrictions for laboring patients at their institutions, while 64% reported restrictions for patients with PET on magnesium. Most respondents agreed there were benefits to eating in labor and while on magnesium (95% and 78%, respectively), and many felt that there were not clinically significant health risks associated with liberalizing oral intake in laboring and PET patients (57% and 44%, respectively). The majority of respondents expressed a belief that laboring patients and patients receiving magnesium for PET on L&D should be allowed to eat solid foods (92% vs 65%, respectively).

Conclusions:
Our study demonstrated that dietary restrictions on L&D are widespread, and that most surveyed providers favor more liberal dietary policies for patients. Further research utilizing gastric ultrasound is needed to better understand the impact of increased oral intake on L&D, and input from anesthesia providers regarding patient risk assessment is essential to developing safe and evidence-based dietary guidelines.

References:
1. ASA Statement on Oral Intake During Labor 2022

2. Stephens BMC Pregnancy Childbirth 2024

3. Fishel Bartal AM J Obstet Gynecol 2022

Eating in Labor- A Cross-Sectional Survey of Obstetric Providers via Social Media Table.pdf

SAT - RA - BS 2 - BR 2 - Leadership - Education For All – 02

Content and Consistency of Informed Consent for Neuraxial Labour Analgesia: A Prospective Observational Study

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Co-Authors: Simon Massey, MBChB, FRCA, FRCPC - Department of Anesthesia, BC Women's Hospital, Vancouver, Canada. Department of Anesthesiology, Pharmacology and Therapeutics, University of British Columbia, Vancouver, Canada.
Maisa Samie, BSc - Department of Biology, University of British Columbia, Vancouver, Canada

Abstract:
Informed consent is an integral part of neuraxial labour analgesia (NLA), yet intrapartum informed consent may be compromised by pain, time pressure, and changing circumstances (1). While guidance emphasizes shared decision-making, disclosure of material risks, and discussion of alternatives (2,3) the bedside content of NLA consent is poorly described. We assessed thematic domains included in obstetric anesthesiologists' NLA consent process.

Methods:
In this single-centre study, we prospectively observed anesthesiologists' routine, non-emergent NLA consent encounters in healthy labouring patients (ASA II, ≥19 years, English-speaking). We excluded advanced labour with significant distress and situations where clinical events altered usual practice. Participants knew they were being observed but were blinded to the specific elements assessed. A single trained observer used a standardized checklist to record identity verification, pre-procedure assessment, assessment of pre-existing knowledge, counselling content (procedure description, alternatives, risks/complications, expected effects), and consent duration. Checklist elements were predefined a priori based on professional and Canadian medicolegal guidance for neuraxial consent. After the NLA procedure, anesthesiologists completed a brief survey on usual consent practices and views on standardization and antenatal education. Outcomes were summarized descriptively.

Results:
Eighteen anesthesiologists each completed one observed encounter. Technique was described before initiation in 15/18 (83%) and expected effects in 17/18 (94%). Risks/complications were discussed in 18/18 (100%), with a median of 8 distinct topics; the most consistently disclosed were inadequate block, post-dural puncture headache, and potential epidural replacement (each 18/18, 100%). Encounters covered a median of 10/14 predefined counselling elements (range 5–12); alternative labour analgesia options were not discussed (0/18, 0%). Only 10/18 (56%) of anesthesiologists verified that the patient had read the information sheet (Figure 1). On the survey, 14/18 (78%) agreed that active-labour patients can

provide informed consent, 11/18 (61%) supported standardized guidance, and 1/18 (6%) believed patients are adequately informed pre-labour. Median consent duration was 4 min (IQR 4–5).

Conclusion:
Intrapartum NLA consent was brief and variable, and consistently omitted discussion of analgesic alternatives. Standardized consent prompts, structured integration of written resources, and antenatal education may improve consistency and strengthen shared decision-making.

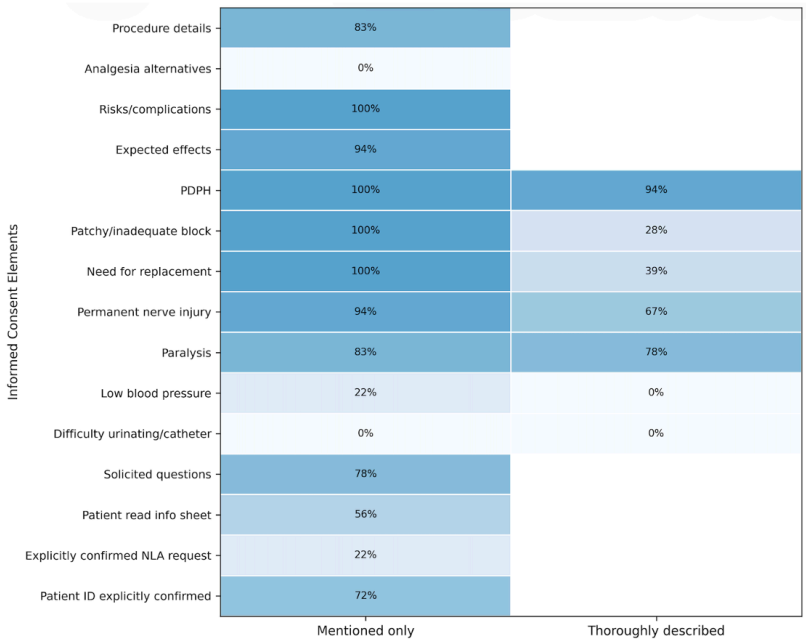
References:

1. Anaesthesia. 2025; 80(10):1275–6

2. Anaesthesia 2025; 80(12):1581–2.

3. CMPA. https://www.cmpa-acpm.ca/en/advice-publications/handbooks/consent-a-guide-for-canadian-physicians.

Figure 1. Variability in content of intrapartum neuraxial labour analgesia consent across 18 encounters.



Checklist elements were predefined a priori from professional and Canadian medicolegal guidance (3). Cells indicate whether each element was discussed during the encounter; selected risks additionally indicate discussion depth (mentioned only vs thoroughly described).

PDPH: Post-dural puncture headache, NLA: Neuraxial labour analgesia.

SAT - RA - BS 2 - BR 2 - Leadership - Education For All – 03

Staff Culture of Respectful Care in Antenatal and Postpartum Units: A Qualitative Concept Elicitation Study

Presenting Author: Moe K. Takenoshita, BSc, MBBChir, MRCS
Presenting Author's Institution: Stanford University - Palo Alto, California
Co-Authors: Aleesha Jethwa, MBBS, BMedSci, MSED - Stanford
Elliott K. Main, MD - Stanford University
Ruhi Nath, BA - Stanford University
Susan Perez, PhD - Stanford University

Abstract :

Introduction:
Culture of respectful care in hospital antenatal and postpartum care settings can impact patient outcomes and satisfaction.[1,2] However, the definition and determinants of culture of respectful care among staff and its potential impact on maternal mortality remains underexplored. We aimed to define and derive a conceptual framework of hospital culture in the context of respectful care in antenatal and postpartum clinical settings.

Methods:
Exploratory qualitative study design was used for this concept elicitation study. Consolidated Criteria for Reporting Qualitative Research reporting standards were followed. Individual interviews with clinical and nonclinical staff working on labor and delivery, antepartum or postpartum units across California were carried out to capture comprehensive perspectives regarding staff culture of respectful care. Eligible participants were recruited between March to October 2025 following Institutional Review Board ethical approval. A purposive sampling method was used, selecting staff members that represented a range of maternal health providers and birth workers from diverse regions, communities, and populations. The primary outcome was development of a conceptual framework of hospital culture in the context of respectful care in antenatal and postpartum care settings. Secondary outcomes were to identify themes and subthemes.

Results:
Of the 58 healthcare workers invited, 22 were recruited and 21 interviews (36%) were included in the qualitative analysis (Asian 2/21, Black or African American 7/21, White 9/21). Participants included 9 physicians, 4 nurses, 4 doulas, 1 midwife, and 3 nonclinical staff across 16 healthcare organizations with equal representation of private, public and academic institutions. The total duration of interviews was 23 h 9 min (mean = 50 min 33 s).

Nine themes and 33 subthemes were identified. Unit culture of respectful care was defined by teamwork, communication, and respectful treatment between staff. Respectful care was characterized by bias-free care, teamwork and kindness. Culture of respectful care was influenced by leadership, psychological safety, and strategies to improve culture of respectful care, such as communication and training and staff education, as well as barriers to respectful care, such as resource constraints and implicit biases.

Based on these findings, we built a conceptual framework for hospital culture of respectful care among staff and between staff and patients in antenatal and postpartum settings (Figure 1).

Conclusions:
Staff culture of respectful care in antenatal and postpartum were defined by teamwork, communication and unbiased respect. We present a conceptual framework that can be used to guide measure development for evaluating staff culture of respectful care for improvement initiatives.

References:

1. Greenberg, M. B. *et al.*, *Am J Obstet Gynecol* 2022; 227:B44–B59
2. Guo, L. *et al. BMJ Qual Saf* 2022; 31:679–687

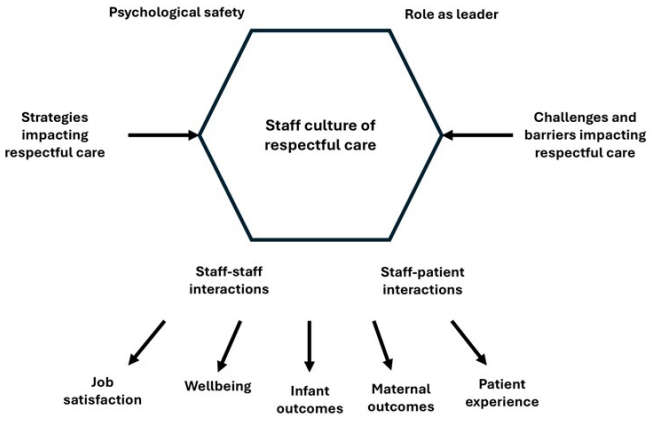


Figure 1. Conceptual framework of staff culture of respectful care in antenatal and postpartum settings. Nine themes include: unit culture definitions and descriptions, respectful care definitions and descriptions, non-respectful care, strategies impacting respectful care, assessment metrics, role as leader, psychological safety, wellbeing, and challenges and barriers to achieve respectful care.

SAT - RA - BS 2 - BR 2 - Leadership - Education For All – 04

Novel Education Image to Improve Recognition and Reporting of an Urgent Maternal Warning Sign: A Pilot Study

Presenting Author: Shayna Levine, MD
Presenting Author's Institution: Endeavor Health - Evanston, Illinois
Co-Authors: Naveen Nathan, MD - Endeavor Health

Abstract :
According to the Centers for Disease Control and Prevention (CDC), 71.4% of maternal deaths occur in the postpartum period. The Maternal Mortality Review Committee has concluded that 87% of maternal deaths are preventable, with lack of knowledge identified as the largest contributing factor.[1] Therefore, efforts to improve education on postpartum warning signs are warranted. Effective communication is critical for health literacy as the mode and volume of information dissemination significantly influence recall. Within obstetrics, graphic-based education has shown to improve patient knowledge of preeclampsia compared to standard materials.[2] Although organizations such as Alliance for Innovation on Maternal Health (AIM) have published educational images of urgent maternal warning signs, these images lack anatomical accuracy and do not adequately convey the urgency of reporting potential complications.

Following IRB approval for this pilot study, researchers created a novel image depicting a deep vein thrombosis (DVT) (Figure 1B) and compared it with the current standard AIM DVT image (Figure 1A). Eligible participants were screened, consented and enrolled after delivery and prior to discharge. Demographic information and baseline knowledge of postpartum complications were collected via REDCap survey. Subjects were randomized to image presentation order and completed a voice-recorded interview of dichotomous and open-ended questions comparing the images. Quantitative data was analyzed through REDCap and repeated measures ANOVA.

Forty patients met inclusion criteria and thirty three were included in the final analysis. Exclusions (n=7) were due to identification of a nurse, missing demographics, incorrect randomization, and lost audio recording. At baseline, 78.8% of participants reported being “somewhat familiar”, “unfamiliar” or “very unfamiliar” with postpartum warning signs. A majority of participants identified the novel image as best illustrating a DVT (90.9%), best conveying the seriousness of a DVT (96.9%), and most likely to prompt one to seek medical attention (87.8%). When rating the likelihood of contacting a physician or presenting to the emergency department (Likert 0-10), the novel image scored higher than the current standard image after adjusting for presentation order (repeated measures ANOVA: $F(1,31)=8.06$, $p=0.008$, $\eta p^2=0.21$ and $F(1,31)=4.43$, $p=0.044$, $\eta p^2=0.13$, respectively).

In this study, a novel image improved patient recognition and increased the likelihood of seeking medical attention. These effects were likely due to improved anatomical accuracy and communication of clinical

urgency, illustrating how educational research can be translated into practical, patient-centered tools for obstetric anesthesia care. Future work will focus on developing and validating additional peripartum maternal warning sign images for a comprehensive visual aid.

References:

1. CDC:Pregnancy-related deaths (MMRC data), 2025.
2. You et al. *Am J Obstet Gynecol*, 2012.

Final_SOAP2026 image 1_DVT image.pdf

SAT - RA - BS 2 - BR 3 – POCUS - 01

Examining the gastric emptying half-time of water versus carbohydrate beverage in early labor in patients with epidurals

Presenting Author: Stefan Rodriguez, MD

Presenting Author's Institution: Beth Israel Deaconess Medical Center / Harvard Medical School - Boston, Massachusetts

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Maria C. Borrelli, MD - Beth Israel Deaconess Medical Center / Harvard Medical School
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Abstract :

Background:
Oral intake is often restricted during labor because of concern for aspiration, despite evidence of safety (1). Furthermore, restricted oral intake is associated with a progressive metabolic acidosis impacting mom and fetus (2). Research on laboring patients using gastric ultrasound suggests that gastric emptying is minimally impacted during labor, but data after epidural placement remains poorly defined (3). Gastric emptying for liquids is affected by caloric content, thus we hypothesize that water will empty more rapidly than sports drink. Our goal was to compare the gastric emptying half-time of water versus a carbohydrate-based sports drink (SpDr) in early labor during epidural analgesia.

Methods:
Randomized unblinded study enrolled healthy, term pregnant women in early labor (< 6cm dilation) who received epidural analgesia. Subjects were randomized to consume 100mL of either water or a sports drink. Patients were positioned in right lateral position head up 30 degrees. Gastric volume was assessed using a 4-8 MHz curvilinear probe at the gastric antrum at baseline, immediately after ingestion, and at 20min intervals for 60min. Hunger was assessed using a 10cm visual analogue scale (VAS) from not hungry to extremely hungry, prior to ingestion and at regular intervals for up to two hours following consumption. Cross sectional area (CSA) measurements were used to calculate the gastric emptying half-time. Comparisons were done using t-test, Mann-Whitney, Fisher's exact, and repeated measures analysis for values over time.

Results:
54 patients enrolled, 46 completed the study; demographics were balanced. Baseline CSA was similar (Water: 5.6±3.5cm^2 v SpDr: 5.5±2.2cm^2;P=0.97), and after ingestion (Water: 12.7±4.7cm^2 v SpDr: 11.5±3.5cm^2;P=0.52). Calculated half-time was similar between groups (Water: 22.9±10.5min. v SpDr:

17.2±13.1min.;P=0.20; see **FIGURE**). Hunger, measured by VAS increased in both groups over time (P< 0.001) but was not statistically significant between groups (P=0.13).

Conclusion:

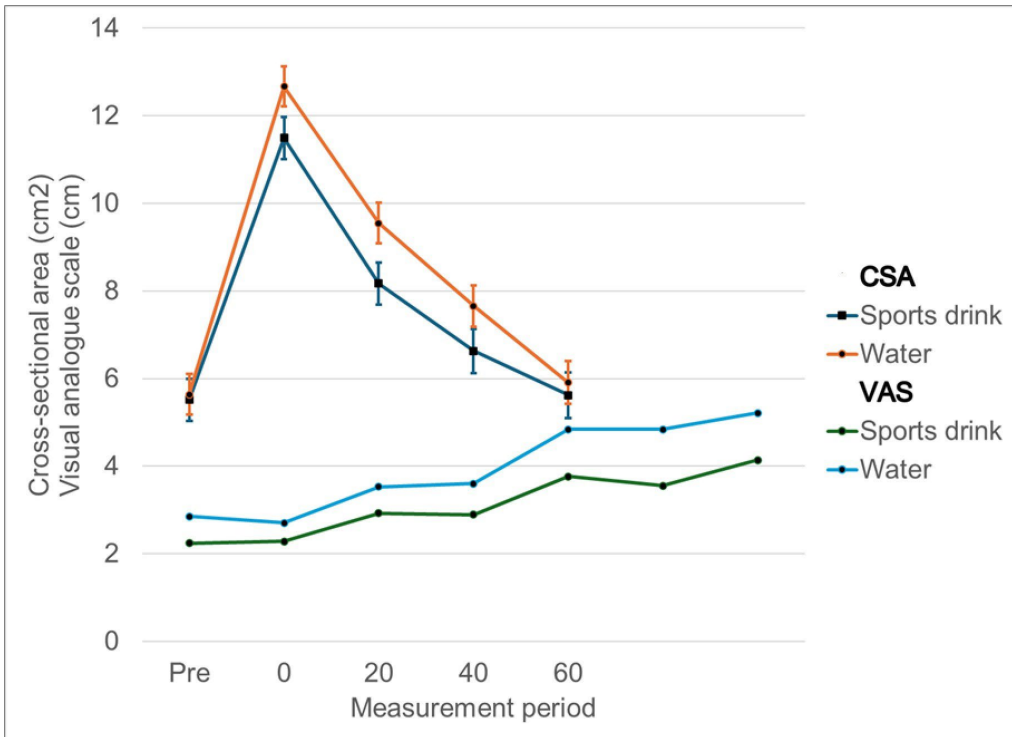
We found no statistically significant differences in gastric emptying half-times between the water and SpDr groups. The results likewise suggest that the risk of aspiration due to large volumes in the stomach are transient after 100mL ingestion. Future avenues for research include evaluating gastric emptying times with larger volumes of fluid, changes with repeated intake at time intervals, comparing different caloric densities, and correlating gastric emptying and hunger with metabolic markers and neonatal outcomes.

References:

1. https://doi.org/10.1046/j.1365-2044.1999.00750.x

2. PMID: 10196659

3. PMID: 24401801



SAT - RA - BS 2 - BR 3 – POCUS - 02

Incidence of pulmonary interstitial syndrome and it's correlation with N-terminal pro-B-type natriuretic peptide in preeclamptic women with severe features: A Prospective cohort study

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Abstract :

Background:
Preeclamptic women with severe features are at risk of cardiopulmonary complications due to complex pathophysiological changes driven by widespread endothelial dysfunction. Acute pulmonary edema is one such complication which can be detected earlier using point of care lung ultrasound (LUS). Several studies have identified that LUS can detect subclinical pulmonary interstitial syndrome (PIS) in pre-eclampsia, even in the absence of overt respiratory symptoms. We aimed to evaluate the incidence of pulmonary interstitial syndrome using LUS in our preeclamptic population and to predict variables which predict the development of PIS. Also, our study correlated this incidence with N-terminal pro-B-type natriuretic peptide(NT-pro BNP), which is a cardiac bio-marker used to predict heart failure and adverse maternal outcomes in pre-eclamptic population.

Methodology:
This was a prospective cohort study conducted in singleton pregnant patients diagnosed with severe preeclampsia after 34 weeks of gestation. Patients with pre-existing cardiac, pulmonary and renal diseases were excluded. The study was conducted after IRB approval and written informed consent was obtained from all participants. Participants were screened for PIS and ejection fraction using point of care LUS within 24 hours of hospital admission and venous samples were withdrawn for NT-proBNP. They were followed until the hospital stay. Demographic variables, medications, incidence of PIS , adverse maternal and fetal outcomes were noted. Predictors of PIS were identified using univariate (clinically relevant covariates $p< 0.10$) followed by multivariable logistic regression. Spearman's correlation was used to identify variables that correlated with NT-proBNP.

Results:

Out of the 120 women assessed for eligibility, 107 were analysed for outcomes. Baseline demographic variables were analysed. Out of 107 women, 14 women (13.1%) had PIS. Univariate analysis revealed patients who developed PIS had higher NT-proBNP, low serum albumin, higher serum creatinine, higher baseline blood pressures(BP) and low ejection fraction in comparison to who did not have PIS. On multivariable logistic regression analysis, NT-proBNP emerged as an independent predictor of pulmonary interstitial syndrome (OR 0.99, 95% CI 0.98–0.99; p = 0.036). Length of hospital stay showed a trend toward significance (OR 0.06, 95% CI 0.003–1.06; p = 0.055), while serum albumin, ejection fraction, systolic BP, and diastolic BP were not independently associated with the outcome.

Conclusion:

Preeclamptic women with severe features develop PIS which can be detected by LUS even before overt symptoms appear. Development of PIS can be significantly predicted by high baseline NT pro BNP and low albumin. NT pro BNP has a good predictive value for PIS and can be used to predict adverse maternal outcomes in the preeclamptic population.

References:

1.Anesth Analg 2019;128:1208–16.

2. Int J Obstet Anesth;2013;22:96–103

3. Anesth Analg 2023;137:1158-1166

Table represents the results of multivariable logistic regression:

Variable	Standard Error	p value	Adjusted OR (95% CI)
Albumin (g/dL)	4.21	0.125	632.87 (0.17–2,426,237.57)
Length of stay (days)	1.49	0.055	0.06 (0.003–1.07)
NT-proBNP (pg/mL)	0.004	0.036	0.99 (0.98–0.99)
Ejection fraction (%)	0.16	0.171	0.80 (0.58–1.10)
Systolic BP (mmHg)	0.15	0.164	0.81 (0.60–1.09)
Diastolic BP (mmHg)	0.14	0.352	1.14 (0.87–1.49)

Values are presented as adjusted odds ratios (OR) with 95% confidence intervals (CI) derived from multivariable logistic regression analysis. A p value < 0.05 was considered statistically significant. OR > 1 indicates increased odds of pulmonary interstitial syndrome, whereas OR < 1 indicates decreased odds.

SAT - RA - BS 2 - BR 3 – POCUS – 03

Comparison of Patient-Perceived and Ultrasound-Defined Midline in Parturients: Implications for Neuraxial Anesthesia

Presenting Author: Payton Gore, MD
Presenting Author's Institution: UC Davis - Sacramento, California
Co-Authors: Maria C. Gutierrez, MD - UC Davis Health
Faisal Tan, MD - UC Davis Health Anesthesiology and Pain Medicine

Abstract :

Background:

Obstetric neuraxial success requires accurate midline identification. Physiologic and anatomic changes during pregnancy may distort surface landmarks and patient-perceived midline (PPM) may not correspond to true spinal anatomy. Existing literature on PPM vs ultrasound-defined midline (USDM) is limited by few patients with BMI >40.[1] Our goal is to compare PPM with USDM in parturients undergoing neuraxial anesthesia and evaluate the clinical implications of any discrepancy. We hypothesize that PPM will frequently differ from USDM with larger discrepancies in patients with higher BMI. Greater deviation is expected to correlate with reduced first-pass success.

Methods:

This is a prospective observational study of patients receiving neuraxial for labor analgesia or Cesarean section, excluding those with known scoliosis. PPM and USDM were identified and marked. We measured the distance between these two points. The primary endpoint is the absolute distance (mm) between PPM and USDM. The secondary endpoint is the number of attempts. Exploratory endpoints (BMI, parity, dilation, gestational age, random scoliosis or edema) were examined for associations with midline discrepancy. Clinically meaningful differences in midline deviation were defined at 1.5 mm, 3 mm, and 4.5 mm. The smallest threshold (1.5 mm) corresponds to the outer diameter of a standard 17g Tuohy needle, representing the minimum deviation that may affect needle trajectory. Larger values represent two and three times this dimension.

Results:

An interim analysis of the first 25 participants demonstrated a mean of 3.7 mm and a standard deviation of 3.7 mm for the primary outcome. Based on this data, a sample size of 25 provides approximately 94% power to detect a clinically meaningful difference of 3.0 mm and greater than 99% power to detect a difference of 4.5 mm (Table 3), using a two-sided α of 0.05. While detection of small differences (1.5 mm) would require a larger sample, the current sample size allows estimation of the mean discrepancy with a 95% confidence interval width of approximately ±1.5 mm, supporting the adequacy of the planned enrollment for the study's primary objective. The mean BMI was 35.5. Seven patients (28%) had a BMI > 40. Absolute distance was weakly correlated to number of attempts (R^2 = 0.11). When stratified by any

clinically meaningful midline deviation threshold, no demographic or obstetric characteristic differed significantly between groups. This suggests that clinically relevant midline deviation is not readily predicted by patient characteristics.

Conclusion:

This study aims to quantify the discrepancy between perceived and true lumbar midline in parturients and highlight its potential impact on neuraxial anesthesia. Preliminarily, this study suggests that there is variation in patient reliability in identifying midline and we failed to identify any risk factor that could predict which patients may be less accurate.

References:

1. J Ultrasound Med 2018;37:1693–1699

Table 3: Summary of subject characteristics by whether distance between perceived and US midlines exceeds 4.5mm

	4.5mm or Less (N=15)	Greater than 4.5mm (N=10)	Overall (N=25)	P-Value
BMI				
Mean (SD)	35.2 (8.39)	36.1 (6.23)	35.5 (7.47)	0.698
Median [Min, Max]	33.8 [23.8, 56.6]	35.1 [27.9, 48.0]	33.8 [23.8, 56.6]	
Gestastion				
Mean (SD)	2.20 (1.26)	2.90 (0.994)	2.48 (1.19)	0.056
Median [Min, Max]	2.00 [1.00, 6.00]	3.00 [2.00, 5.00]	2.00 [1.00, 6.00]	
Parity				
Mean (SD)	0.733 (0.961)	1.60 (1.58)	1.08 (1.29)	0.0514
Median [Min, Max]	0 [0, 3.00]	1.00 [1.00, 6.00]	1.00 [0, 6.00]	
Gestastional Age (weeks)				
Mean (SD)	38.3 (2.31)	36.1 (5.48)	37.4 (3.95)	0.29
Median [Min, Max]	39.0 [32.3, 41.1]	37.9 [22.1, 40.3]	38.1 [22.1, 41.1]	
Dilation				
Mean (SD)	1.73 (2.12)	2.00 (3.23)	1.84 (2.56)	0.759
Median [Min, Max]	0 [0, 5.00]	0 [0, 10.0]	0 [0, 10.0]	
number of neuraxial attempts				
Mean (SD)	1.60 (0.910)	1.20 (0.422)	1.44 (0.768)	0.264
Median [Min, Max]	1.00 [1.00, 4.00]	1.00 [1.00, 2.00]	1.00 [1.00, 4.00]	

Table 3 summarizes subject characteristics by whether distance between perceived and US midlines exceeds 4.5mm. No patient characteristic differs significantly between groups.

SAT - RA - BS 2 - BR 3 – POCUS - 04

Teaching an Ultrasound-Guided Median Interspinous In-Plane Approach for Spinal Anesthesia in Obese Parturients

Presenting Author: Charlene Wun Kuk, MS

Presenting Author's Institution: Department of Anesthesiology, The Third Affiliated Hospital of Zhengzhou University; Visiting Scholar, Department of Anesthesiology, The Ohio State University Wexner Medical Center - Columbus, Ohio

Abstract :

Background:
Neuraxial anesthesia in obese parturients is challenging because surface landmarks are poorly palpable and the distance from skin to intrathecal space is increased, leading to multiple puncture attempts and prolonged procedure time. Ultrasound guidance can improve success, but commonly used paramedian interlaminar in-plane approaches may remain limited in obese patients by long, oblique needle trajectories and reliance on deep target visualization.

Objective:
To evaluate an ultrasound-guided median interspinous in-plane approach for spinal anesthesia in obese parturients and to explain the technical mechanisms underlying its clinical performance, supported by comparative outcome data.

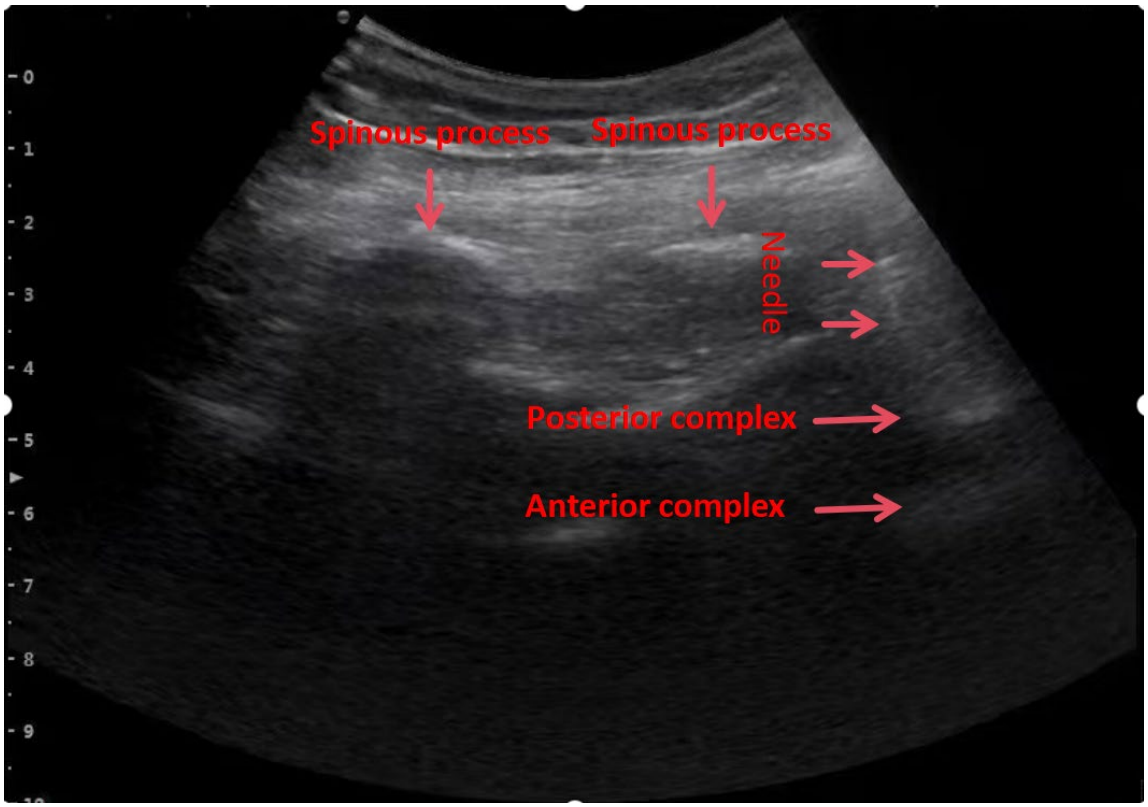
Methods:
This abstract summarizes data derived from a randomized controlled study including 80 obese parturients (BMI >30 kg/m²) undergoing elective cesarean delivery. Patients were randomly assigned to either an ultrasound-guided median interspinous in-plane approach (Group M, n=40) or an ultrasound-guided paramedian interlaminar in-plane approach (Group P, n=40). Patients were randomized using a computer-generated sequence with concealed allocation. Primary outcomes included first-attempt success rate, number of puncture attempts, procedure time, and overall success rate. Sonographic visibility of target structures was also assessed.

Results:
Compared with the paramedian in-plane approach, the median interspinous in-plane approach achieved higher first-attempt success (72% vs 25%, p=0.001) and overall procedural success (100% vs 85%, p=0.034), with fewer puncture attempts (median 1 [IQR 1–2] vs 2 [IQR 1–3], p=0.001) and shorter procedure time (median 324.5 s [IQR 299.5–359.5] vs 387.0 s [IQR 310.5–452.5], p=0.002). Ultrasound visualization of the target bony landmark was superior with the median interspinous approach (p=0.001), whereas visibility scores for the anterior and posterior complexes and the needle were similar between groups (p >0.05).

Conclusions:

In obese parturients, the ultrasound-guided median interspinous in-plane approach improves first-attempt and overall neuraxial success while reducing puncture attempts and procedure time compared with a paramedian interlaminar in-plane approach. A relatively flat midline skin surface supports probe stability, and superficial spinous processes provide clearer near-field landmarks than deeper laminae, while positioning the target interspinous space at the tail of the ultrasound fan creates a shorter, more vertical needle trajectory that facilitates real-time guidance. These technical features make the technique reproducible, efficient, and well suited for routine obstetric anesthesia practice and teaching.

References:



SAT - RA - BS 2 - BR 3 – POCUS - 05

Ultrasound assessment of gastric contents in patients with epidural analgesia in advanced labor or requiring cesarean delivery

Presenting Author: Saranya Lertkovit, MD

Presenting Author's Institution: Department of Anesthesiology, Siriraj Hospital, Mahidol University, Bangkok. Thailand - Bangkok, Krung Thep

Co-Authors: William R. R. Camann, MD - Brigham and Women Hospital, Mass General Brigham
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Abstract :

Background:
Pulmonary aspiration is a major anesthetic concern in labor due to reduced lower esophageal sphincter tone and impaired gastric emptying.[1] Existing fasting guidelines for laboring patients are consensus-based and designed to minimize aspiration risk. Studies show variable effects of epidural analgesia on gastric emptying and data to inform clinical practice in laboring patients are limited.[2,3] This study evaluated gastric contents using point-of-care ultrasound in patients with advanced labor or undergoing unscheduled cesarean delivery.

Methods:
In this prospective observational study at a single quaternary hospital (October 2024-May 2025), we enrolled obstetric patients with epidural analgesia in advanced labor (cervical dilation ≥9 cm) or requiring unscheduled, non-emergent cesarean delivery. Gastric ultrasound (GUS) was performed in semi-supine and right lateral decubitus positions. Images were screened for interpretability by 2 independent sonographers and analyzed via consensus review. Gastric volume was estimated from antral cross-sectional area in both positions and findings were graded using the 4-point Perlas system (0–3). High-risk (HR) was defined by solid gastric contents and/or volume >1.5 $mL \cdot kg^{-1}$; low-risk (LR) by an empty gastric antrum and/or volume ≤1.5 $mL \cdot kg^{-1}$.[4] Associations between clinical factors and HR status were analyzed.

Results:
Of 88 patients enrolled, 60 underwent GUS; after excluding 13 for noninterpretable images, 47 were included for final analysis (29 advanced labor [61.7%], 18 unscheduled cesarean [38.3%]). Mean age was 32 years; median BMI 31.4 $kg \cdot m^{-2}$, with 2 >40 $kg \cdot m^{-2}$. Most were gravida 1, para 0; 70% without significant comorbidities. Perlas grades were 0 (9, 19.1%), 1 (10, 21.3%), 2 (10, 21.3%), and 3 (18, 38.3%). Fasting duration for solids and clear liquids did not differ across grades. Average predicted gastric volume increased with Perlas grade: 0 = 55.8 mL, 1 = 154.9 mL, 2 = 235.8 mL ($p < 0.005$). Most

patients had increased gastric contents (68.1% HR vs 31.9% LR, $p < 0.001$). Epidural fentanyl dose, fasting duration for solids or liquids, fatty food intake, BMI, mode of delivery and epidural duration were not significantly associated with gastric content analysis.

Conclusion:
A substantial proportion of patients in advanced labor or undergoing unscheduled cesarean delivery had evidence of elevated gastric contents. Commonly cited clinical factors were not associated with gastric content analysis by GUS. Despite limitations in image quality at term pregnancy, bedside GUS may aid in anesthetic risk assessment and inform fasting guidelines in laboring patients with epidural analgesia. Furthermore, given the low real-world incidence of aspiration, the relationship between gastric contents and aspiration risk warrants re-assessment.

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Result Labor GUS.pdf

SAT - RA - BS 2 - BR 3 – PDPH – 01

AI-assisted comparison of institutional protocols with 2024 SOAP/ASRA consensus report on post-dural puncture headache: a multi-institution analysis

Presenting Author: Alexander Peres, MD, MSc

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Co-Authors: Tomer Cramer, PhD - C8 Health
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Abstract :

Background:
National society guidelines are routinely adapted into institutional protocols for routine clinical guidelines; however these may become outdated and misaligned when new evidence-based recommendations are published. To address this, we built an AI-enabled platform (C8 Health) that centralizes locally vetted best practices and streamlines dissemination for just-in-time clinical use. We developed and validated an automated tool to systematically compare institutional protocols with evidence-based clinical practice guidelines. We analyzed alignment between the SOAP/ASRA 2024 Consensus report on postdural puncture headache (PDPH)[1] and institutional protocols, flagging omissions and inconsistencies at scale.

Methods:
We examined 48 of the PDPH recommendations with 5 institutional protocols uploaded on C8 Health (data from Dec 2025). We built an LLM-based AI model with a 4-step pipeline resulting in adjudication of items as “aligned”, “inconsistent” or “missing” (see Figure 1). We also tested associations between alignment and grade of evidence (A/B/C/D/I), using χ^2 tests, and evaluated which recommendations are mostly aligned or missing, across institutions.

Results:
After performing 240 comparisons (48 PDPH recommendations x 5 institutional protocols), our tool labeled 49 as aligned (20.42%), 12 as inconsistent (5.0%), and 180 as missing (74.58%). Alignment varied widely by site (Table 1), with Hospital 5 at 20.78% vs Hospital 3 and 4 at 14.58%. Compared with anesthesiologists' adjudication (gold standard), the system achieved 97% recall and precision with an accuracy of 96% across two test sets (96 item–site pairs). Alignment correlated strongly with evidence level.
Systematically aligned recommendations included: hydration, multimodal analgesia, epidural blood patch sterility, and follow-up until resolution.

Systematically missing recommendations included: procedural characteristics, avoidance of unsupported therapies, and primary care physician handoff.

Conclusions:

Our AI-assisted guideline audit effectively surfaces misalignments in institutional protocols, achieving 96% accuracy compared with expert review, demonstrating the feasibility of an automated framework for assessing protocol alignment and relevance that can be broadly applied across the literature. Our model also demonstrates the ability to identify areas addressed and omitted systematically by institutions, emphasizing clinical needs and relevance for future statements and publications.

This approach enables rapid, scalable identification of practice gaps that may impact patient safety and quality of care, facilitating timely protocol updates.

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SAT - RA - BS 2 - BR 3 – PDPH – 02

Lost in Translation: Limited English Proficiency and Suboptimal Management of Postdural Puncture Headache

Presenting Author: Meeseo Lee, BA

Presenting Author's Institution: Harvard Medical School - Brookline, Massachusetts

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Nolan K. Wheeler, BS - Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA

Abstract :

Introduction:
Patients with limited English proficiency (LEP) encounter healthcare barriers, such as limited access to language-concordant services, which contribute to suboptimal care and outcomes.[1] Postdural puncture headache (PDPH) is the most common complication of obstetric neuraxial procedures and may cause substantial morbidity if inadequately treated.[2] Epidural blood patch (EBP) is definitive therapy for moderate-to-severe PDPH, yet racial and ethnic disparities in EBP utilization and treatment delays have been described.[3] Disparities related to language proficiency, however, remain poorly defined. We hypothesized that obstetric patients with LEP experience differences in PDPH management compared to non-LEP patients.

Methods:
We conducted a retrospective cohort study using structured electronic health record (EHR) data from 2015 to 2025 across a large healthcare system with 6 community and 2 tertiary hospitals. Patients with PDPH were identified using natural language processing and were confirmed by manual chart review. LEP status was defined by the EHR's preferred language field. The primary outcome was receipt of an EBP. Secondary outcomes included time from initial neuraxial procedure to first EBP, anesthesia follow-up duration and frequency, and repeat EBP (≥ 2). Group comparisons used Fisher’s exact test for binary outcomes and Wilcoxon rank-sum tests for continuous outcomes. Exploratory adjusted analyses controlled for age, delivery mode, anesthesia type, hospital site, and delivery year.

Results:
Among 556 obstetric patients with PDPH, 500 (89.9%) reported English as their preferred language and 56 (10.1%) had LEP. Patients with LEP were significantly less likely to receive an EBP compared to non-

LEP patients (unadjusted OR 0.30, 95% CI 0.17-0.52). Among EBP recipients, time from neuraxial procedure to first EBP did not differ between groups. LEP patients had shorter follow-up duration and fewer total anesthesia encounters. LEP patients had fewer repeat EBPs but the study was underpowered to show significance (Table 1).

Discussion:

Obstetric patients with LEP were markedly less likely to receive definitive PDPH treatment. Similar treatment timing among EBP recipients suggests that disparities may arise earlier in care, including initial assessment, counseling, or escalation of decisions. Shorter follow-up duration and fewer total anesthesia encounters among LEP patients raise concerns for reduced monitoring and engagement. Limitations include potential EHR inaccuracies, incomplete diagnostic capture, residual confounding, and limited power for secondary outcomes due to smaller LEP cohort. These findings highlight language proficiency as an actionable risk factor for suboptimal PDPH management. Targeted interventions to improve language-concordant communication and standardized PDPH pathways are needed to promote equitable and evidence-based obstetric anesthesia care.

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Lost in Translation-Limited English Proficiency and Suboptimal Management of Postdural Puncture Headache.pdf

SAT - RA - BS 2 - BR 3 – PDPH – 03

Management of Postdural Puncture Headache: Continuity of Care, But For How Long? A Mixed-Methods Quality Initiative Study

Presenting Author: Emma Rahilly, BS

Presenting Author's Institution: Brigham and Women's Hospital - South Hadley, Massachusetts

Co-Authors: Noor A. Raheel, MD, MPH - Brigham and Women's Hospital
Kerwin Wang, BA - Boston University Chobanian and Avedisian School of Medicine

Abstract :

Background:
Postdural puncture headache (PDPH) remains a challenging complication in obstetric anesthesia (1). Following PDPH, patients may be more likely to develop chronic headache (2,3). Mechanisms to capture all PDPH cases and ideal follow-up duration remain unclear. We hypothesize that a multifaceted strategy to identify PDPH patients is warranted, and patient perspectives about recovery may inform our management strategy for duration of longitudinal care.

Methods:
After IRB exemption, patients with PDPH at our hospital from May 2021 through September 2022 were identified from a complications archive. In parallel, butalbital/caffeine/acetaminophen administrations and epidural blood patch procedure notes were extracted from the electronic health record, excluding non-obstetric and non-PDPH patients. A pragmatic sample of patients were contacted for a semi-structured phone interview 3 to 6 months postpartum. Interviews explored PDPH nature, treatment effect, openness to future epidural, and adequacy of follow-up duration.

Results:
From all data sources, 113 patients were identified. While our established PDPH archive captured the majority (n = 99; 88%), use of pharmacy and procedural records captured an additional 12%, and 63 patients (58%) were captured through 2 or more mechanisms (Figure).

12 respondents were interviewed. PDPH was frequently characterized as severe, with substantial functional impairment. Treatments were perceived as effective: butalbital/caffeine/acetaminophen at reducing symptom intensity and blood patch described as curative. No patients reported new chronic headache at 3-6 months. Overall treatment satisfaction was high, and most respondents would not have changed their management. Attitudes toward future epidural use ranged from clear willingness to conditional acceptance. Future decision-making about

epidurals was framed by clinical need, prior experience, desire for improved communication, and provider expertise during placement. Continued follow-up after discharge was appreciated, and a duration lasting until headache resolution was universally reported as 'just right.'

Conclusion:

Following PDPH, meticulous follow-up is high yield for both patient safety and satisfaction. Not all PDPH patients were identified within our archive; incorporating pharmacy and procedure records may enable more comprehensive capture. While long-term follow-up after immediate headache resolution may not be warranted, no patients in our cohort reported chronic headache in the qualitative assessment, further study of this subgroup is warranted. Easy mechanisms to reinitiate contact may be warranted for patients who develop chronic concerns.

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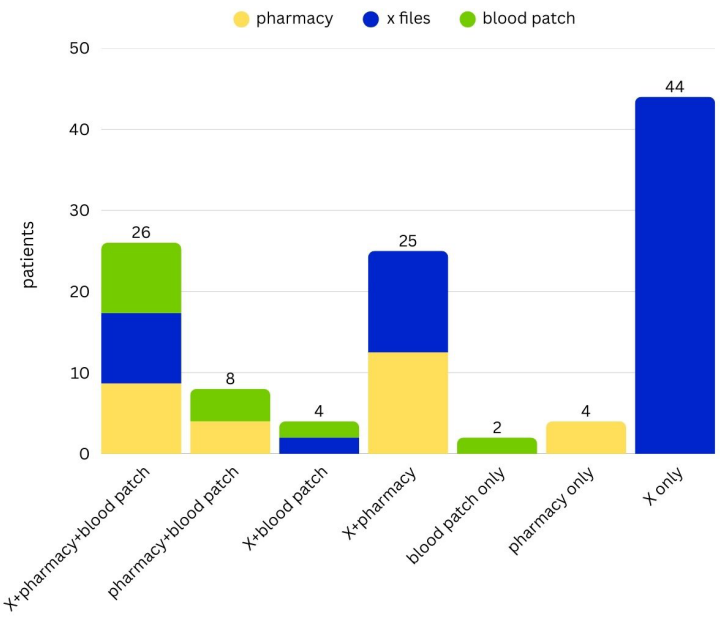

SAT - RA - BS 2 - BR 3 – PDPH – 04

Nebulized Dexmedetomidine for Post-Dural Puncture Headache after Cesarean Delivery: A Systematic Review

Presenting Author: Hassan Kiani, MSc

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Cheng Lin, FRCPC - Western University
Gopakumar Sudhakaran Nair, MD, FRCPC, DABA - University of Western Ontario

Abstract :

Introduction:
Post-dural puncture headache (PDPH) is a common complication after neuraxial anesthesia in obstetrics. While the epidural blood patch (EBP) remains as the gold-standard treatment, less invasive strategies are being increasingly explored. One such intervention is dexmedetomidine (DEX), an alpha-2-adrenergic agonist with analgesic and sedative properties.

Method:
A comprehensive search of MEDLINE, Embase, and CENTRAL databases was conducted. All randomized controlled trials on nebulized dexmedetomidine used for the treatment of PDPH following spinal anesthesia in obstetric patients were included. Comparison groups included saline (control), neostigmine/atropine, and fentanyl. The primary outcome was reduction in visual analogue scale (VAS) pain scores after intervention. Secondary outcomes included adverse effects and the need for additional treatment, such as EBP. Two reviewers independently screened studies, extracted data, and assessed risk of bias.

Results:
Four studies using DEX 1 µg/kg diluted to 4 mL, administered twice daily up to 72 hours were included. Versus placebo, administration of nebulized DEX consistently resulted in lower VAS scores at 24-72 hours and need for additional treatment. Versus fentanyl, DEX provided superior pain control, while providing comparable pain control to neostigmine/atropine. The use of DEX was associated with fewer additional treatments. Adverse effects were infrequent and mild, but included sedation, dry mouth, and bradycardia.

Conclusion:
DEX has the potential to be a safe, non-invasive, and effective therapy for PDPH for postpartum patients,

offering clinically significant reduction in pain and reducing reliance on invasive measures. Larger, multicenter trials are warranted before widespread adoption.

SAT - RA - BS 2 - BR 3 – PDPH – 05

Fluoroscopic versus Conventional Epidural Blood Patch for Post-Dural Puncture Headache in Obstetrics: A Retrospective Cohort Study of Efficacy

Presenting Author: Rachel Pinkhasov, BS

Presenting Author's Institution: Mayo Clinic Alix School of Medicine - Rochester, Minnesota

Co-Authors: Andrew C. Hanson, MS - Mayo Clinic
Dare O. Olatoye, MD - Mayo Clinic
Emily E. Sharpe, MD - Mayo Clinic - Rochester

Abstract :

Background:
Post-dural puncture headache (PDPH) is one of the most common complications associated with neuraxial blockade and can cause significant postpartum morbidity (1). An epidural blood patch (EBP) remains the gold-standard treatment for moderate to severe PDPH. An EBP may be performed using a conventional landmark-based technique or under fluoroscopic guidance; however, data comparing the effectiveness of these approaches in obstetric patients is limited (2-3).

Methods:
This retrospective cohort study included postpartum patients diagnosed with PDPH who received an EBP at our institution between May 2018 and July 2025. Patients were categorized based on initial EBP technique (conventional vs. fluoroscopy-guided). The primary outcome was performance of a repeat EBP. Secondary aims included rate of continued PDPH following EBP, duration of time to treatment, and volume of blood injected. Univariable logistic regression was used to estimate odds ratios (ORs) with 95% confidence intervals (CIs).

Results:
A total of 224 patients were analyzed; 138 (61.6%) underwent conventional EBP and 86 (38.4%) underwent fluoroscopy-guided EBP. Baseline demographic and obstetric characteristics were largely similar between groups. Multiple EBPs were required in 37/224 patients (16.5%), including 24/138 (17.4%) in the conventional group and 13/86 (15.1%) in the fluoroscopy-guided group (OR 0.85; 95% CI 0.40 to 1.74; p=0.656) (Figure). The composite outcome of multiple EBP or continued PDPH occurred in 54/224 patients (24.1%), including 39/138 (28.3%) in the conventional group and 15/86 (17.4%) in the fluoroscopy-guided group (OR 0.54 [0.27 to 1.03]; p=0.068). Longer duration from dural puncture to EBP was associated with lower odds of repeat EBP performance (6.9% vs. 34.5% for duration 2-3.9 days vs. 0-1.9 days; OR 0.14 [0.05 to 0.34]; p< .001), while larger gauge needle size at initial dural puncture was associated with higher odds of requiring multiple EBP (22.1% vs 7.1% for 17–20 vs 22–27 gauge; OR 3.70 [1.57–10.2]; p = 0.005). No serious EBP-related complications were observed in either group.

Conclusions:
Fluoroscopy-guided EBP was not associated with a statistically significant reduction in repeat EBP or continued PDPH compared with conventional EBP in obstetric patients. However, this study may be underpowered to detect a clinically meaningful benefit of fluoroscopy-guided EBP. In contrast, we observed strong associations between characteristics of the initial dural puncture and outcomes. These findings suggest that conventional EBP is an appropriate approach to treating PDPH. These results should be interpreted within the retrospective design, and further study is warranted.

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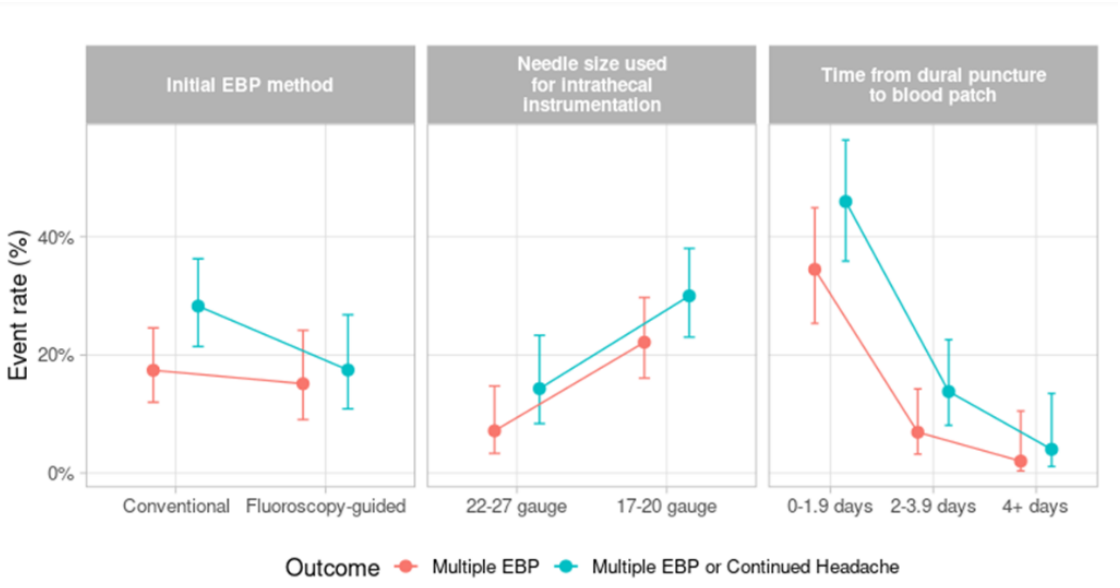

Figure 1: Event rates (± 95% binomial confidence intervals) for repeat EBP and repeat EBP or continued headache, shown by initial EBP technique, intrathecal needle size, and duration of time to treatment.

SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 01

When Neuraxial is a No-No: General Anesthesia for a Parturient with Heart Failure and Cerebral Midline Shift

Presenting Author: Taylor Catalano, MD

Presenting Author's Institution: UNC Hospitals - Chapel Hill, North Carolina

Co-Authors: Hannah Jennings-Davis, MD - UNC Hospitals

Introduction: Neuraxial anesthesia is preferred during cesarean delivery because it decreases risk of aspiration, provides postoperative pain control, avoids potential intubation difficulty, and allows for wakefulness during birth.1 Caution with neuraxial anesthesia is needed in parturients with intracranial pathology and increased intracranial pressure due to risk of cerebrospinal fluid leaks, cerebral hypoperfusion, and herniation.2 Careful preoperative planning should occur in patients with coexisting cardiac and intracranial pathology.

Case One: Our patient is a 32-year-old G9P3235 with a history of non-ischemic cardiomyopathy (NICM) with a left ventricular ejection fraction (LVEF) nadir of 20-25%, congenital arachnoid cyst, chronic subdural hematoma with mass effect and midline shift, polysubstance use, type 2 diabetes, hypertension, and two prior cesarean deliveries. The patient was diagnosed with NICM after her G6 pregnancy. Etiology was suspected methamphetamine-induced versus peripartum. The patient was later in a motor vehicle collision, which resulted in a chronic subdural hematoma. This was her first delivery with heart failure and a subdural hematoma. Echocardiography prior to delivery revealed a LVEF of 35-40%, moderately dilated left ventricle, and normal right ventricle size and function. MRI brain prior to delivery showed a large left frontotemporal arachnoid cyst and chronic subdural collection with moderate mass effect, as seen in Figure 1. As a result, the patient was deemed not a candidate for vaginal delivery or neuraxial anesthesia due to the risk of increased intracranial pressure and herniation. Cesarean delivery was scheduled at 36 weeks under general anesthesia. Two peripheral IVs and a pre-induction arterial line were placed. A rapid sequence intubation with video laryngoscopy was performed without complication. Anesthesia was maintained with a propofol infusion. A clevidipine infusion was used briefly intraoperatively to manage hypertension. The surgery was uncomplicated with a quantitative blood loss of 392 mL. The patient received intraoperative fentanyl, acetaminophen, and ketorolac. Bilateral transverse abdominis plane blocks with liposomal bupivacaine were performed prior to emergence, and the patient was extubated without complication. Post-operative pain was well-controlled with scheduled acetaminophen and ibuprofen and as-needed oxycodone. The patient was discharged on post-operative day 5.

Case Two:

Discussion: While neuraxial anesthesia is the most common form of pain management for vaginal deliveries and cesarean sections in the Unites States,1 certain comorbidities, particularly those resulting in increased intracranial pressure, may warrant careful preoperative planning to ensure patient safety.

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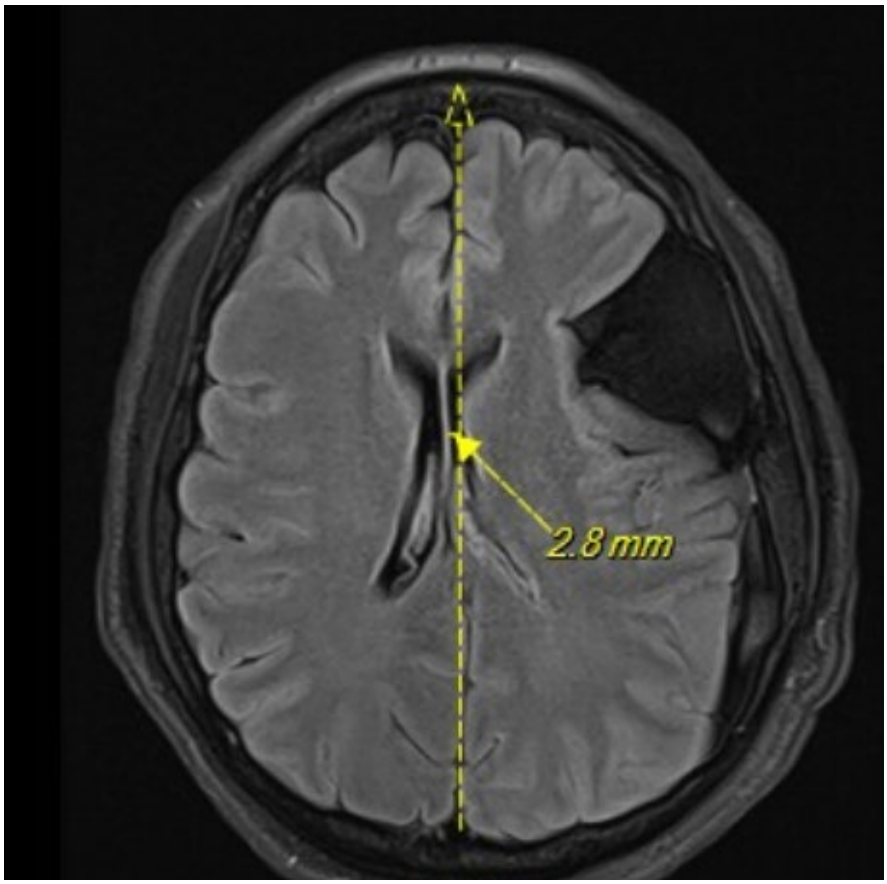

SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 02

Screening and Anesthetic Management of Hereditary Hemorrhagic Telangiectasia in Parturients

Presenting Author: Nicholas Cirrone, Jr., MD

Presenting Author's Institution: Mount Sinai Morningside West - New York, New York

Co-Authors: Christine Chen, MD - Mount Sinai Morningside West
Mohammad A. Nawaz, MD - Mount Sinai West Hospital

Introduction: Hereditary hemorrhagic telangiectasia (HHT) is a vascular dysplasia affecting about 1 in 5000 people, characterized by telangiectasias and arteriovenous malformations (AVMs), most commonly in the lung (40%) and more rarely in the spine (< 1%).1 Pregnancy increases blood volume and cardiac output, potentially worsening AVMs. Guidelines recommend screening, multidisciplinary planning, and risk assessment.2 Although neuraxial anesthesia is preferred in obstetrics, HHT raises concern for spinal AVMs and neuraxial bleeding, while general anesthesia carries risk from pulmonary AVM rupture and right-to-left shunting.1,2, We report two parturients with HHT and review evaluation, anesthetic management, and outcomes.

Case One: 32-year-old G1P0 (IVF) with prior pulmonary AVM embolization (2022) and stable residual pulmonary AVMs on CTA (2024). Brain (2022) and spine (2025) MRI were negative. Her only symptom was mild epistaxis. After presenting in December 2025 for premature rupture of membranes, she received uncomplicated combined spinal-epidural (CSE) labor analgesia using saline loss of resistance with in-line air filters. She later underwent cesarean delivery for category II tracing without hemorrhagic or neurologic complications and was discharged postoperative day 3.

Case Two: 37-year-old G2P1 with longstanding HHT, two prior pulmonary AVM embolizations (2018), and negative brain (2017) and lumbar (2016) MRI. She had intermittent epistaxis only and a prior uncomplicated labor CSE in 2021. She declined neuraxial analgesia during her recent labor in October 2025 and delivered vaginally without complications or postpartum hemorrhage.

Discussion: Although uncommon, HHT creates high-stakes anesthetic decisions due to pulmonary shunting and possible neuraxial vascular lesions. These cases support a risk-stratified approach using focused history, prior imaging review, pulmonary/CNS AVM assessment, and multidisciplinary planning. When neuraxial anesthesia is used, saline loss of resistance to reduce paradoxical embolism, strict avoidance of intravascular air, and early analgesia may mitigate preventable risk.3 Standardizing these steps promotes safe neuraxial use and provides practical teaching points.

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SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 03

Urgent Cesarean Delivery in a Patient with Charcot-Marie-Tooth Disease, Scoliosis, and Preeclampsia.

Presenting Author: Elise Costa, MD

Presenting Author's Institution: Massachusetts General Hospital - Boston, Massachusetts

Co-Authors: Lauren Crosby Zawierucha, MD, FRCPC - University of Calgary, Foothills Medical Centre
Annie Ma, MD - Massachusetts General Hospital

Introduction: Charcot-Marie-Tooth disease (CMT) is a genetically heterogenous group of hereditary polyneuropathies that can cause increased sensitivity to neuromuscular blocking agents, autonomic dysfunction, cardiac conduction abnormalities, respiratory muscle weakness, and positioning challenges [1]. These symptoms may significantly impact anesthetic intervention during labor [2]. We present a case of a patient with marked functional impairment from CMT who received a general anesthetic for urgent cesarean section in the context of preeclampsia.

Case One: The patient was a 37-year-old female, G3P1011, with CMT, presenting at 36 weeks with preeclampsia, necessitating urgent repeat cesarean section. Her comorbidities included mixed obstructive/restrictive lung disease, complicated by prior admissions for respiratory failure requiring intubation and tracheostomy; obstructive sleep apnea; orthopnea; class II obesity; and scoliosis. She used a volume-assured pressure support machine nightly at home. She had recently undergone a preoperative anesthesia consultation to assess feasibility of neuraxial placement. Her epidural space had been identified on ultrasound at a depth of 10cm at L4-L5 in the lateral position. However, she could not tolerate the supine position required for cesarean delivery. Even after optimizing positioning for respiratory mechanics and comfort, she became breathless and distressed while supine, and her SpO2 dropped to 90-92% from her baseline 98%. After multidisciplinary discussion, including shared decision making with the patient, the decision was made to proceed with general anesthesia and planned postoperative ICU admission. Given her lung disease, orthopnea, and history of tracheostomy, the patient was induced in the reverse Trendelenburg position. She was preoxygenated with high flow nasal cannula. A rapid sequence induction and intubation was performed with video laryngoscopy. Surgery was uneventful with an estimated blood loss of 600 mLs. Postoperatively, the patient remained intubated with a plan to extubate to Bi-PAP in the ICU. She was started on intravenous magnesium postoperatively due to ongoing severe range blood pressures. Given the potential for worsening of her respiratory status due to muscle weakness while on magnesium, she remained in the ICU for monitoring and intermittent Bi-PAP. She was weaned to her home non-invasive ventilation by postoperative day 3 and was discharged home on day 5.

Case Two:

Discussion: Pregnancy has the potential to exacerbate CMT symptoms. Both general and neuraxial

anesthesia have successfully been used in parturients with CMT [3]. A thorough, multidisciplinary evaluation and shared decision making facilitate a safe and individualized delivery plan.

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SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 04

Wired for Success: Labor Analgesia in a Patient with a Sacral Nerve Stimulator

Presenting Author: Rohini Loke, MD

Presenting Author's Institution: Mount Sinai Morningside & West Hospitals - New York, New York

Introduction: Neuromodulation devices range from intracranial, neuraxial (spinal cord or dorsal root ganglion), and peripheral (sacral nerve) stimulators (1). Sacral neuromodulation involves placement of a quadripolar tined lead that stimulates sacral nerve roots to treat conditions such as fecal incontinence, urinary retention, and chronic pain after conservative management fails (2). The mechanism of sacral nerve stimulators (SNS) is thought to involve activation of afferent pathways (3).

Case One: This is a 34 year old nulliparous female with a history of IBS and persistent rectal prolapse treated with an Axonics SNS. One year after placement, she became pregnant and anesthesiology was consulted to discuss labor analgesia options. Review of imaging confirmed the neurostimulator location below the iliac crest, lateral to the sacrum, with leads entering through the S3 foramina (Figure 1). Two months later, the patient presented in labor at 38w5d. A 17 gauge Touhy needle and 25 gauge pencil-point needle were used to place an uncomplicated combined spinal-epidural at L4-L5 in the midline position. Continuous epidural infusion of 10 mL per hour of 0.0625% bupivacaine-2 mcg/mL fentanyl was initiated with a demand dose of 5 mL every 10 minutes. The patient required one 10 mL top off of 0.25% bupivacaine during her labor. The patient delivered her baby vaginally four hours later and the epidural was removed without any complications.

Case Two:

Discussion: This case demonstrates how antepartum anesthesia consultation led to satisfactory labor analgesia. Pre-operative assessment includes determining the type of device, its last interrogation, and confirming the location with lumbosacral ultrasound, plain films or fluoroscopy studies (2,4,5). While the location of SNS generally does not affect neuraxial block placement, neuraxial stimulators are often placed in the lumbar and thoracic levels: this confers a higher risk of seeding lead infection and epidural fibrosis, which can interfere with medication delivery (1). If cesarean delivery is indicated, bipolar cautery is favored. If monopolar cautery must be used, the grounding pad should be placed on the contralateral side of the stimulator and placed as far away as possible (2). If emergent defibrillation is necessary, pads should be placed far from the device and positioned perpendicularly (6). Attention should be given to padding external stimulators/batteries to prevent pressure injuries (1). As the number of patients with neuromodulation devices grows, they should be referred to anesthesiology as part of delivery planning.

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Wired for Success_ Labor Analgesia in a Patient with a Sacral Nerve Stimulator - Figure 1.pdf

SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 05

Gluteal Augmentation: A Contraindication for Neuraxial Anesthesia?

Presenting Author: Erik McKee, MD

Presenting Author's Institution: University of Cincinnati - Dayton, Kentucky

Introduction: Neuraxial anesthesia has remained the standard of care for cesarean section due to its favorable risk profile for both mothers and neonates.1 However, general anesthesia remains a viable alternative, especially in the setting of an atypical or uncommon contraindication. Cosmetic gluteal augmentation can be performed with a variety of techniques, from implants and liposculpture to injectables like Polymethyl-methacrylate (PMMA) and fillers.2 Injectable gluteal augmentation with PMMA or with illicit substances like silicone or hydrogels has been associated with migration to unexpected anatomical planes, introducing the possibility for complications with neuraxial intervention.3

Case One: A 40 year old G6P5 at 34w6d with dichorionic-diamniotic twins and history of chronic hypertension, gluteal augmentation, and bariatric surgery presented to the emergency department with superimposed pre-eclampsia with severe features. She presented with intractable headaches and hypertension that was unresponsive to repeated dosing of her home hydralazine. During her preoperative evaluation, concerns were raised about the possible ramifications of gluteal augmentation with regard to neuraxial anesthetic, given reports of polymer migration in foreign literature.3 Her prior successful neuraxial was prior to her cosmetic augmentation and she was unaware of what material or surgical technique was used. A stat MRI was ordered to evaluate for possible material migration. The image indication was not specified on the obstetrician's order and initial read was unremarkable, requiring a phone discussion with the anesthesiologist and subsequent addendum. Multiple lesions were identified in the posterior lumbar soft tissues with a maximal measurement of 1.3cm, concentrated around the L5-S1 level but extending up to L3. After a risk-benefit discussion with the patient, neuraxial anesthesia was deemed to be relatively contraindicated due to the risk of translocation of a material with unknown composition and sterility into the intrathecal space and risk of neurologic injury. A general anesthetic was subsequently performed with favorable outcomes for both her and her neonates.

Case Two:

Discussion: There are a variety of factors that impact the feasibility and safety of neuraxial anesthetics. This case highlights an emerging anesthetic consideration in obstetric patients with a history of cosmetic augmentation. Since migration of these unknown materials comes with a possible risk of harm while undergoing neuraxial procedures, it may be prudent to incorporate questions about cosmetic augmentation into preoperative evaluation for obstetric anesthetics. As cosmetic augmentation continues to become more prevalent, anesthesiologists should be aware of this potential for foreign material migration from the gluteal region to the lumbar tissues, and adjust their anesthetic planning accordingly.

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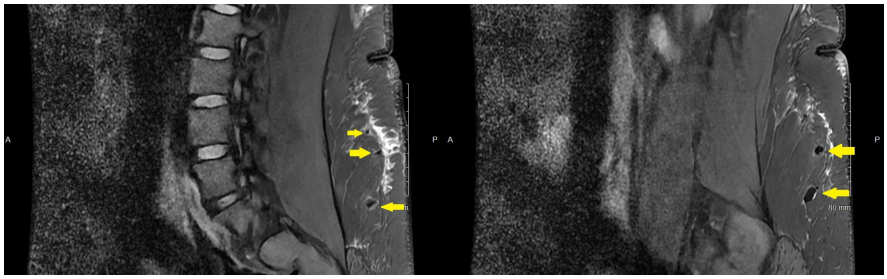

SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 06

Combined Spinal-Epidural for Cesarean Delivery in Complex Congenital Heart Disease and Recent Stroke: A Case Report

Presenting Author: Deval Jhaveri, DO

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Introduction: Improved pediatric cardiac surgery allows women with congenital heart disease to become pregnant but they usually require specialized care [1]. Severe pulmonic stenosis with regurgitation (PSw/R) and RV enlargement can lead to heart failure. The modified WHO classification helps assess CV issues during pregnancy [2]. Neuraxial anesthesia (NA) is preferred for C/S but may necessitate invasive monitoring [1]. We present a rC/S under CSE for a woman with severe PSw/R, ASD, and recent CVA.

Case One: A 30-y/o F G2P1 presented at term for rC/S. PMH included congenital critical PS, ASD, gHTN, syncope, migraines, anemia, and hypothyroidism. Pulmonic valve-ectomy with patch enlargement of main PA was performed as a child, complicated by R parietal CVA. This pregnancy, she reported dyspnea with strenuous exercise, but no HF. TTE showed severe PS, mod/severe PR, mod dilated RV, normal RV function, mild TR, PAS 36 mmHg, mild MR, small ASD w/L-R shunt, normal LV function, and EF 60%. She had a R insular CVA at 5wks gestation, and enoxaparin (120 mg daily) was initiated. ECG showed RBBB with LPFB. Her prior C/S was done under spinal with pre-spinal arterial line and CVC/PA catheter. PPH (QBL 1610 mL) required CVICU postdelivery. A multidisciplinary group with obstetrics, anesthesiology, cardiology, and neurology planned for rC/S. We chose CSE to ensure adequate duration (prior PPH). CV pressors/inotropes were ready if needed. We avoided invasive monitors, given stable physiology and absence of HF, to decrease the risks of infection and thrombosis when pausing enoxaparin. TXA was held. The spinal (15 mg hyperbaric bupivacaine, 0.15 mg PF morphine, 10 mcg fentanyl) was placed simultaneously with a phenylephrine infusion. A b/l T4 level was obtained, and a healthy baby boy was delivered (QBL 337 mL). Enoxaparin was restarted PPD 1 with discharge PPD 2.

Case Two:

Discussion: Our patient's mWHO classification was II-III, suggesting a 5.7-19% risk of maternal cardiac complications [2], but normal RV function was reassuring. Unrepaired ASDs risk paradoxical embolism causing CVA, as in our patient. Anticoagulation is necessary and requires careful timing of NA. CSE is ideal for rC/S as it combines effectiveness of intrathecal local with ability for epidural rescue [1]. Hemodynamic targets with PR include adequate preload to support RV output and preventing significant increases in PVR [1]. Evaluation of risks/benefits deemed invasive monitoring unnecessary.

Hemodynamic stability using noninvasive BP and a full spinal with a phenylephrine infusion maintained coronary blood flow without reflex tachycardia. TXA was omitted after risk (recent CVA) - benefit (uncertain) analysis. Our patient's successful outcome resulted from careful planning, individualized risk assessment, and evidence-based principles by a multidisciplinary team. Choosing to avoid invasive monitoring emphasizes tailoring risks and care to current physiology, not past practices.

References: 1. Circ 2023;147:e657-73 2. J Am Col Cardiol 2021;77:1763-77

SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 07

A Multidisciplinary, Multi-operator Approach to Neuraxial Anesthesia in Parturient with BMI of 101 kg/m²

Presenting Author: Dipti Punjabi

Presenting Author's Institution: The University of Texas Medical Branch - Sugar Land, Texas

Co-Authors: Casey Risinger, MD - University of Texas Medical Branch at Galveston

Introduction: Maternal obesity presents significant anesthetic challenges, particularly during cesarean delivery. Neuraxial anesthesia procedures can be technically difficult due to obscured landmarks and the increased distance between the skin and the epidural space, which increases proportionately with BMI. Epidural and combined spinal epidural (CSE) anesthesia are the preferred methods of anesthesia for this patient population due to the increased operative durations commonly reported for morbidly obese parturients and risks with general anesthesia. While neuraxial anesthesia is preferred, successful initial placement in patients with extreme obesity (BMI > 60 kg/m²) is infrequently reported, and it is recommended to conduct substantial testing of the anesthetic block before incision. We describe a successful CSE anesthetic in a parturient with a BMI of 101 kg/m².

Case One: A 27-year-old G1P0101 at 34+2 weeks' gestation with chronic hypertension, obstructive sleep apnea, and a BMI of 101.49 kg/m² (251.7 kg) presented for primary cesarean delivery. She was admitted a day prior to the planned procedure for superimposed preeclampsia with severe features. She was assigned an ASA status of 4, a Mallampati score of III, and a thyromental distance of < 5 cm. Given the elevated risk of general anesthesia, neuraxial anesthesia was pursued. After invasive monitoring, meticulous positioning and adequate preloading, a CSE was performed using a multidisciplinary, multi-operator midline approach. Tissue retraction and ultrasound guidance facilitated landmark identification. The epidural space was accessed with a 16.5 cm epidural needle at a depth of 10 cm confirmed by loss-of-resistance. The epidural needle was then manually held in place by an additional provider facilitating successful intrathecal access and drug delivery with a 25 G spinal followed by epidural catheter placement. The intrathecal medications delivered consisted of 1.6ml .75% bupivacaine, 15mcg fentanyl, and 150mcg morphine. The procedure was atraumatic, completed in a single attempt, and a T4 anesthesia level was obtained. Surgery proceeded uneventfully with hemodynamic stability maintained using vasopressors and adjunctive sedation. The patient recovered without anesthetic complications.

Case Two:

Discussion: This case demonstrates that neuraxial anesthesia can be safely and effectively performed in parturients with extreme obesity when meticulous planning and appropriate equipment are used. Early planning may mitigate risk and provide an efficient and efficacious anesthetic while avoiding general anesthesia.

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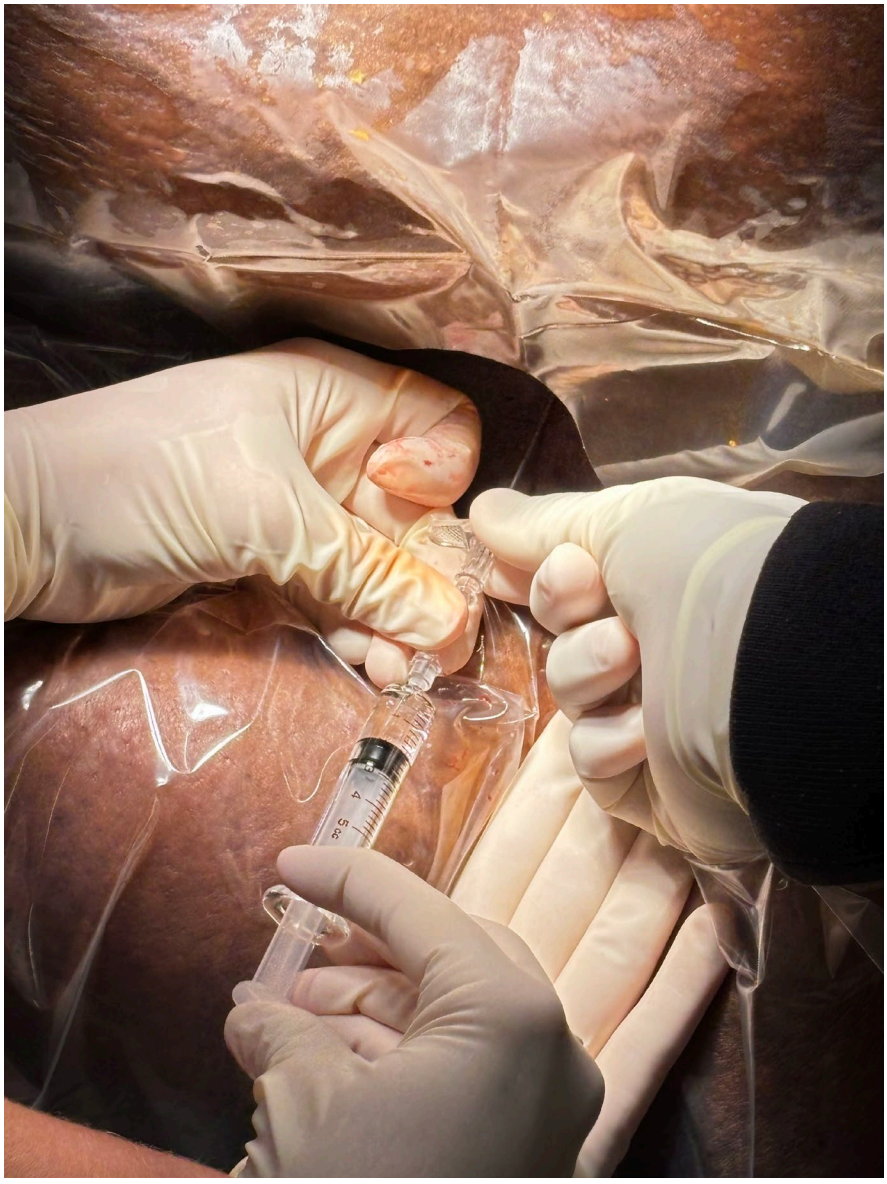


SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 08

From Triage to Delivery Planning: Management After Massive Pulmonary Embolism

Presenting Author: Mohammad A. Nawaz, MD

Presenting Author's Institution: Mount Sinai West Hospital - Edison, New Jersey

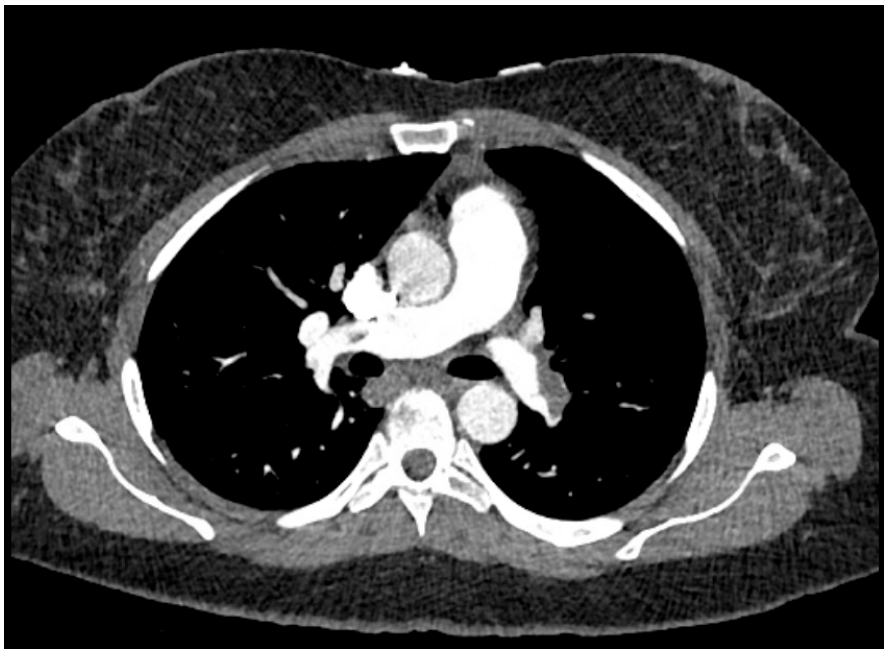
Introduction: Pulmonary embolism is a leading cause of maternal morbidity and mortality, driven by the hypercoagulability and venous stasis attributed to physiologic changes during pregnancy. Massive PE with RV dysfunction represents obstetric emergencies in which delayed treatment can be fatal. Systemic thrombolysis with alteplase is recommended for hemodynamically unstable PE; however, its use in pregnancy remains rare as parturients are excluded from clinical trials with thrombolytics and guidance is largely derived from observational data. These cases pose unique challenges for obstetric anesthesiologists who must rapidly coordinate care and anticipate downstream implications.

Case One: A 41-year-old G6P2123 at approximately 29 weeks presented with syncope, hypotension, tachycardia, hypoxemia, and chest tightness. Point-of-care echocardiography confirmed RV strain and McConnell's sign, and CTA demonstrated extensive bilateral mainstem pulmonary emboli with RV dilation and interventricular septal flattening. Given hemodynamic instability, she received a half-dose systemic alteplase (50 mg) in labor and delivery triage, followed by heparin infusion and inotropic support, with transfer to a tertiary center for potential ECMO support. Maternal oxygenation and RV function progressively improved, allowing discontinuation of vasoactive agents and transition to therapeutic low-molecular-weight heparin. Serial TTE demonstrated normalization of RV function and fetal status remained reassuring throughout hospitalization. At 32+6 weeks gestation, the patient's neuraxial feasibility, anticoagulation timing, and delivery planning were discussed at a multidisciplinary meeting. The patient subsequently underwent scheduled Cesarean delivery under combined spinal-epidural anesthesia without complication. Therapeutic anticoagulation was resumed postoperatively once adequate hemostasis was confirmed.

Case Two:

Discussion: This case highlights the critical role of obstetric anesthesiologists in the acute and longitudinal management of pregnancy-associated PE. POCUS TTE was critical for rapid diagnosis and risk stratification, helping inform the decision to pursue systemic thrombolysis. Major societies such as ACOG state that pregnancy is not an absolute contraindication to thrombolysis when a PE is life-threatening. Despite minimal placental transfer of the drug itself, alteplase carries a risk of fetal compromise indirectly through placental or uterine bleeding and maternal hemorrhage leading to uteroplacental hypoperfusion. Another important highlight is the early involvement of obstetric anesthesiology for peripartum risk assessment, especially in patients recovering from high-risk cardiopulmonary events.

References: ACOG Practice Bulletin No. 196: Thromboembolism in Pregnancy. Leffert LR, et al. Anesthesia for the pregnant patient with cardiac disease. Anesthesiology. Stein PD, et al. Thrombolytic therapy for pulmonary embolism in pregnancy: A systematic review. Chest.



SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 09

Neurofibromatosis Type 1 in Pregnancy: Implications for Delivery Planning

Presenting Author: Margaret L. Lund, MD

Presenting Author's Institution: University of Kentucky - Lexington, Kentucky

Introduction: Neurofibromatosis Type 1 (NF-1), or von Recklinghausen disease, is an autosomal dominant syndrome characterized by a loss-of-function mutation of the gene encoding neurofibromin, a tumor-suppressing protein [1]. Clinical manifestations include cafe-au-lait macules, neurofibromas, axillary or inguinal freckling, Lisch nodules, optic pathway gliomas, and bony dysplasias [2].

Case One: A 37-year-old G5P040 with history of poorly controlled chronic hypertension, renal artery stenosis s/p stent placement, and NF-1 with pregnancy complicated by severe IUGR (AC 2%) and elevated umbilical artery dopplers presented as a transfer of care for persistent category 2 tracing at 33w4d. She had innumerable cutaneous and subcutaneous neurofibromas that had reportedly increased in size and quantity during pregnancy. On pre-operative examination of the airway, it was noted that she also had an oral cavity neurofibroma. She denied a history of intracranial lesions or symptoms of elevated ICP. In anticipation of neuraxial placement for delivery, she had an MRI of her spine performed at an earlier point in pregnancy, which demonstrated lumbar paraspinal muscle neurofibromas but no epidural or intrathecal lesions. Although she was deemed safe for epidural analgesia when delivery was warranted, she unfortunately developed severe abdominal pain and had a prolonged fetal heart rate deceleration at 34w0d. She underwent emergency Cesarean section via general anesthesia. After rapid-sequence induction, video laryngoscopy was utilized to safely navigate around the oral lesion for successful intubation. Placental pathology demonstrated an abruption. Neonatal Apgar scores were 8 and 9, and both mother and child had an uneventful recovery.

Case Two:

Discussion: Special care must be taken when planning delivery of a parturient with NF-1. Of critical importance is confirmation of the absence of neuraxial neurofibromas that would prohibit safe neuraxial placement. Given the propensity for new neurofibroma formation and existing neurofibroma growth in pregnancy, imaging should be timed as close to delivery as possible. In the absence of spinal neurofibromas, other characteristics of NF-1, such as dystrophic scoliosis (which could make neuraxial placement technically challenging), dural ectasia (which could limit neuraxial anesthetic efficacy), or pharyngeal/laryngeal neurofibromas (which could further complicate airway management in a pregnant patient) must be considered [3].

References: 1. PMID: 22778675 2. PMID: 29083784 3. PMID: 39352569

SAT - CR - BS 3 - BR 1 - Can't do a Neuraxial – 10

Anesthetic Approach and Delivery Planning in Peripartum Aneurysmal Subarachnoid Hemorrhage

Presenting Author: Sanjana Dayananda, MD

Presenting Author's Institution: Northwestern University Department of Anesthesiology - Chicago, Illinois

Co-Authors: Nancy H. Greenspon, MD - McGaw Medical Center of Northwestern University

Introduction: Peripartum subarachnoid hemorrhage (SAH) occurs in approximately 5–8 per 100,000 deliveries annually. Aneurysmal SAH (aSAH) is responsible for 77% of SAH in pregnancy and is associated with high morbidity and 16.3% mortality.1 Our case demonstrates the importance of multidisciplinary management when establishing optimal delivery mode and timing, and neuraxial candidacy following recent aSAH.

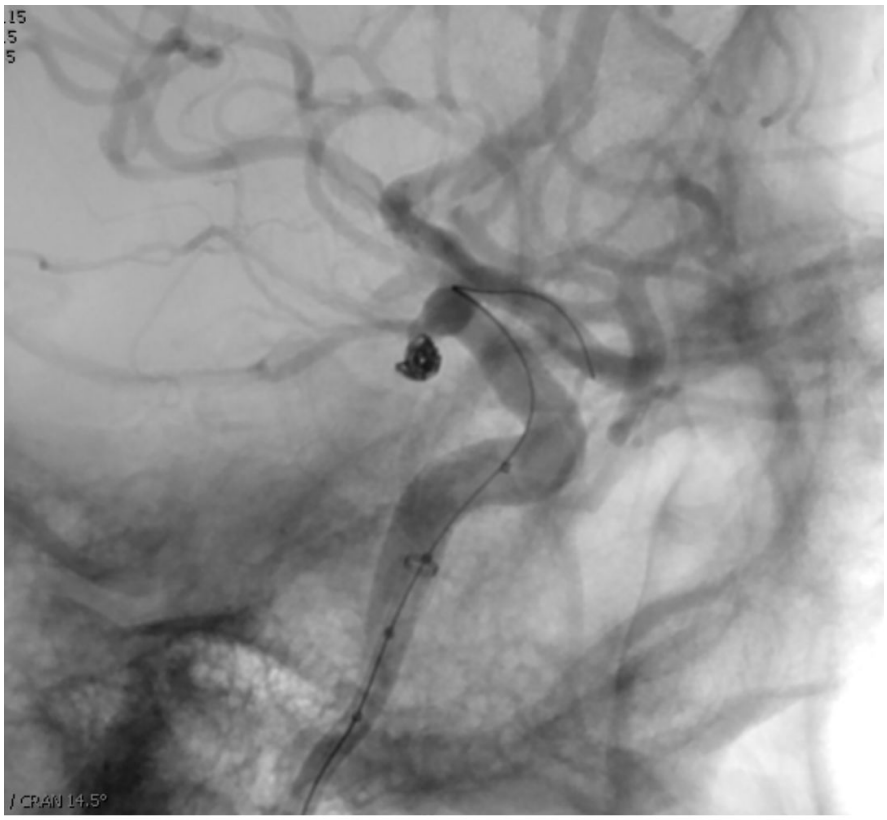
Case One: A 38-year-old G6P4205 female with chronic HTN at 23w4d gestation with di/di twin pregnancy presented with lethargy and HTN emergency. Imaging revealed ruptured 3mm right ICA aneurysm with diffuse intraventricular hemorrhage, SAH, and hydrocephalus, presumed secondary to superimposed preeclampsia with severe features. She then underwent EVD placement and endovascular aneurysm coiling. Her ICU course was complicated by a new diagnosis of AIDS. On postoperative day 7, she developed preterm labor and underwent cesarean delivery with general anesthesia. Both neonates were admitted to the NICU. Twin B ultimately died from neonatal respiratory distress syndrome. Following several weeks, twin A was safely discharged. On postpartum day 12, the patient was discharged on antihypertensive and antiretroviral therapies.

Case Two:

Discussion: Management of aSAH during pregnancy parallels that of nonpregnant patients. Early aneurysm securement, blood pressure (BP) control, prevention of delayed cerebral ischemia, and intracranial pressure (ICP) management are prioritized. Prompt endovascular coiling is preferred over surgical clipping.2 After complete aneurysm securement, rebleeding risk is low (0.1-0.3%).1 Neither pregnancy nor vaginal delivery independently increases secured aneurysm rebleeding risk. Delivery mode should be based on completeness of aneurysmal securement, BP control, ICP status, herniation risk, and obstetric indications, rather than the presence of recent aSAH alone.3 In this case, cesarean delivery was indicated due to high maternal HIV viral load, hydrocephalus, and ongoing elevated ICP. Delivery timing following aSAH should prioritize maternal neurologic stabilization and fetal development.3 Neuraxial anesthesia is not contraindicated in patients with secured aSAH unless signs of elevated ICP with herniation risk exist.4,5 Neuraxial anesthesia may be beneficial in patients with recent aSAH—reducing labor catecholamine surge, allowing superior BP and ICP control.6 This case underscores the importance of multidisciplinary management among neurosurgery, obstetrics, and anesthesiology to

provide optimal peripartum and anesthetic care for patients with recent aSAH. Recent aSAH does not independently preclude patients from vaginal delivery or neuraxial anesthesia, and both modalities should be considered when clinically appropriate.

References: 1. Stroke. 2023;54(1):198-207. 2. Stroke. 2023;54(7):e314-e370. 3. Neurosurg. Rev. 2021;44(5):2511-2522. 4. Anesth Analg. 2020;130(4):1085-1096. 5. Anesthesiology. 2013;119:703-718. 6. Clin Obstet Gynecol. 2023;66(1):223-230.



Post Endovascular Aneurysm Coiling

SAT - CR - BS 3 - BR 1 - Strange Conditions – 01

Anesthetic Management of Cesarean Delivery in a Parturient With Glycogen Storage Disease Type IIIa and Multisystem Involvement

Presenting Author: Alexander Meshel, MD

Presenting Author's Institution: Icahn School of Medicine at Moutn Sinai - Stamford, Connecticut

Co-Authors: Robert Huseby, MD - Icahn School of Medicine at Mount Sinai
Talia Scott, MD - Icahn School of Medicine at Mount Sinai

Introduction: Glycogen storage disease type IIIa (GSD IIIa) is a rare autosomal recessive metabolic disorder caused by deficiency of the glycogen debranching enzyme, resulting in accumulation of incompletely degraded glycogen in hepatic, skeletal, and cardiac muscle. While hepatic manifestations are well described, cardiac involvement, most commonly hypertrophic cardiomyopathy, can pose significant anesthetic risk during pregnancy. Data guiding peripartum anesthetic management in parturients with GSD IIIa and multisystem disease are limited.

Case One: A 26-year-old G1P0 woman with GSD IIIa presented for planned cesarean delivery at 36w6d. Her medical history was notable for cirrhosis with portal hypertension and esophageal varices, recurrent hypoglycemia, progressive thrombocytopenia, and hypertrophic obstructive cardiomyopathy. She also reported episodic chest pain, dyspnea, and lower extremity edema during pregnancy. Given the extent of multisystem involvement, obstetric anesthesiology was involved early in gestation, and a multidisciplinary team including maternal–fetal medicine, cardiology, hematology, gastroenterology, nutrition, genetics, and critical care was assembled. After multiple planning discussions, a consensus decision was made to proceed with scheduled cesarean delivery under general anesthesia at a tertiary care center with cardiac anesthesiology support, intraoperative transesophageal echocardiography, and extracorporeal membrane oxygenation availability should hemodynamic collapse occur. On the day of delivery, invasive monitoring included a pre-induction arterial line and central venous access. General anesthesia was induced with etomidate, fentanyl, and rocuronium, and an ETT was placed without complication. Intraoperative TEE demonstrated severe left ventricular hypertrophy with minimal dynamic obstruction, preserved systolic function, trace aortic insufficiency, and severe mitral regurgitation. Hemodynamics were managed with careful preload optimization and phenylephrine to maintain systemic vascular resistance. Cesarean delivery proceeded uneventfully, with favorable maternal and neonatal outcomes. The patient was extubated at the conclusion of surgery, transferred to the cardiac intensive care unit for postoperative monitoring, and discharged home on postoperative day five without complication.

Case Two:

Discussion: This case highlights two key principles in the care of parturients with rare metabolic disorders and multisystem involvement. Early and meaningful multidisciplinary collaboration, supported by an institutional culture that allows obstetric anesthesiologists to be deeply involved in care planning, is

critical to safe peripartum management. Additionally, in patients with GSD IIIa and concern for hemodynamic compromise from hypertrophic cardiomyopathy, delivery at a center with advanced cardiac anesthesia expertise, transesophageal echocardiography, and extracorporeal support capabilities should be strongly considered.

References: 1. J Inherit Metab Dis. 2012;35(2):245-251

SAT - CR - BS 3 - BR 1 - Strange Conditions – 02

Multidisciplinary care in Vascular Ehlers Danlos Syndrome Pregnancy

Presenting Author: Shreya Dey, MD

Presenting Author's Institution: University of Cincinnati - Cincinnati, Ohio

Introduction: Vascular Ehlers-Danlos syndrome (vEDS) is a rare connective tissue disorder caused by type III collagen defects, resulting in marked arterial and organ fragility (1). Pregnancy with vEDS carries high maternal risk for spontaneous vascular rupture, uterine rupture, and hemorrhage (2). Management remains challenging given the lack of standardized guidelines, requiring individualized multidisciplinary care.

Case One: We present a 20-year-old female G1P000 at 26 weeks' gestation with vEDS, scheduled for cesarean delivery under general anesthesia. She was diagnosed after a spontaneous bowel perforation at age 14, requiring emergent left hemicolectomy. Family history includes sudden death of patient's mother at age 22, presumed from undiagnosed vEDS-related aortic rupture. Pregnancy termination was recommended given significant maternal risk but was declined by patient. Management therefore focused on optimizing maternal and fetal outcomes via surveillance and planned delivery. A multidisciplinary team of maternal-fetal medicine, anesthesiology, cardiology and vascular surgery coordinated care with goals of minimizing hemodynamic stress, labor-associated vascular strain, and hemorrhagic complications via a planned cesarean delivery. Preoperative assessment included transthoracic echocardiogram and cardiac magnetic resonance imaging, demonstrating normal cardiac anatomy and aortic dimensions. The patient will be admitted preoperatively for laboratory evaluation and care coordination. Intraoperative management will prioritize atraumatic technique and strict hemodynamic control (2). Large bore intravenous access will be obtained, with blood products immediately available. Standard ASA monitors will be used, with consideration of invasive arterial monitoring. General anesthesia will be induced in a controlled manner, and the airway will be secured with video laryngoscopy to minimize cervical manipulation and airway trauma. Neuraxial anesthesia will be avoided given concerns for vascular injury (2). Post-operatively, the patient will remain inpatient due to the postpartum risks of vascular complications.

Case Two:

Discussion: This case highlights the importance of individualized and multidisciplinary care in pregnancies complicated by vEDS. Planned cesarean section may reduce catastrophic complications compared with emergent delivery or prolonged labor. Meticulous anesthetic technique with close peripartum monitoring is essential for minimizing maternal morbidity. Further research is needed to guide standardized management in this rare but high-risk population.

References: 1. Blackburn, J., Geoghegan, J., Sharih, G., & Allan, M. (2023). Anesthesia for caesarean

birth in patients with vascular Ehlers-Danlos syndrome. International Journal of Obstetric Anesthesia, 56, 103921. https://doi.org/10.1016/j.ijoa.2023.103921 2. Lane, D. (2006). Anesthetic implications of vascular type Ehlers-Danlos syndrome. Anesthesia and Intensive Care, 34(4), 501–505. https://doi.org/10.1177/0310057x0603400412

SAT - CR - BS 3 - BR 1 - Strange Conditions – 03

Factor VII deficiency and Remifentanil use

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Co-Authors: Jakayla Harrell-Mohamed, MD - Touro

Introduction: Factor VII (FVII) deficiency is a rare autosomal recessive bleeding disorder affecting the extrinsic coagulation pathway, with an estimated incidence of 1 in 300,000–500,000. Clinical manifestations range from mild mucocutaneous bleeding to severe hemorrhagic complications, including surgical and obstetric bleeding [1]. In pregnancy, altered coagulation physiology and the risk of peripartum hemorrhage complicate anesthetic management, and neuraxial techniques may be contraindicated. Alternative strategies for labor analgesia may therefore be considered in parturients with FVII deficiency [2]. Efficacy is a concern with alternatives with decision for primary c/s amongst morbidities. Remifentanil has been demonstrated to be superior to N2O and other IV opioids in labor, but appropriate monitoring is essential [3]. We present a case of our institution's first use of remifentanil as a labor analgesic alternative.

Case One: A 26yo G4P2 at 38w5d with congenital FVII deficiency, gHTN, and asthma presented for scheduled IOL for expected 3rd vaginal delivery. Given FVII activity levels in the 30% range in 3rd trimester, neuraxial was contraindicated. Planning included pharmacy, nursing, and approval by our multidisciplinary obstetric critical care committee of all providers and OB anesthesia. Remifentanil patient-controlled analgesia (PCA) at 40mcg q2 mins demand was initiated for labor analgesia with continuous pulse oximetry, ETCO2 monitoring, 1:1 nursing, a dedicated IV, and structured patient education. Recombinant activated factor VII (NovoSeven) and tranexamic acid were administered prior to delivery. The parturient underwent a vaginal delivery with a quantitative blood loss of 605 mL, Apgar scores of 8 and 9, and no maternal over sedation or respiratory events. Pain was adequately controlled without up titration. She was discharged on hospital day 3 without need for prbc transfusion.

Case Two:

Discussion: Remifentanil is ultrashort-acting, has rapid onset, and has a context-sensitive half-time of approximately 3 min contributing to its safety profile [3]. Although it may pose maternal safety risks particularly of over sedation and apnea, when implemented with multidisciplinary planning, strict respiratory monitoring, and careful risk vs benefit consideration, remifentanil PCA may serve as an important alternative for labor analgesia decreasing morbidity associated with ineffective labor analgesia in certain high risk and/or coagulopathic parturients.

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SAT - CR - BS 3 - BR 1 - Strange Conditions – 04

Balancing Maternal Risk in Refractory Immune Thrombocytopenic Purpura: Safety & Systems Errors with Remifentanil Patient-Controlled Analgesia for Labor Analgesia

Presenting Author: Kimberly Peloza, MD

Presenting Author's Institution: Stanford Healthcare - Palo Alto, California

Co-Authors: Naola Austin, MD - Stanford Healthcare
Lauren Blake, MD, MHS - Stanford Healthcare

Introduction: Immune thrombocytopenic purpura (ITP) affects approximately 1-3 in 10,000 pregnancies (1). This condition requires careful peri-partum planning to safely facilitate neuraxial analgesia.

Case One: A 42-year-old G1P0 at 17 weeks who presented to the emergency room with epistaxis, easy bruising, and petechiae was diagnosed with ITP. She had a PMH of iron deficiency anemia & prior CMV. Her ITP was refractory to steroids and IVIG and she underwent splenectomy at 24 weeks complicated by intra-abdominal bleeding that was managed conservatively. The thrombocytopenia did not improve following splenectomy, with a platelet nadir of 5,000. She was treated with a thrombopoietin mimetic, romiplostim, with a robust, but highly variable response. Given fluctuating platelet counts, she was particularly concerned about epidural hematoma risk and initially preferred elective cesarean delivery under general anesthesia. At 35+6 weeks she presented with PPROM and a platelet count of 131,000. After multidisciplinary counseling, she elected to proceed with augmentation of labor but was unwilling to proceed with any neuraxial procedures and utilized a remifentanil PCA, which ultimately provided adequate labor analgesia. She experienced an uncomplicated vaginal delivery with a quantitative blood loss of 484 mL. Immediately postpartum, she became febrile and tachycardic and an intravenous fluid bolus was initiated. Within 5 minutes, she was found unresponsive, hypoxemic, and with no palpable carotid pulse. An obstetric code was activated, the anesthesia team confirmed presence of both femoral and radial pulses and administered bag-mask ventilation with recovery of oxygen saturation above 90% while preparing for intubation. The patient rapidly regained consciousness describing profound fatigue. Bedside POCUS and additional workup were largely negative.

Case Two:

Discussion: Residual remifentanil in the IV tubing, rapidly delivered with a fluid bolus, is a possible cause of the transient sedation and respiratory depression. This case highlights the importance of a dedicated IV line for remifentanil administration. Respiratory arrests have been reported with remifentanil labor analgesia; attributed to remifentanil dosages received (2,3). This case highlights that respiratory events may be caused by remnant remifentanil in-line.

References: 1. Zhang et al. Am J Reprod Immunol. 2024;92(5) 2. Bonner and McClymont. Anaesthesia.

2012 May; 67: 538-540. 3. Pruefer and Bewlay. Anaesthesia. 2012; 67:1042-1056.

SAT - CR - BS 3 - BR 1 - Strange Conditions – 05

Weathering the Sympathetic Storm: A Precisely Orchestrated Cesarean Delivery as a Therapeutic Strategy for Refractory Paroxysmal Sympathetic Hyperactivity in a Parturient

Presenting Author: Emilie J. Cohn, MD

Presenting Author's Institution: Case Western Reserve University / MetroHealth - Cleveland, Ohio

Co-Authors: Bushra Abdul Aleem, MD - Case Western Reserve University / MetroHealth

Introduction: Paroxysmal sympathetic hyperactivity (PSH) is a devastating complication following severe brain injury characterized by episodic hyperthermia, hypertension, tachycardia, and dystonic posturing in response to stimuli. PSH during pregnancy is rare, limiting guidance regarding management and maternal-fetal outcomes. We report the first case of a parturient with PSH progressing to live delivery via C-section.

Case One: A 34-year-old G4P1 presented following a motor vehicle accident at 27w6d with diffuse axonal injury and ischemic stroke. She was admitted to the ICU intubated and sedated. Initial fetal heart rate monitoring was reassuring and expectant management was pursued. On day four, she developed persistent hyperthermia with recurrent episodes of tachycardia and hypertension, associated with fetal tachycardia and decelerations that improved with maternal stabilization. Management required escalating sedation with propofol, dexmedetomidine, and fentanyl infusions, and scheduled propranolol, diazepam, and clonidine. Despite these therapies, the PSH episodes became refractory by day nineteen. After a multidisciplinary discussion with anesthesiology, maternal fetal-medicine, obstetrics, neonatal ICU, and the patient's family, a scheduled c-section was planned. Considerations included increasing fetal movement as a potential trigger, ongoing hyperthermia and hypertension increasing the risks of fetal acidosis and placental abruption, and reducing overall metabolic demand facilitating maternal neurologic improvement by delivery, with postoperative cabergoline to suppress lactation. Notably, a prophylactic magnesium infusion was initiated for fetal neuroprotection one day prior to surgery, with no overnight PSH events. The c-section was performed at 30w5d under general anesthesia via tracheostomy utilizing total intravenous anesthesia with propofol, remifentanil, and dexmedetomidine infusions with rocuronium and midazolam adjuncts. Uterine manipulation was minimized by in situ repair. No intraoperative complications or PSH events occurred and a healthy neonate was delivered. Postpartum, the PSH episodes decreased in frequency, allowing discontinuation of sedation by postoperative day ten. The patient was discharged to an acute care facility and ultimately returned home with her infant, achieving full neurologic recovery.

Case Two:

Discussion: This case highlights the importance of early recognition of PSH and multidisciplinary collaboration in guiding management and delivery planning. In this parturient with refractory disease,

balancing maternal clinical stability with fetal well-being informed decisions regarding timing of delivery. Intraoperatively, a proactive approach to episode prevention guided anesthetic management. Additionally, this case suggests a potential role for magnesium in PSH management beyond pregnancy, as its vasodilatory effects may offer therapeutic benefit, warranting further investigation.

References: 1. Acute Med Surg. 2015 Dec 8;3(3):268-271

SAT - CR - BS 3 - BR 1 - Strange Conditions – 06

Avoiding Pheochromocytoma Crisis During Delivery in a Parturient with a Large Tumor and Lynch Syndrome

Presenting Author: Julio-Santiago Perez, MD

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Introduction: The overall incidence of pheochromocytoma and paraganglioma (PPGL) is estimated at 5-7 per million adults and approximately 0.007% in pregnancy.1,2 Although rare, PPGLs confer substantial maternal and fetal risk during pregnancy, labor, and delivery. Accordingly, affected parturients require coordinated multidisciplinary care throughout the peripartum period. Prognosis is highly variable and depends on timing of diagnosis and underlying genetic and histopathologic characteristics. We report a parturient with Lynch syndrome and an incidental large adrenal mass who underwent cesarean delivery (CD).

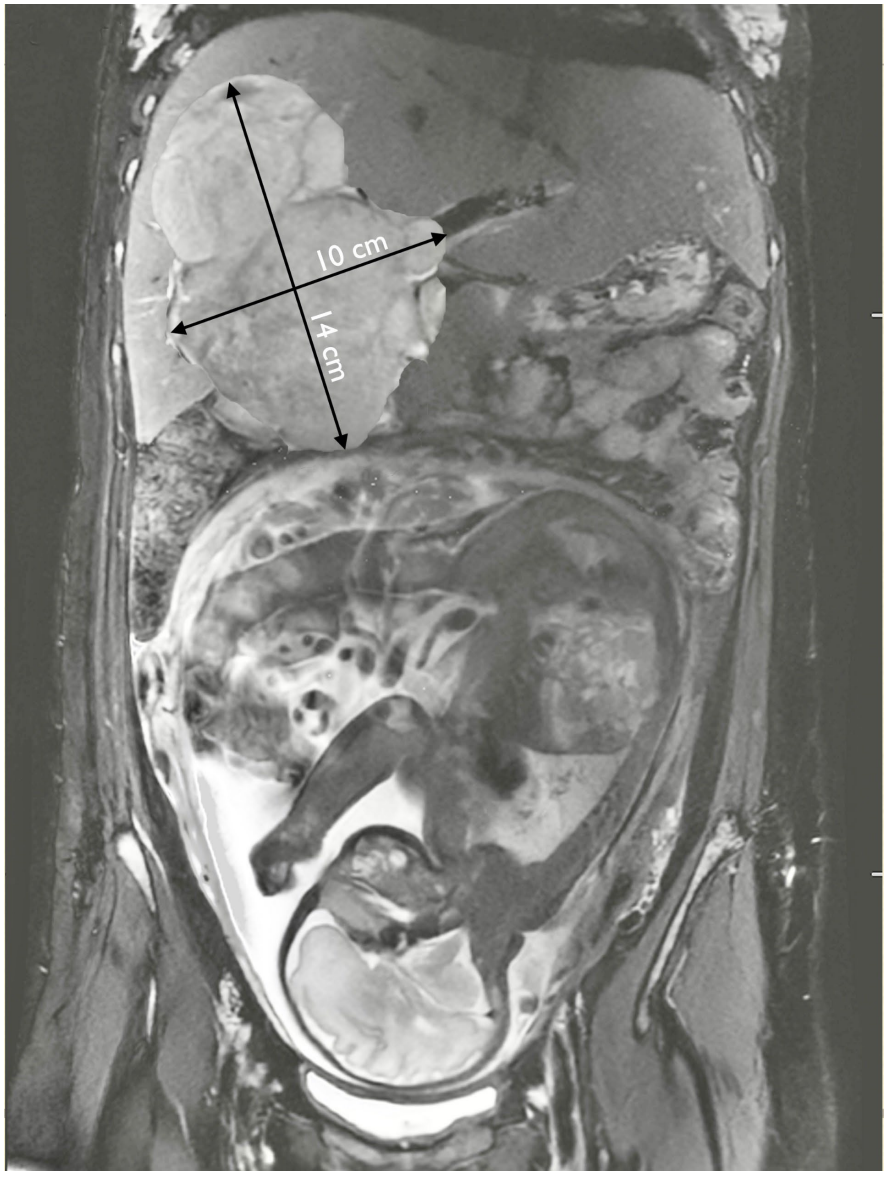
Case One: A 19-year-old gravida previously diagnosed with MSH2-associated Lynch syndrome underwent prenatal testing at 13 weeks gestation, which showed atypical chromosomal findings. Given concomitant refractory hip and back pain, further evaluation with whole-body MRI revealed a 14 x 10 cm right adrenal mass (Figure1). Adrenocortical carcinoma (ACC) and pheochromocytoma (PCC) were initially considered, given reported associations between MSH2 mutations and ACC. However, germline testing for primary ACC and PCC-associated mutations were negative. Plasma normetanephrine was elevated to 10X normal limits, while metanephrine was normal, with only mild elevation noted during the third trimester. Notably, the patient remained normotensive and asymptomatic, without palpitations, diaphoresis, or headaches during serial preoperative assessments. Low dose alpha blockade (Doxazosin) was started before delivery. At 33w6d gestation, the patient underwent a scheduled CD with tumor resection planned 7 weeks later. CD was performed under combined spinal-epidural with intrathecal hyperbaric bupivacaine (7.5 mg), fentanyl (15 mcg) and morphine (100 mcg). The primary concern for the delivery was to avoid a hypertensive crisis given the size of the tumor. The patient was provided an axillary arterial line to monitor central arterial pressure and central venous line with nitroprusside, clevidipine and esmolol infusions available. The patient had no hypertensive episodes during delivery and a large uterine incision was made to avoid unnecessary fundal pressure. A healthy 5 lb 2 oz baby (Apgar scores 8, 6 at 1 and 5 minutes) was delivered. The post-cesarean course was complicated by endometritis on POD9 that responded well to metronidazole treatment.

Case Two:

Discussion: Multidisciplinary collaboration among obstetrics, anesthesiology, endocrinology, oncology, and surgery facilitated diagnosis, surveillance, and perioperative planning for management of this case.

CD with neuraxial anesthesia, vascular preparedness, and pharmacologic premedication were selected to mitigate hemodynamic risks associated with surgery while avoiding potential complications with vaginal delivery altogether.

References: 1. World J Surg. 1999 Feb;23(2):182-6 2. Eur J Endocrinol. 2012 Feb;166(2):143-50



SAT - CR - BS 3 - BR 1 - Strange Conditions – 07

Multidisciplinary Approach to Electroconvulsive Therapy in a Pregnant Patient

Presenting Author: Olga I. Diomede, MD, MS

Presenting Author's Institution: MaineHealth Maine Medical Center - Portland - Portland, Maine

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Emily Caron, DO - MaineHealth, Maine Medical Center Portland, Department of Psychiatry

Introduction: Perinatal depression affects an estimated 10 - 20% of pregnant women in the United States1 and is associated with significant maternal and neonatal morbidity. Timely diagnosis and effective treatment are essential, particularly in cases of severe or treatment-refractory illness. Electroconvulsive therapy (ECT) is an effective and generally safe intervention for severe depression during pregnancy2; however, its use remains uncommon3 and requires careful multidisciplinary coordination.

Case One: We report the case of a 27-year-old primigravida in her second trimester with a primary psychiatric diagnosis of severe major depressive disorder who was referred for ECT due to inadequate response to pharmacotherapy and transcranial magnetic stimulation. A multidisciplinary care team, including Psychiatry (ECT service), Maternal-Fetal Medicine, Obstetric Anesthesiology, and the Family Birth Center, developed a comprehensive care protocol. ECT was initiated at 23 weeks' gestation and administered three times a week using ultra-brief pulse with right unilateral electrode placement. Stimulus energy was titrated from 20 to 30 Joules during the treatment course. Treatments took place in the Labor and Delivery unit due to fetal viability and the risk of preterm labor, with obstetrical and neonatology teams on standby. General endotracheal anesthesia with rapid sequence induction was used to minimize the risk of aspiration. Periprocedural management included preoxygenation, hydration, avoidance of hyperventilation, and administration of prokinetic and antiemetic agents. Fetal well-being was monitored with pre- and post-treatment non-stress tests and with doptone monitoring immediately after the procedure. The patient continued her home antidepressant medications throughout the ECT course. During treatment, the patient demonstrated significant improvement in mood, affect, and functional engagement. After 14 ECT sessions, fetal growth restriction was identified on ultrasound, leading to heightened maternal anxiety regarding potential fetal effects of ECT. Despite recommendations to taper ECT after the acute phase, the patient elected to discontinue treatment. The remainder of the pregnancy was clinically stable. She subsequently delivered vaginally without complications following induction of labor for preterm prelabor rupture of membranes at 36 weeks and 3 days' gestation.

Case Two:

Discussion: This case highlights the clinical complexity of administering ECT during pregnancy and underscores the importance of multidisciplinary collaboration, individualized risk-benefit assessment, and shared decision-making in the management of severe perinatal depression.

References: 1. Cleve Clin J Med. 2020;87(5):273–277. 2. Gen Hosp Psychiatry. 2009;31(5):403–413. 3. Obstet Gynecol Surv. 2020 Mar;75(3):199-203.

SAT - CR - BS 3 - BR 1 - Strange Conditions – 08

Challenges during labor anesthesia in a patient with Klippel-Trenaunay syndrome

Presenting Author: Andrew Lee, MD

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Introduction: Klippel-Trenaunay (KT) syndrome is a rare disorder characterized by vascular malformations, soft tissue, or osseous hypertrophy. Manifestations include capillary, venous (varicosities, hypoplasia, and valvular incompetence (70–100%)), and lymphatic malformations.[1] Pregnant patients with KT syndrome present unique challenges due to the potential of vascular malformations involving the pelvis or spinal cord, increasing risk of hemorrhage and epidural hematoma. Physiologic changes of pregnancy may exacerbate venous stasis and thrombotic risk. We present the management of a parturient with KT syndrome who underwent incomplete pre-delivery imaging.

Case One: A 29-year-old G1P0 at 39 weeks and 4 days presented in latent labor. She was diagnosed with KT syndrome at age four, affecting the left leg with varicose veins. She previously underwent sclerotherapy and two surgical excisions and remained minimally symptomatic, without limb-length discrepancy, thromboembolic history, or other symptoms. MRI of the abdomen, pelvis, and lower extremities demonstrated residual diffuse low-flow vascular malformations confined to the left lower extremity, without pelvic or abdominal involvement. Obstetric anesthesia consultation recommended MRI of the brain and whole spine prior to neuraxial anesthesia. MRI brain and thoracic spine showed no vascular abnormalities, but lumbar imaging was not completed. As the L1–L2 level was partially visualized and appeared normal, an epidural catheter was placed at L1–L2 without complication. The patient had a spontaneous vaginal delivery. Methylergonovine 0.2mg and misoprostol 1mg was administered for brisk bleeding despite adequate uterine tone after placental delivery, with resolution and a quantitative blood loss of 550 mL. The epidural catheter was removed, and she was discharged 36 hours postpartum.

Case Two:

Discussion: This case underscores the importance of multidisciplinary care in managing parturients with rare conditions such as KT syndrome. Although no standardized anesthetic guidelines exist, prior reports describe the use of MRI of the abdomen, pelvis, brain, and spine to assess for vascular malformations and guide neuraxial anesthesia.[2] Early involvement of maternal-fetal medicine, hematology, radiology, and obstetric anesthesia is critical. Despite incomplete imaging, neuraxial anesthesia was successfully and safely administered following interdisciplinary discussion. This case highlights not only the value of coordinated care but also the importance of follow-up on recommendations. Completion of lumbar spine imaging would have further reduced the risk of neuraxial complications and optimized patient safety.

References: 1. J Vasc Bras. 2017;16(4):320–324 2. Korean J Anesthesiol. 2018;71(5):411–412

SAT - CR - BS 3 - BR 1 - Strange Conditions – 09

Diastematomyelia in Pregnancy: Implications for Neuraxial Anesthesia

Presenting Author: Elizabeth Cifuentes, MD

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Introduction: Congenital spinal cord abnormalities such as diastematomyelia are rare in parturients and present significant challenges for obstetric anesthetic management, particularly when neuraxial analgesia is desired.

Case One: We report the case of a 31-year-old G5P3 parturient with a history of spina bifida occulta at L4–S1 and type II diastematomyelia beginning at L1-L2, who required detailed multidisciplinary planning to safely provide labor analgesia. Baseline neurologic symptoms included decreased sensation of the right lower extremity without tibial or patellar reflexes, as well as inability to move her right toes. She had normal sensation, mobility, and reflexes on the left lower extremity. Lumbar spine MRI performed during pregnancy demonstrated type II diastematomyelia, with splitting of the spinal cord into two hemicords beginning at L1–L2 and extending caudally to L5. Given the abnormal spinal anatomy and distorted neural elements, the safety of neuraxial anesthesia required careful evaluation. Her pregnancy was further complicated by chronic hypertension and paroxysmal atrial fibrillation. A multidisciplinary conference involving obstetric anesthesia, maternal–fetal medicine, cardiology, hospital medicine, and critical care was convened. Review of spinal imaging and neurologic examination led to the determination that spinal anesthesia was contraindicated due to the risk of direct spinal cord injury and unpredictable intrathecal local anesthetic spread. However, lumbar epidural analgesia was considered acceptable, with recommendation for early placement around the L2–L3 interspace, above areas of spina bifida occulta and away from regions of maximal cord splitting. Early epidural placement was emphasized to avoid emergent neuraxial intervention in the setting of labor progression or maternal instability. Additional planning included careful documentation of baseline neurologic deficits, informed consent addressing neurologic risk, cautious fluid management, and continuous intrapartum monitoring. Patient presented at 39 weeks for induction of labor in setting of chronic hypertension with superimposed preeclampsia with severe features. She obtained an early epidural at L2-L3 level and had a spontaneous vaginal delivery without complications.

Case Two:

Discussion: This case highlights the importance of detailed spinal imaging review and individualized anesthetic planning in parturients with diastematomyelia. Obstetric anesthesiologists play a central role in balancing the benefits of neuraxial labor analgesia against the potential for neurologic harm, underscoring the value of early multidisciplinary collaboration in rare congenital spinal conditions.

References: 1. O'Neal MA. A Pregnant Woman with Spina Bifida: Need for a Multidisciplinary Labor Plan. Front Med (Lausanne). 2017;4:172. 2. Griffiths S, Durbridge JA. Anaesthetic implications of neurological disease in pregnancy. Continuing Education in Anaesthesia Critical Care & Pain. 2011;11:157–161.

SAT - CR - BS 3 - BR 1 - Strange Conditions – 10

Remifentanil-induced fetal heart rate changes during labor in a patient with active malaria and thrombocytopenia: a case report

Presenting Author: Walter M. Taylor, MD

Presenting Author's Institution: Columbia University - New York, New York

Introduction: Thrombocytopenia is common in patients with malaria.1 Given the risk of spinal epidural hematoma with neuraxial anesthesia when platelet count < 70,000/μL, labor analgesia is limited to alternatives such as remifentanil or N2O. Though regarded as an effective and safe labor analgesic, remifentanil undergoes rapid placental transfer. In a survey of remifentanil use across US academic medical centers, several maternal and neonatal respiratory arrests were reported after bolus or continuous remifentanil administration.2 The effect of remifentanil on fetal heart rate (FHR) is less commonly reported, though loss of beat to beat variability is expected. We report on a patient with malaria and thrombocytopenia, which precluded neuraxial labor analgesia, and in whom remifentanil IV PCA use resulted in adverse FHR changes.

Case One: A 31-year-old G1P0, 76 kg, female with sickle cell trait and recent travel to Ghana presented with fever and Plasmodium falciparum malaria, treated with artesunate, and platelet count of 50,000/μL. She was admitted at 36w5d with PPROM and contractions. Repeat platelet count was 64,000/μL and FHR was category I with baseline HR 130bpm. Per institutional protocol, a remifentanil IV PCA was started with bolus of 0.10 μg/kg q2min without continuous infusion. PCA was titrated for patient comfort during labor (max bolus 0.18 μg/kg), though increases were limited by effects on FHR (Fig 1). Remifentanil negatively affected HR and variability causing category III tracings twice, each time prompting discussion of urgent intrapartum cesarean delivery, five hours apart. Both times the PCA was stopped, FHR improved within 10 min, negating the need for cesarean delivery. Total remifentanil dose was 3,476 μg over 10 hours and 6 minutes. Given worsening pain and fetal intolerance of remifentanil, a dexmedetomidine infusion was started with as needed fentanyl boluses. Within 30 minutes of stopping PCA, the cervix was fully dilated and the patient delivered a healthy infant with Apgar scores of 8 and 9. The patient did not have any respiratory depression during labor. She completed malaria treatment and thrombocytopenia resolved within one week.

Case Two:

Discussion: This case demonstrates a temporal association between remifentanil IV PCA bolus administration (0.14 and 0.18 μg/kg q2min) and FHR in which FHR worsened to category III twice during the labor course. Improved FHR 10 minutes after stopping remifentanil played a critical role in avoiding cesarean delivery. Maternal monitoring and active management of remifentanil dose, recognizing its unique pharmacokinetics and placental transfer, were instrumental to safe peripartum care of this patient with active malaria and thrombocytopenia.

References: 1. N Engl J Med. Apr 3 2025;392(13):1320–1333. 2. Anesth Analg. Apr 2017;124(4):1208–1210.

Figure 1_v2.pdf

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 01

Anesthesia and Multidisciplinary Management in a High-Risk Obstetric Patient with Severe Pulmonary Disease Undergoing Cesarean Delivery

Presenting Author: Damon Wallace, MD

Presenting Author's Institution: University of Michigan - Ann Arbor, Michigan

Co-Authors: Austin M. Foote, MD - University of Michigan

Introduction: Obstetric patients with severe respiratory disease who undergo cesarean delivery are at known increased risk for perioperative respiratory complications(1), thromboembolism(2), and mortality(3). One serious complication that can occur is a pneumothorax. Multiple case reports exist pertaining to pneumothoraces that develop during or after cesarean section(4-6). However, the literature is less robust regarding cesarean delivery and perioperative anesthetic management for patients with active preoperative pneumothorax and underlying complex pulmonary disease. This case report addresses important and unique anesthetic considerations in a high-risk obstetric patient with an active pneumothorax prior to cesarean delivery.

Case One: We present a 32-year-old G4P0405 with severe asthma, bullous emphysema, obstructive sleep apnea, and chronic hypoxic respiratory failure requiring home oxygen. At 28 weeks gestation, she underwent a laparoscopic cholecystectomy complicated by prolonged intubation and a left-sided pneumothorax requiring chest tube placement. She was transferred to our surgical intensive care unit at 31 weeks gestation due to recurrent pneumothorax, persistent air leak, and escalating respiratory needs. Non-reassuring antenatal testing with recurrent decelerations necessitated a cesarean delivery at 32 weeks gestation. After complex multidisciplinary planning, the decision was made to perform the delivery at the main hospital, rather than labor and delivery unit, due to proximity to the surgical intensive care unit and potential need for extracorporeal membrane oxygenation cannulation. Anesthetic plan included a low-dose combined spinal-epidural with slow uptitration and Transnasal Humidified Rapid Insufflation Ventilatory Exchange (THRIVE), a method that delivers continuous warmed oxygen via nasal cannula with a maximum flow rate of 70L/min(7). This plan optimized pain management while maintaining spontaneous ventilation and minimizing risk of prolonged intubation and subsequent postoperative respiratory complications. Postoperatively, she recovered in the intensive care unit for optimal respiratory support prior to transfer to the labor and delivery unit.

Case Two:

Discussion: This case highlights the complexities of managing a high-risk obstetric patient with an active pneumothorax in the setting of significant pulmonary comorbidities during the perioperative period. Key considerations for this patient included delivery timing and location, coordination with multidisciplinary teams, multiple preparations in the event of emergent respiratory compromise, and unique anesthetic methods to provide excellent perioperative obstetric care.

References: 1. Br J Anaesth 2019; 123(4):480-7 2. Thromb Res 2018; 171:51-6 3. Anesthesiology 2016; 124(4):792-802 4. Saudi J Anaesth 2022; 16(4):466-8 5. BMJ Case Rep 2013; 2013:bcr2012008507 6. Int J Obstet Anesth 2000; 9(4):286-9 7. Anaesthesia 2014; 70(3):323-9

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 02

Navigating the Danger Zone: Cesarean Delivery in a Patient with Idiopathic Pulmonary Hypertension

Presenting Author: Jeroen De Haes, MD, EDAIC, EDIC

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Co-Authors: Fernanda SL Oliveira, MD - University of Toronto
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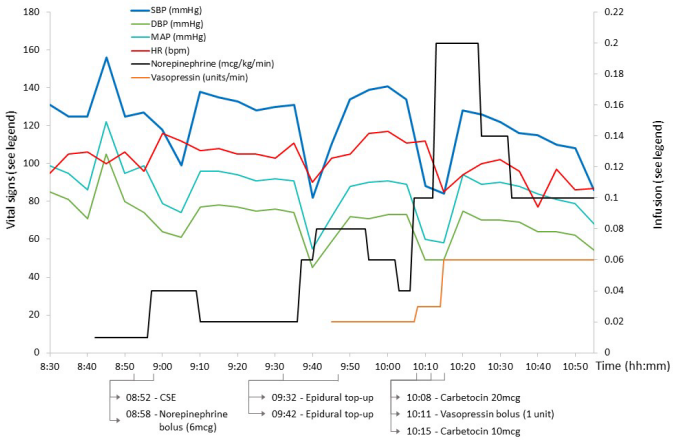
Introduction: Pulmonary arterial hypertension (PAH) in pregnancy carries high maternal morbidity & mortality and classified as WHO class IV heart disease, for which pregnancy is not recommended.(1,2) Anesthetic management during delivery is critical, as abrupt changes in preload, afterload, and systemic vascular resistance may precipitate RV failure. Titratable neuraxial techniques and cautious uterotonic administration including carbetocin may help maintain hemodynamic stability.

Case One: A 35-year-old G2P0 woman at 32+1 weeks' gestation with severe idiopathic PAH (mPAP 48 mmHg, PVR 8.8 WU) was admitted with worsening hypoxemia despite prostacyclin therapy. PAH was diagnosed in 2023 and managed with triple therapy. Macitentan was discontinued during pregnancy and intravenous treprostinil initiated. TTE demonstrated preserved LV function, severely dilated RV with moderately reduced systolic function, severe TR, and septal flattening. Given progressive symptoms and declining RV function, a planned preterm cesarean was undertaken at 33+5 weeks. Extensive multidisciplinary planning involved obstetrics, anesthesia, PAH specialists, ECMO, transplant teams, and NICU.. ECMO standby was arranged, and pre-emptive femoral single-lumen catheters were placed Cesarean was performed under titrated CSE using a low-dose intrathecal local anesthetic, followed by incremental epidural supplementation. Hemodynamic stability was maintained with norepinephrine and vasopressin. Uterine tone was achieved with incremental carbetocin dosing (10-mcg boluses to a total of 30 mcg), administered in close communication with the obstetric team, and was associated with transient hemodynamic instability requiring escalation of norepinephrine, vasopressin, and a single ephedrine bolus. The patient required short-term ICU support including inhaled nitric oxide and vasopressors and was discharged home on POD 9 in stable condition.

Case Two:

Discussion: This case demonstrates that carefully titrated combined spinal–epidural anesthesia and incremental low-dose carbetocin can be safely used in parturients with severe PAH. Their successful implementation, however, relies on early, structured multidisciplinary collaboration and continuous communication between anesthesia, obstetrics, cardiology, and critical care teams. A shared understanding of RV physiology and real-time hemodynamic assessment allowed anesthetic and uterotonic dosing to be tailored to physiologic response, achieving effective anesthesia and uterine tone while limiting hemodynamic instability to predictable and manageable changes.

References: 1. Eur J Heart Fail 2016;1119-28 2. Pulm. Circ. 2021;1–9



SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 03

Urgent Cesarean Delivery in a Patient with Newly Diagnosed Pulmonary Hypertension at 34 Weeks

Presenting Author: Paxton Walton, MS

Presenting Author's Institution: University of Cincinnati College of Medicine - Cincinnati, Ohio

Co-Authors: Devin Dimitrov, DNP, CRNA - University of Cincinnati Medical Center
Michael Stacey, CRNA - University of Cincinnati

Introduction: A leading cause of maternal mortality in the United States is cardiovascular disease (1). Pulmonary Arterial Hypertension (PAH) is a high-risk condition in pregnancy due to the increased risk of cardiopulmonary complications leading to a 3-year maternal mortality of 55% (2). Patients with concomitant preeclampsia and PAH are at further increased risk due to physiologic changes of pregnancy and fluid shifts that can precipitate heart failure and arrhythmia. We present a patient with preeclampsia with severe features requiring urgent, preterm delivery due to newly diagnosed PAH and volume overload.

Case One: A 36-year-old G2P1 with a past medical history of chronic hypertension with superimposed preeclampsia and class 3 obesity presented for a scheduled prenatal visit at 34 weeks. She had a two-week history of worsening shortness of breath, orthopnea, headache, floaters, and bilateral lower extremity edema. These symptoms prompted a cardiac work-up which showed an EF of 55% and PA pressure of 50mmHg, consistent with PAH. Urgent right heart catheterization found precapillary PAH with a mean of 27mmHg. Due to newly diagnosed PAH in the setting of preeclampsia with severe features and volume overload, delivery was recommended. An arterial line was placed and indwelling Swan-Ganz catheter utilized for CD. A combined spinal epidural (CSE) was dosed with 0.5mL 0.75% bupivacaine, 200mcg morphine, and 15mcg fentanyl intrathecally which obtained a T10 level. This was followed by 3mL 1.5% lidocaine with 1:200,000 epinephrine via epidural with resultant T4 level. CSE placement was complicated by an unintentional dural puncture. An 8mcg bolus of norepinephrine was given and infusion started at 1-2mcg/min for post spinal hypotension. The patient developed uterine atony requiring oxytocin, misoprostol, TXA, and JADA placement. Postoperatively, she was taken to the CVICU in stable condition. On postpartum day 2, she developed a postural headache and was successfully treated with an epidural blood patch.

Case Two:

Discussion: This case highlights the importance of teamwork and multidisciplinary care required when taking care of high-risk obstetric patients. As cardiac conditions are a leading cause of maternal mortality, thorough evaluation and management remain critical for good outcomes. The prompt diagnosis and management of her decompensated PAH, in the setting of preeclampsia, likely improved her outcome. Equally important was her anesthetic management. A low-dose CSE was chosen to minimize

sympathectomy and ensure block quality. Norepinephrine was chosen due to the ability to provide inotropy and increase systemic pressures without dramatically increasing pulmonary vascular resistance at low doses. Overall pillars of anesthetic management in patients with PAH include: type of neuraxial, mode of delivery, delivery location, vascular access, monitoring needs, uterotonic options, and contingency plans for advanced cardiac support.

References: 1. PMID: 40202759 2. PMID: 36601027

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SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 04

Peripartum anesthetic management of a patient after heart-lung transplant

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Co-Authors: Pedram Aleshi, MD - UCSF Anesthesia
Stephanie Lim, MD - UCSF

Introduction: There is a growing population of patients with combined heart-lung transplant. The rate of obstetric complications, including preeclampsia and premature labor, are higher than in the nontransplant population (1). This case report describes the peripartum management of a patient with history of heart-lung transplant.

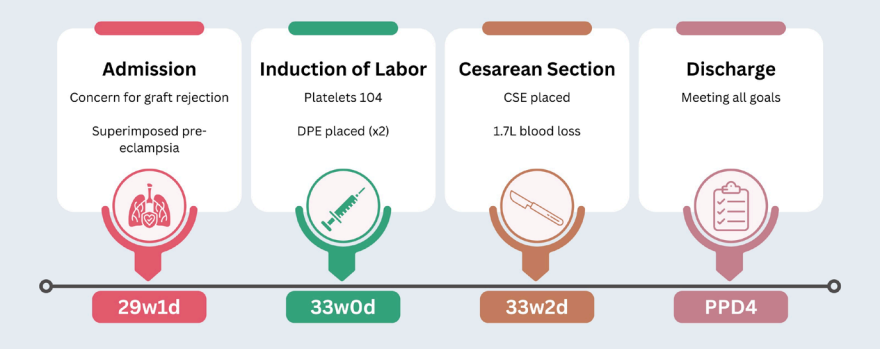
Case One: A 28 year old G3P0 s/p heart-lung transplant for idiopathic PAH was admitted to the antepartum service at 29w1d for concern of graft rejection due to worsening PFTs and subtherapeutic tacrolimus levels. Her transplant team focused on medical management by titrating immunosuppressants. Unfortunately, early during the admission, the patient was ruled in for superimposed preeclampsia with severe-range blood pressures, and a multidisciplinary plan was made for the patient to remain inpatient with expectant management until delivery. Induction of labor occurred at 33 weeks due to concerns about thrombocytopenia, with a platelet count of 104. At this time, patient's CARPREG II score was 3. A DPE was placed and initially working well, but required replacement at 15 hours due to inadequate block. After 2 days of continued induction, the patient was recommended to have a cesarean delivery for fetal intolerance of labor. The anesthesia team was unable to achieve adequate surgical block with her labor epidural and replaced it with a CSE. During the case, patient remained stable with a phenylephrine infusion and 1.5L crystalloid. Her delivery was complicated by postpartum hemorrhage of 1.7L and she received oxytocin, carboprost, misoprostol, and two doses of tranexamic acid. She was stably discharged on postpartum day four.

Case Two:

Discussion: There are many anesthetic considerations for patients with history of heart-lung transplantation. Immunosuppression agents put patients at higher risk for infections, and side effects of these medications include hypertension (as was present in this case) and myelosuppression. Fortunately, although thrombocytopenic, our patient's platelet count remained appropriate for neuraxial block. From a cardiac standpoint, the transplanted heart is dependent on preload, which can be significantly affected by neuraxial procedures. Furthermore, patients have a denervated heart so indirect acting medications have a blunted effect. Thus, our team chose fluid boluses and phenylephrine to support blood pressure, rather than ephedrine (2). From a pulmonary standpoint, patients are prone to edema due to disrupted lymphatic drainage, so fluid administration should be judicious. If possible, neuraxial anesthesia is preferred to avoid intubation and risk of disrupting surgical suture lines (3). Our patient ultimately had a successful

cesarean delivery with a multidisciplinary team managing concern for graft rejection, preeclampsia, fetal intolerance of labor, and postpartum hemorrhage.

References: 1. Anesth Analg 1999 Sep; 89(3): 613-22 2. Ann Card Anaesth 2021 Apr-Jun; 24(2): 140-148 3. J Clin Anesth 2011 Sep; 23(6): 508-16



SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 05

Anesthetic Management of a Pregnant Patient with Post-Radiation Supraglottic Stenosis Undergoing Laser Excision

Presenting Author: Alva Powell, MD

Presenting Author's Institution: McGaw Medical Center of Northwestern University - Chicago, Illinois

Introduction: Airway surgery during pregnancy presents anesthetic challenges due to pregnancy-related changes including airway edema, increased aspiration risk, and difficult intubation.1,2 The literature describes anesthetic management of subglottic stenosis in pregnancy, but there is a paucity of data on supraglottic stenosis.3,4 We present a case of awake monitored anesthesia care (MAC) with remifentanil for laser excision of supraglottic stenosis in pregnancy, demonstrating a safe alternative to general anesthesia with airway instrumentation.

Case One: A 34-year-old G1P0 at 24 weeks with post-radiation supraglottic stenosis from nasopharyngeal carcinoma presented for flexible laryngoscopy with blue light laser excision and balloon dilation. History included radiation-induced esophageal stenosis requiring gastric tube and supraglottic stenosis requiring serial interventions. Pregnant patients past 20 weeks gestation typically require a secured airway due to increased aspiration risk. We chose an awake MAC to avoid intubating a known difficult pregnant airway and to preserve laryngeal reflexes thereby mitigating aspiration risks.1,2 Preoperatively, the patient received glycopyrrolate 0.2 mg and famotidine 20 mg, with documented normal fetal heart tones. Anesthesia was maintained with remifentanil infusion and lidocaine 60 mg intravenously. Topical anesthesia included bilateral nasal 2% lidocaine with oxymetazoline and nebulized oral 2% lidocaine. The surgical team performed flexible nasolaryngoscopy and blue light laser excision followed by wire-guided balloon dilation. The patient maintained awake, spontaneous ventilation during the procedure without desaturation or aspiration. Postoperative fetal heart tones were normal.

Case Two:

Discussion: MAC with remifentanil infusion is a safe alternative for laser excision of supraglottic stenosis in pregnancy when airway instrumentation is high risk. The short half-life and rapid neonatal metabolism make it ideal for brief, controlled analgesia.5,6 The decision to proceed with MAC balanced competing risks: aspiration without a secured airway versus failed intubation in a difficult pregnant airway. Pregnancy-related airway changes like mucosal edema and increased vascularity further complicate instrumentation, while post-radiation anatomy increased intubation difficulty.1,2 Recent data show most patients undergoing endoscopic airway interventions during pregnancy deliver at term without complications.3 Our case extends these findings to supraglottic stenosis managed with MAC and remifentanil.

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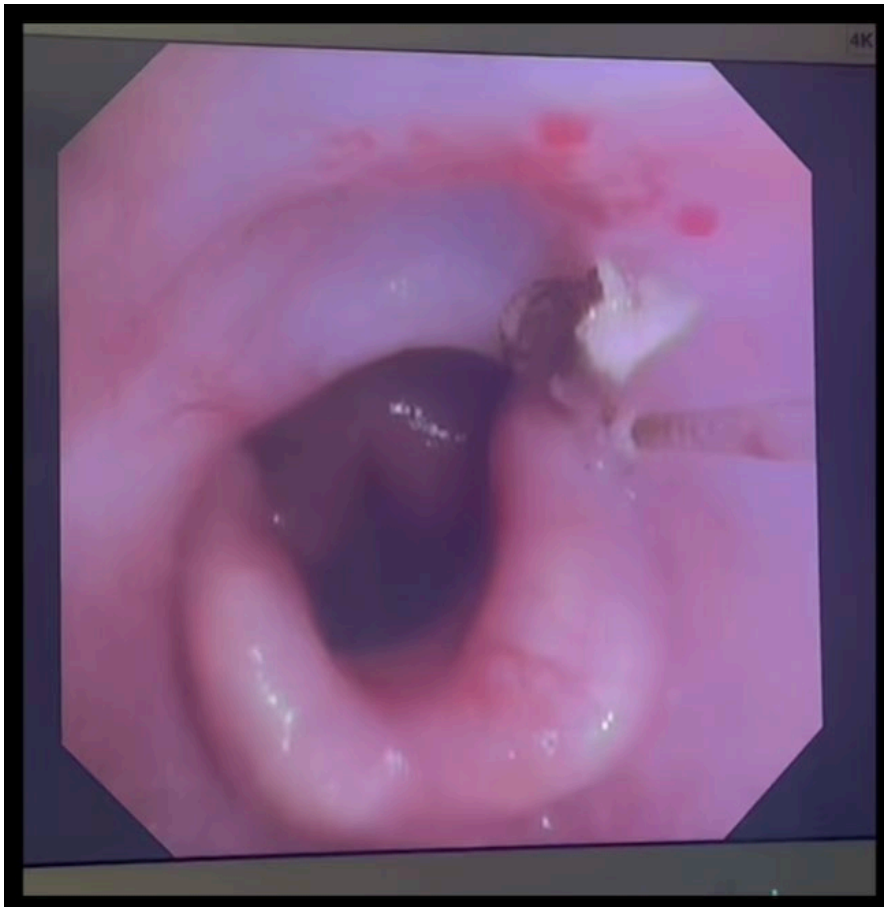

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 06

A Case Report: Trial of Labor in a Parturient with Fibrosing Mediastinitis and Superior Vena Cava Syndrome

Presenting Author: Christa Saelinger, MD

Presenting Author's Institution: University of Cincinnati Health - Cincinnati, Ohio

Co-Authors:

Introduction: Obstetric patients with mediastinal masses present significant anesthetic risk due to pregnancy related physiologic changes that may exacerbate cardiopulmonary symptoms during labor and delivery. Fibrosing mediastinitis (FM) is a rare fibroinflammatory disorder characterized by progressive encasement of mediastinal structures, including the superior vena cava (SVC), pulmonary vasculature, and airway. Although FM may occur as part of IgG4-related disease, most cases are idiopathic or post-infectious.1,2 Data guiding anesthetic management of parturients with FM are limited; however, multidisciplinary planning, vigilant cardiopulmonary monitoring, and early neuraxial analgesia are central to minimizing risk, with avoidance of general anesthesia strongly encouraged.2

Case One: A 27-year-old G7P2133 at 35 weeks' gestation with chronic FM of unknown etiology complicated by SVC syndrome was admitted for induction of labor due to recurrent fetal decelerations. Imaging demonstrated a 4-cm subcarinal mass encasing the right pulmonary artery with SVC narrowing (figure 1) and progressive occlusion of the right superior pulmonary vein. Echocardiography demonstrated normal biventricular function and pulmonary function testing revealed preserved lung volume and diffusion capacity. Symptoms included mild pleuritic chest pain, dyspnea on exertion, right upper extremity discomfort, and facial fullness. Multidisciplinary consultation with obstetrics, anesthesia, thoracic surgery, vascular surgery and interventional radiology determined that pre-delivery SVC and pulmonary artery stenting would provide limited benefit. The patient elected trial of labor after cesarean with induction at 37 weeks. The delivery plan included early, carefully titrated epidural analgesia, strict euvolemia, continuous cardiopulmonary monitoring, assist-second stage, if indicated, and immediate availability of interventional teams. Induction of labor was initiated with amniotomy and oxytocin, followed by continuous epidural titration. During the second stage of labor, the patient developed worsening chest pain but remained hemodynamically stable with positional optimization and judicious fluid management; assisted second stage was not required. Vaginal delivery was complicated by postpartum hemorrhage secondary to retained products, managed successfully with use of bimanual extraction, second-line uterotonics including methergine and misoprostol, tranexamic acid, Jada balloon placement and blood transfusion. The patient remained clinically stable and was discharged on postpartum day two with unchanged echocardiography.

Case Two:

Discussion: This case illustrates that, with meticulous planning, trial of labor can be safely accomplished

in parturient with FM and SVC syndrome. Vigilant monitoring, avoidance of general anesthesia, strict volume management and early neuraxial analgesia are essential to optimizing maternal and fetal outcomes in this high-risk population.

References: 1. PMID: 31890562 2. PMID: 26371817

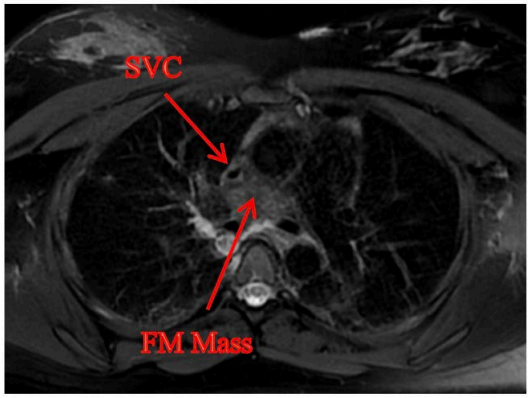

Figure 1: T2-weighted MRI showing FM mass with SVC compression

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 07

Managing cesarean delivery complicated by severe pulmonary arterial hypertension secondary to newly diagnosed conotruncal ventricular septal defect

Presenting Author: Vrinda Shukla, M.D.

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Co-Authors: Trent D. Bryson, MD - University of Texas Southwestern
David Preston, D.O., M.P.H - UT Southwestern Medical Center

Introduction: Ventricular septal defect (VSD) is the most common congenital heart disease consisting of 30% of defects in isolation and up to 50% in combination with other defects. Conotruncal VSDs form in the left ventricular outflow tract beneath the aortic valve and are commonly associated with heart defects such as tetralogy of Fallot (1). Unrepaired large defects can lead to volume overload, pulmonary arterial hypertension (PAH), and heart failure (HF) (2). Pregnancy in unrepaired large VSD patients unmasks these morbidities and carries a high risk of maternal and fetal complications (3).

Case One: A 19 year old primigravida was diagnosed with a large holosystolic murmur at a routine prenatal visit at 33w3d. A few days later, she developed new onset dyspnea requiring supplemental oxygen and was admitted to the hospital for optimization until her scheduled cesarean delivery (CD). Echocardiogram and cardiac catheterization demonstrated an unrestricted conotruncal VSD with left to right shunting, dilated and hypertrophied left and right ventricles with reduced ventricular function (RVEF 29%, LVEF 50%), and severe PAH with estimated right ventricular systolic pressure of 76mmHg. Pulmonary vasodilators, sildenafil and epoprostenol, were immediately initiated. For her scheduled CD at 36w3d, pre-operative peripheral central venous access was obtained. Intraoperatively, we placed an epidural and arterial line, then initiated epinephrine and vasopressin infusions, and inhaled nitric oxide (iNO) at 20ppm via high flow nasal cannula. The cardiac surgery team obtained femoral extracorporeal membrane oxygenation microcannulation. We slowly titrated the epidural to achieve adequate surgical anesthesia with maintenance of baseline hemodynamics. CD was complicated by postpartum hemorrhage (PPH) secondary to uterine atony and coagulopathy, requiring oxytocin, tranexamic acid, two units PRBCs, followed by norepinephrine, to prevent hypotension. Estimated blood loss was 1120mL. She was admitted to the intensive care unit postoperatively, where she was weaned off epoprostenol and discharged on postoperative day 9 with close PAH clinic follow up for dual therapy.

Case Two:

Discussion: Unrepaired VSD carries high risk of maternal HF, arrhythmia, and hemorrhage (3). Our patient had a conotruncal VSD with left-to-right shunt resulting in severe PAH and HF requiring an elective CD. Intraoperative management should prioritize avoiding sudden hemodynamic changes and maintaining euvolemia to preserve biventricular function (4). PAH and RVEF can be optimized with pulmonary vasodilators and inotropic support. There is an elevated risk of PPH due to coagulopathy

caused by iNO and prostacyclins. Recognition and treatment of PPH is particularly important to prevent hypovolemia-mediated worsening of cardiac output.

References: 1.Ultraschall Med 2025;46(6):536-59 2.Cardiology 2017;136(3):147-155 3.BJOG 2010;117(16):683-69 4.BJA Education 2023;23(1): 24-31

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 08

Prolonged Neuromuscular Weakness Following Emergent Cesarean Delivery Revealing Undiagnosed Pseudocholinesterase Deficiency

Presenting Author: Ola Shana, MD

Presenting Author's Institution: McGaw Medical Center, Northwestern University - Chicago, Illinois

Co-Authors: Emily B. Clamp, MD - McGaw Medical Center, Northwestern University

Introduction: Pseudocholinesterase deficiency is an enzymatic disorder affecting ~ 1 in 3000-5000 people that impairs metabolism of ester local anesthetics and depolarizing neuromuscular blockers, most notably succinylcholine. We present the case of a patient with previously undiagnosed pseudocholinesterase deficiency with prolonged neuromuscular blockade following succinylcholine administration for an emergent cesarean delivery.

Case One: A 44kg 33-year-old G2P1001 with no significant medical history presented at 28 weeks gestation in preterm labor and received antenatal steroids for lung maturation and magnesium sulfate for neuroprotection. A combined spinal epidural was placed for labor analgesia, but following spontaneous rupture of membranes, umbilical cord prolapse prompted emergent cesarean delivery. Epidural dosing with 20ml 3% 2-chloroprocaine failed to achieve an adequate surgical level, and given marked fetal bradycardia, anesthesia was rapidly converted to general anesthesia with propofol and succinylcholine. Cesarean delivery was uncomplicated. On emergence (~ 60 minutes after succinylcholine administration) the patient exhibited possible neuromuscular weakness, including relatively low tidal volumes and weak hand grip. Qualitative train-of-four monitoring demonstrated four weak twitches without fade. Decision was nonetheless made to extubate patient, whereupon she exhibited poor respiratory effort and gradually worsening hypoxemia. Arterial blood gas (ABG) revealed respiratory acidosis (pH 7.15, PaCQ, 69 mmHg), which rapidly improved with supplemental oxygen and close observation, and a repeat ABG two hours later demonstrated improvement. The patient had an otherwise uncomplicated postpartum course. Pseudocholinesterase activity on postoperative day one was significantly reduced at 1258 (normal >3200), confirming pseudocholinesterase deficiency.

Case Two:

Discussion: Anesthetic management in obstetric emergencies, during which fetal distress and incomplete neuraxial anesthesia may necessitate rapid transitions in anesthetic plans, may unmask previously undiagnosed disorders of drug metabolism such as pseudocholinesterase deficiency. Careful neuromuscular assessment is essential as and prolonged weakness may occur after a single dose of succinylcholine. Reliance on qualitative train-of-four alone may be misleading, particularly after administration of a depolarizing neuromuscular blocking agent. Magnesium administration may further confound assessment of weakness, and impaired metabolism of ester local anesthetics may also contribute to unpredictable neuraxial blockade. Lastly, patents with newly diagnosed

pseudocholinesterase deficiency require careful counseling, documentation, and future avoidance of triggering agents.

References: Viby-Mogensen J. Anesthesiology. 1980. Kalow W, Gunn DR. Can J Biochem Physiol. 1957. Miller RD, et al. Miller's Anesthesia. 9th ed.

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 09

Perioperative Anesthetic Management of Pulmonary Hypertension: A Case Report

Presenting Author: Kimberly Hughes, MD

Presenting Author's Institution: University of Kansas Medical Center - Olathe, Kansas

Co-Authors: Grant Gwinner, BS - University of Kansas School of Medicine - Salina
Taylor J. Leathers, MD. - University of Kansas Medical Center

Introduction: Pulmonary hypertension (PH) is a progressive cardiopulmonary disease that results from inappropriate pulmonary vascular remodeling leading to right-sided heart failure. The presence of PH with the physiological changes of pregnancy poses significant challenges to anesthetic management due to elevated risk of right-sided heart failure and maternal mortality [1].

Case One: We present a 35 yo G2P1 at 34w0d with PMH OSA, HTN, prior cesarean section (CS), severe obesity (BMI 60), WHO group 1 PH who presented at 34 weeks for repeat CS. Her planned delivery date was moved up due to respiratory decompensation requiring an ICU stay. Echo showed PASP 55 mmHg which was improved from prior elevation to 75 mmHg. PH medications included tadalafil and IV Treprostinil. A multidisciplinary approach was used to plan for this procedure with input from MFM, ICU, pulmonology and anesthesia teams. After ensuring team support, access to TEE and required vasoactive agents, we proceeded to the OR. We placed an arterial line and 2 large bore peripheral IVs before placing a CSE with 1.5cc bupivacaine 0.75%, 20mcg fentanyl, and 150ml of morphine. Hemodynamics were supported using norepinephrine and dobutamine intraoperatively. The procedure was uncomplicated and she was transported to the MICU postop for close monitoring in the high risk, immediate postpartum period. Patient remained stable and was discharged after 6 days in the ICU.

Case Two:

Discussion: Despite therapeutic advancements, pregnancy-related mortality rate of women with PH remains high, with idiopathic PH having a mortality rate of about 20% [2, 3]. Maternal outcomes have gradually improved with advances in multidisciplinary care and a dedicated task force for PH management in pregnancy [4]. Considerations including the effect of IV pulmonary vasodilators on oxygenation, prevention of decompensation in the postpartum period, and hemodynamic safety of neuraxial use vs general anesthesia for these deliveries are imperative to consider on an individual basis for severely decompensated PH patients.

References: 1. Emmanuel, Y. et al., Heart disease in pregnancy. Best Pract Res Clin Obstet Gynaecol, 2015. 29(5): p. 579-97. 2. Low, T.T., et al., Pulmonary arterial hypertension in pregnancy-a systematic review of outcomes in the modern era. Pulm Circ, 2021. 11(2): p. 20458940211013671. 3. Barańska-Pawełczak, K., C. et al., Pregnancy in Patients with Pulmonary Arterial Hypertension in Light of New ESC Guidelines on Pulmonary Hypertension. Int J Environ Res Public Health, 2023. 20(5). 4. Preston, I.R., et

al., Management of pulmonary hypertension in special conditions. Eur Respir J, 2024. 64(4).

SAT - CR - BS 3 - BR 2A - Pulmonary Morbidity – 10

Intervention for Grade 3 Subglottic Stenosis in the Third Trimester: A Case Report

Presenting Author: Hannah Schmucker, MD

Presenting Author's Institution: Ochsner Clinic Foundation - New Orleans, Louisiana

Co-Authors: Adrienne Ray, M.D., MD - Ochsner

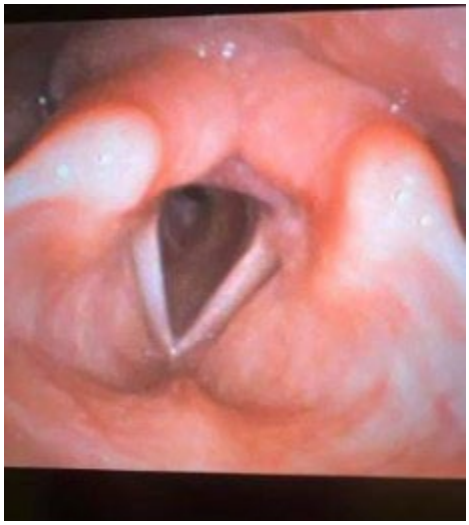
Introduction: Airway stenosis is characterized by fibrotic changes in the upper airway that can become a life-threatening condition(1). It is poorly tolerated during pregnancy as physiologic changes cause a 20-40% increase in maternal oxygen consumption(2). There are few reports on management in pregnancy. We present a case of successful surgical intervention for idiopathic subglottic stenosis at 32 wks gestation.

Case One: A 30yoF G3P1 at 27w3d with hx of asthma, anxiety, and Hashimoto's presented to the ED with worsening shortness of breath and stridor for 6 months. Flexible laryngoscopy revealed grade 3 subglottic stenosis. She was admitted to the ICU for airway monitoring and was treated with oral and inh steroids and racemic epi. The risks of delaying airway intervention and fetal prematurity were weighed through multidisciplinary discussion. The decision was made for surgical intervention at 32wks. Intraoperative findings would determine the procedure extent which could include dilation, incision/excision, or tracheostomy. Given the nature of the procedure and gestation age, we planned for intraoperative fetal monitoring with possible stat cesarean section should the fetus become compromised. In the OR, the pt was preoxygenated for a full 5 min prior to rapid sequence induction. ENT intubated with 5.0 ett and Ossoff-Pilling laryngoscope. General anesthesia was maintained with IV medications. The ett was removed and during a period of apnea, laryngeal endoscopy was performed. A 14mm balloon airway dilation catheter was inflated for 30 seconds. The patient was reintubated for a period of ventilation. This process was repeated for a relaxing incision of the obstructive tissue and another dilation. Endoscopy revealed improvement in the caliber of the airway and a 6.0 ett was placed for the remainder of the case. She was extubated completely awake. Throughout the periods of apnea, the SpO2 never dropped below 92%. Patient and fetus tolerated the procedure well. She was discharged home and delivered via repeat cesarean section at 38 wks without complication.

Case Two:

Discussion: During apnea, parturients become hypoxemic more rapidly than non pregnant patients because of increased oxygen consumption and reduced functional residual capacity. Preoxygenation was emphasized prior to induction which likely contributed to safe oxygen saturation during a period of apnea. This case demonstrates the efficacy of tracheal dilation with periods of apnea during the third trimester of pregnancy. It also demonstrates the importance of multidisciplinary coordination to optimize the safety of mother and fetus.

References: 1. Miller, K.M., Liang, K.Y., et al. Surgical Management of Airway Stenosis During Pregnancy: A Scoping Review. The Laryngoscope 2024; 134: 1014-1022. https://doi.org/10.1002/lary.30994 2. Barbera JP, Mossayebi MH, Khanuja K, et al. Idiopathic subglottic stenosis in pregnancy: A systematic review. Int J Gynecol Obstet. 2025; 00: 1-12. doi:10.1002/ijgo.70719



SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 01

Persistent labor pain that should trigger alarm, not a repeat bolus

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Presenting Author's Institution: Department of Anesthesiology and Critical Care Medicine - Washington, District of Columbia

Co-Authors: Anne Marcinkowski, MD - Department of Anesthesiology and Critical Care Medicine
Akhil Patel, MD - Department of Anesthesiology and Critical Care Medicine

Introduction: Uterine rupture is a rare but potential obstetric emergency. Current teaching stresses suspicion during times of fetal distress or maternal hemodynamic instability, and less emphasis is placed in anesthetic manifestations. In this case series, we present two TOLAC patients with functioning epidurals that had persistent and escalating pain during their trial of labor as the primary symptom of their uterine rupture.

Case One: 36 year old G2P1 at 39w5d planned for IOL History of AMA, TOLAC, GDM2. Prior delivery via LTCS for arrested descent. Presented to triage with painful contractions, no VB, FHT baseline. 2053, epidural placed, failed, and replaced with appropriate response. 0134, 0323, and 0627, epidural bolused due to breakthrough pain with appropriate response. 0657, patchiness noted; epidural replaced and bolused. Patient comfortable post replacement. 0822, pushing poorly tolerated due to pain, patient desired CS at this time. Bedside US did not show a rupture. No VB noted, FHT reassuring, patient HDS. General anesthesia induced given poor analgesia with neuraxial blockade. CS was performed during which a ~4cm anterior uterine wall defect was found, consistent with a uterine rupture.

Case Two: 24 year old G2P1 at 40w5d presented to L&D with painful contractions. History of mild asthma, marijuana use and hypoplastic right kidney. Prior delivery via LTCS for breech presentation. On presentation, VSS, FHT baseline, irregular toco. Admitted for labor induction. 0714, laboring epidural placed, patient comfortable.1257 & 1521, reporting vaginal pressure, resolved both times with boluses. 1600, bloody discharge, membranes intact. IVF for fetal cat II tracing. 2017, epidural thought to be sacral sparing and replaced. Obstetrics team alerted to possible rupture, however given reassuring FHT, uterine rupture unlikely. 0047, sacral pressure resolved with bolus. Due to prolonged TOLAC course and poor analgesia, patient opted for repeat CS. Epidural bolused, however still sacral sparing in OR. Single shot spinal performed, high spinal noted shortly after, patient intubated and fetus delivered. Intraop, an amniotic sac with thick meconium bulged out of the fascial opening without creating a hysterotomy. There was adequate space in the uterine opening to deliver the fetus. Patient extubated in OR with complete resolution of neuraxial blockade shortly after.

Discussion: These cases highlight an underemphasized presentation of uterine rupture - breakthrough pain. Neither case exhibited dramatic labor or hemodynamic changes, underscoring subtle clues that may precede more obvious and classical signs. Through this case presentation, we hope to emphasize the

paucity of content regarding uterine rupture in anesthetic literature, illustrate an atypical presentation, and reinforce the importance of heightened vigilance when managing TOLAC patients.

References: 1. Togioka BM, Tonismae T. Uterine Rupture. [Updated 2023 Jul 29]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-.

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 02

My Legs Fell Asleep and They Won't Wake Up! Managing HNPP During Labor and Delivery

Presenting Author: Joshua Hamburger, MD

Presenting Author's Institution: Icahn School of Medicine ay Mount Sinai - Bergenfield, New Jersey

Co-Authors: Carolina Aravera, MD - Mount Sinai Hospital

Introduction: Hereditary Neuropathy with Liability to Pressure Palsies (HNPP) is a rare autosomal dominant demyelinating disease in which short duration pressure leads to transient or sometimes permanent somatic and motor neuropathies.1 We present a case in which a parturient with known HNPP presents for delivery and discuss the management strategies and adaptations needed for safe anesthetic care.

Case One: KP was a G2P0 with known HNPP without permanent deficits who presented in labor at 40 weeks gestation. An epidural catheter was placed at L4-5 and an PCEA with Bupivacaine 0.625% and fentanyl 2mcg/ml was started. The bed was padded and the patient was asked to move every 15-20 minutes. 14 hours later she proceeded for cesarean delivery (CD) for arrest of dilation with category 2 tracing. Chloroprociane 3% 20ml and fentanyl 100mcg were administered epidurally and the cesarean proceeded. The OR bed was padded, and the patient's legs were moved q15 minutes. She regained lower extremity strength within 30 minutes of arrival to the PACU and reported no neuropathies.

Case Two:

Discussion: HNPP is caused by a deletion on Chromosome 17p12 affecting the PMP22 gene1, causing myelin to be exquisitely sensitive to pressure injury. HNPP manifests as recurrent transient focal neuropathies. Most patients report the sensation of a limb 'falling asleep' after leaning on it or after sleep, but 75% report associated pain. Resolution may take days, weeks or even months.2 Prolonged immobility during labor or CD may be dangerous and lead to prolonged or even permanent disability3. Attention must be paid to padding and frequent repositioning. In the case presented, we utilized ultra-low dose epidural analgesia to maintain mobility so the patient may move around on a schedule to prevent injury, recognizing that that the analgesia may reduce her ability to detect a neuropathy. For the CD, Cloroprocaine was selected to minimize immobility time. All surfaces were padded and her legs were moved every 15 minutes to prevent continuous pressure. Reports suggest a preference for neuraxial anesthesia over general anesthesia given complications such as tongue and other oropharyngeal neuropathies from the endotracheal tube.3 While the same author suggested utilizing invasive pressure monitoring to avoid neuropathies from a frequently cycling blood pressure cuff, we opted to use a cuff given that the patient would maintain sensation in her arms.

References: 1. Chance PF. Inherited focal, episodic neuropathies: hereditary neuropathy with liability to

pressure palsies and hereditary neuralgic amyotrophy. Neuromolecular Med. 2006;8(1-2):159-174. doi:10.1385/NMM:8:1:159 2. HNPP | The Foundation for Peripheral Neuropathy. Accessed January 22, 2026. https://www.foundationforpn.org/causes/hnpp/ 3. Sudhakar VP, etal. Pregnancy and Hereditary Neuropathy With Liability to Pressure Palsies: A Case Report and Narrative Review of the Literature. Cureus. 2024;16(5):e61236. doi:10.7759/CUREUS.61236

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 03

Labor pain management of a parturient with Friedreich ataxia, cardiomyopathy, super morbid obesity and challenging lumbar epidural catheter placement, a case report.

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Presenting Author's Institution: University of Texas Medical Branch Galveston - GALVESTON, Texas

Co-Authors: John Harman, MD - University of Texas Medical Branch
Allison Mullins, MD - University of Texas Medical Branch

Introduction: Friedreich's Ataxia is an inherited Autosomal Recessive disease of the nervous system, progressing to ataxia, sensory deficits leading to impaired mobility, with associated diabetes mellitus, scoliosis and hypertrophic cardiomyopathy[1]. Due to trinucleotide (guanine-adenine-adenine) repeat expansion mutation, reduced frataxin protein, iron accumulates in mitochondria and generates free radicals, leading to cell damage affecting neurons, cardiomyocytes and pancreatic beta cells[1]. With advances in medical and supportive care, we encounter pregnant women with such condition, presenting unique challenges to the anesthesiologists. We report a case of labor epidural analgesia for a parturient with Friedreich's Ataxia, morbid obesity, position limitations and cardiomyopathy.

Case One: A 20-year-old second gravida woman at 39 weeks gestation with Friedreich's ataxia, hypertrophic cardiomyopathy, Body Mass Index 51.56 kg/m², presented for induction of labor. She had progressive gait instability, impaired fine motor coordination, sensory axonal polyneuropathy, wheelchair bound but bilateral intact sensory perception to cold; Brain imaging showed mild cerebellar atrophy and genetic testing revealed a homoplasmic MT-CYB mutation of uncertain significance. Pre-induction transthoracic echocardiography was inconclusive, telemetry was normal. Ultrasound-assisted epidural placement was first attempted; it provided inadequate analgesia and was replaced. Continuous Ropivacaine 0.2% infusion at 10ml/hr with patient controlled bolus of 4ml/hr with 10 min lockout interval, achieved a bilateral T10 sensory block. Labor progressed uneventfully, and she delivered vaginally. Postpartum echocardiography demonstrated EF 45–50% with mild global left ventricular hypokinesis.

Case Two:

Discussion: Friedreich's ataxia complicates pregnancy due to cardiomyopathy, scoliosis, limited mobility, and psychological challenges[2,3]. Up to 60% develop cardiomyopathy, progressing to heart failure, atrial arrhythmias and ST changes [2,4,5]. Pregnancy induced cardiovascular changes can exacerbate heart failure. Our patient had left ventricle hypertrophy with ejection fraction 45–50%. Morbid obesity and ataxia added positioning challenges for epidural catheter placement, sucessful in second attempt, and epidural infusion was titrated to avoid hypotension with judicious fluid bolus. Literature supports gradual neuraxial titration and low threshold for replacement to minimize hemodynamic shifts and avoid general anesthesia[6,7,]. General anesthesia has high risk of aspiration, hemodynamic instability and

mitochondrial sensitivity to Propofol[8,9]. Careful planning is essential for maternal and fetal safety.

References: 1.Treasure Island StatPearls; 2025 2.Am J Cardiol 2024, 210:118 3.Ann Clin Transl Neurol 2021, 8:1239 4.J Multidiscip Healthc 2021,14:1645 5.Neurol Sci 2022, 43:6831 6.Anesthesiol 2021,135:164 7.Cureus 2024, 16:61776 8.J Med Cases 2014, 5:232 9.Cureus 2022,14:30383

TTE image for FRA case report SOAP.pdf

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 04

Anesthetic Management of Super-Obese Parturients: A Two-Case Series

Presenting Author: Xiao Lu Zhang, DO, PhD

Presenting Author's Institution: University of Alabama at Birmingham - Birmingham, Alabama

Co-Authors: Andrew Hackney, MD - University of Alabama at Birmingham
Teshi Kaushik, MD - University of Alabama at Birmingham
Nathalia Torres Buendia, MD - University of Alabama at Birmingham

Introduction: Super-obese parturients (BMI ≥50) pose significant anesthetic challenges, including difficult neuraxial placement, higher epidural failure rates, and increased risk of difficult intubation if general anesthesia (GA) is required (1). Obesity increases airway risk and anesthesia-related maternal mortality from airway obstruction and hypoventilation (1). Early multidisciplinary planning-emphasizing early labor epidural placement, difficult airway preparedness, and assessment of comorbidities-is essential to reduce these risks (2).

Case One: A gravida with BMI 79 underwent induction of labor at 33 weeks for severe superimposed pre-eclampsia (SevSiPreE) with heart failure and type 2 diabetes mellitus (T2DM). Labor epidural placement was uncomplicated. Cesarean delivery (CD) was called for failed induction and nonreassuring fetal heart tones (NRFHT), the epidural was displaced prior to the operating room. A reduced-dose combined spinal-epidural was performed, achieving surgical anesthesia with additional epidural lidocaine. Due to a skin incision above the umbilicus in the left upper abdominal quadrant and classical uterine incision, the patient experienced discomfort from surgical manipulation and required additional intravenous ketamine, midazolam and epidural local anesthetic with continuous end-tidal CO_2 monitoring. APGAR was 3 and 7 at 1 and 5 minutes. Estimated blood loss (EBL) was 1000 mL. Patient was discharged on postoperative day (POD) 5. Six weeks later, surgical wound washout was performed under GA without complication.

Case Two: A gravida with BMI 88 underwent induction at 34 weeks for SevSiPreE with T2DM and chronic kidney disease. Labor epidural placement via dural puncture epidural technique was uncomplicated. Emergent CD for NRFHT was required; however, conversion to surgical anesthesia failed. The patient underwent cesarean delivery under GA with uncomplicated intubation. APGAR was 3, 3 and 5 at 1, 5, and 10 minutes. EBL was 2000 mL. She subsequently required two additional wound washouts under GA for surgical site infection and was discharged on POD 15 after resolution of acute kidney injury.

Discussion: These cases highlight key anesthetic considerations in super-obese parturients. Early placement of a reliable labor epidural is critical, as failed induction and urgent CD are common, and successful conversion may prevent emergent GA. However, altered surgical approaches, including supraumbilical skin and classical uterine incisions, require higher sensory levels and may necessitate additional neuraxial supplementation due to increased visceral manipulation. Anesthesiologists must

balance adequate surgical anesthesia with avoidance of excessively high neuraxial block in patients with limited pulmonary reserve and cardiopulmonary comorbidities. Vigilant respiratory monitoring and multidisciplinary coordination are essential to optimize maternal and neonatal outcomes.

References: 1. N Engl J Med. 2022;387(3):248-259. 2. Best Pract Res Clin Obstet Gynaecol. 2023;91:102405.

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 05

Management of Cramp Fasciculation Syndrome During Childbirth

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Presenting Author's Institution: Oregon Health and Science University - Portland, Oregon

Co-Authors: Thomas Bartlett, MD - Oregon Health and Science University
Abigail Cantwell, MD - Oregon Health and Science University
Brandon M. Togioka, MD - Oregon Health and Science University

Introduction: Cramp Fasciculation Syndrome (CFS) is a rare disorder characterized by abnormal excitation of peripheral neurons, resulting in muscle fasciculations, cramping, pain, stiffness, episodic fever, and hyperreflexia. Diagnosis is established through nerve conduction studies, laboratory evaluation, and muscle biopsy. Although CFS has been associated with ion channel disorders, anterior horn disease, metabolic abnormalities, and thymoma, most cases are idiopathic. Literature guiding anesthetic management during labor and delivery in patients with CFS is limited.

Case One: A 31-year-old G1P0 woman with biopsy-confirmed CFS presented for an induction of labor at 39 weeks and 1 day due to history of gestational diabetes requiring medication. Her pregnancy was notable for celiac disease and marginal cord insertion. She had a history of severe CFS characterized by painful lower-extremity cramping and fever, partially responsive to benzodiazepines and intravenous immunoglobulin (IVIG), with normal creatine phosphokinase levels (measured to rule out rhabdomyolysis). Fasciculations were triggered by physical and emotional stress, raising concern for lower extremity rigidity and impaired positioning during vaginal delivery. A multidisciplinary anesthetic plan included early neuraxial labor analgesia, availability of IVIG and diazepam to treat fasciculations, and malignant hyperthermia precautions. An epidural was placed early in labor with administration of a single prophylactic dose of diazepam. The patient delivered a healthy infant vaginally without fasciculation episodes and was discharged after a four-day hospitalization without postpartum myalgias.

Case Two:

Discussion: CFS is not a contraindication to neuraxial or general anesthesia but requires individualized planning. Key considerations include documentation of baseline neurologic symptoms, electrolyte monitoring, avoidance of depolarizing neuromuscular blocking agents, cautious titration of nondepolarizing agents with quantitative monitoring, and preference for sugammadex for reversal. Although CFS has not been definitively associated with malignant hyperthermia, precautionary measures are often recommended. Early neuraxial analgesia may reduce risk for stress-related fasciculations and rigidity

References: 1.PMID: 1648679 2.PMID: 25304174 3.PMID: 23836298 4.PMID: 40476211

Table 1. Anesthetic Considerations in Cramp Fasciculation Syndrome

Phase	Key Considerations	Clinical Rational
Pre-Delivery	• Thorough documentation of baseline neurologic symptoms • Identify known triggers (pain, stress, etc) • Check electrolytes (Ca^{2+}, Mg^{2+}, K^{+})	Establish a reference for peri-delivery changes; minor physiologic stressors can exacerbate neuromuscular hyperexcitability
Labor Analgesia	• Early neuraxial anesthesia	Reduces pain and stress, potentially decreasing likelihood of fasciculations and rigidity
Neuraxial Anesthesia	• No contraindication for spinal/epidural • Monitor motor side effects closely	CFS is a peripheral nerve disorder; no evidence of neuraxial involvement
General Anesthesia	• Avoid succinylcholine • Use non-depolarizing NMBAs cautiously • Quantitative twitch monitoring if available	Risk of exaggerated fasciculations and prolonged blockade in CFS
Reversal of NMB	• Prefer sugammadex over anticholinesterases	Cholinergic activation may precipitate muscle fasciculations
MH Precautions	• Consider MH precautions	Symptoms overlap with MH (rigidity, hyperthermia, etc) and CFS symptoms suggested altered muscle membrane excitability
Adjunct Medications	• Benzodiazepines available for acute flares • IVIG for severe/refractory symptoms	Reduce Neuronal excitability; used in peripheral nerve hyperexcitability syndromes
Postpartum	• Monitor for delayed myalgias or rigidity	Symptoms may emerge as anesthetic depth lightens and physiologic stress increases

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 06

Multidisciplinary Management of Labor and Neuraxial Anesthesia in a Parturient with Complex Cardiac and Hematologic Disease

Presenting Author: Carter M. Pacheco

Presenting Author's Institution: University of Arkansas for Medical Sciences - El Paso, Arkansas

Co-Authors: Nadir ElSharawi - UAMS

Introduction: Anesthetic management of parturients with complex multisystem disease is challenging, requiring multidisciplinary planning. Ehlers–Danlos syndrome (EDS), particularly the hypermobile subtype, may be associated with abnormal platelet function and reduced responsiveness to local anesthetics, complicating neuraxial analgesia. Postural orthostatic tachycardia syndrome (POTS) further increases risk due to pain-induced autonomic instability and hemodynamic fluctuations during labor. When these conditions coexist with inherited arrhythmia syndromes, coordination amongst multiple specialties is essential. We report successful anesthetic management of a parturient with EDS type III, POTS, Brugada syndrome, and platelet dyscrasia, highlighting the value of coordinated, patient-centered care.

Case One: A 27-year-old G4P0030 female at 39 weeks 1 day gestation with a history of Brugada syndrome, POTS, EDS type III, syringomyelia, platelet dyscrasia, and Hashimoto's thyroiditis presented for labor. The anesthesia team discussed the labor plan at length with the patient, hematology, cardiology, and obstetricians, and a collaborative plan was made for labor epidural analgesia. With her history of syringomyelia, spinal MRI was performed during pregnancy showed no evidence of syrinx. Brain MRI confirmed absence of Arnold–Chiari malformation and increased intracranial pressure. She declined spinal anesthesia due to her history of syringomyelia. Due to her history of platelet dyscrasia, EDS, and prolonged bleeding with minor procedures, hematology recommended administering a unit of platelets both prior to epidural placement and prior to catheter removal and administering tranexamic acid (TXA) six hours before epidural placement with continuation 10–14 days post-procedure. Platelets were within normal limits on admission with a normal peripheral smear and platelet aggregation studies. Ultrasound guidance was used to increase first-attempt success of epidural placement. Her Brugada Syndrome had been diagnosed via genetic sequencing due to her mother’s clinical Brugada syndrome. The patient had been asymptomatic without prior electrocardiogram evidence of the syndrome. She also did not have an implantable cardioverter-defibrillator (ICD). Defibrillation pads were placed during labor with isoproterenol at bedside. Her transthoracic echocardiogram demonstrated normal left ventricular systolic and diastolic function. The patient had a successful labor and neuraxial anesthetic without complications.

Case Two:

Discussion: This case highlights the importance of multidisciplinary coordination in achieving safe

vaginal delivery and effective neuraxial analgesia in a parturient with complex cardiac and hematologic comorbidities. Early referral to a tertiary care center allowed comprehensive planning, risk mitigation, and successful maternal and fetal outcomes.

References: 1. Schubart JR, et al. J Dent Anesth Pain Med 2019;19(5):261–270. 2. Blitshteyn S, et al. J Matern Fetal Neonatal Med 2012;25(9):1631–1634.

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 07

Labor in Pregnant Patient with Epidermolysis Bullosa

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Introduction: Epidermolysis Bullosa (EB) is a disorder caused by genetic mutations of structural proteins in the basement membrane. This causes abnormal adhesions leading to fragile skin that can lead to bullae and blisters1. There are four main types of Epidermolysis Bullosa which are EB Simplex, Junctional EB, Dystrophic EB, and Kindler EB. We present a G1P0 patient with dystrophic epidermolysis bullosa reporting to the labor and delivery unit.

Case One: A 21yo G1P0 at 36w6d with a past medical history of epidermolysis bullosa with associated hyperkeratosis of hands and pseudo syndactyly presented to labor and delivery unit for scheduled induction of labor. The physical exam additionally revealed dental erosion and small mouth opening. The plan was discussed with wound care and OB/GYN team extensively prior to the patient's admit. She would be a high-risk cesarean section, if necessary, due to her skin fragility secondary to EB, concerning airway exam, and unknown possible airway strictures that are associated with dystrophic EB. The patient further had a known history of prolonged intubation leading to development of airway blisters due to a surgery that required a secured airway. Anesthetic plan included early epidural to allow time to troubleshoot and emergency airway equipment availability. The plan was to use a silicone-based mesh when dressings or EKG stickers were required. Discussed potential for arterial line placement to avoid repeated crush injury from NIBP. Anesthesia resident placed ultrasound guided IV with careful awareness to not apply any shear pressure on skin particularly with site prep or ultrasound movement. Tourniquet was placed over gown and IV dressed with silicone-based mesh. Epidural placed with consideration to apply no shearing trauma to skin and avoid any bullae or skin blisters. Betadine solution dabbed on for site preparation instead of chloraprep. No skin wheal was made with lidocaine injection. Epidural secured with silicone dressing and additionally secured to patient's gown with tape. Patient's level was frequently checked throughout labor. Nurses in mother baby unit were given adhesion removal spray for when epidural and IV needed to be removed. Patient had successful uncomplicated vaginal delivery. She was discharged postoperative day 2.

Case Two:

Discussion: EB has an incidence of 1 in 50,000 births1. It is a complex pathology that affects multiple organ systems including dermatologic, cardiac, gastrointestinal, and musculoskeletal. As in our patient, it highlights the need for meticulous multidisciplinary planning with regards to patient's comfort and safety. It also emphasizes the importance of early preparation when possible to optimize patient care and safety during labor and postpartum.

References: 1. Kaltofen, Heike 2020; 1:7

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 08

Knot at our Hospital-Case Reports

Presenting Author: William F. Obrecht, Jr., MD

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Introduction: True umbilical cord knots (UCKs) have been investigated for their role in fetal death, premature birth, low birth weight, low Apgar scores, and other measurable outcomes. In one study, 0.3%-1.3% of all pregnancies were affected by UCK and found to be associated with advanced maternal age, multiparity, spontaneous abortion, polyhydramnios, obesity, chronic hypertension, and diabetes. (1) An UCK may have profound implications for the well-being of the fetus. Recently, two cases of UCKs were observed at our institution.

Case One: 25 y/o parturient G2 P1(1,0,0,1), BMI 50 kg/m², EGA 39 weeks, underwent cesarean section for failure to dilate and potential fetal macrosomia (estimated weight 9 lbs. and 11 oz.). Spinal anesthesia was administered. The fetus was delivered and presented with a nuchal cord and a true knot in the mid portion of the umbilical cord. Apgar score: 9/9 at 1 and 5 minutes. Birthweight: 8 lbs. 9 oz. (Fig. 1)

Case Two: 30 y/o parturient G3P2(2,0,0,3), BMI 71, EGA 39 weeks with prior cesarean section, presented in labor and declined vaginal birth (VBAC). Medical history included gestational diabetes and class III obesity (BMI > 40). Spinal anesthesia was administered. After delivery, a true knot was noted in the mid portion of the umbilical cord. Apgar score: 9/9 at 1 and 5 minutes. Birthweight: 8 lbs. 15 oz.

Discussion: True umbilical cord knots are uncommon and if present may lead to fetoplacental insufficiency. The presence of a knot alone does not automatically indicate clinical problems; rather, the degree of tightness determines whether blood flow is restricted and influences pregnancy outcomes. At early stages, UCK's are often silent, but as fetal descent progresses, diminution of blood flow to the fetus may occur necessitating urgent or operative delivery. Ultrasound has low sensitivity and cord knots may be easily missed during prenatal visits. Advanced imaging technologies using color Doppler and three- and four-dimensional ultrasound imaging may be helpful in defining anatomical features of the cord and assessing for the presence of UCKs. Currently, there is no intervention to loosen a cord knot or ameliorate its potential danger. Antenatal management relies on careful fetal monitoring and high suspicion for cord compromise. (2) In the cases presented, there were good clinical outcomes and UCKs were not suspected, although there were several clinical associations present. If a UCK is found, the pregnancy should be considered high risk and additional vigilance warranted by utilizing frequent ultrasound scans, cord doppler studies, fetal movement assessments, and establishing a lower threshold for operative delivery.

References: 1. Int J Gynecol Obstet 2013;122:18 2. Int J Gynecol Obstet 2024;166:559

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 09

Presentation of Atypical Hemolytic Uremic Syndrome in a Peripartum Patient

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Presenting Author's Institution: Mount Sinai Hospital - New York, New York

Co-Authors: Talia Scott, MD - Icahn School of Medicine at Mount Sinai

Introduction: In postpartum patients with cesarean delivery complicated by postpartum hemorrhage and laboratory evidence of multisystem injury and thrombocytopenia, early recognition and prompt treatment of atypical hemolytic uremic syndrome (HUS) can markedly improve maternal outcomes.

Case One: A 30-year-old G2P1011 with no significant past medical history presented for induction of labor due to gestational hypertension. Labor was complicated by non-reassuring fetal heart tracings and suspected chorioamnionitis, prompting conversion to cesarean delivery. Intraoperatively, estimated blood loss exceeded 2,500 mL, prompting arterial line placement for hemodynamic monitoring and serial laboratory assessment. The patient received 2 units of packed red blood cells, 1 unit of fresh frozen plasma, 3 units of cryoprecipitate, and RiaSTAP fibrinogen concentrate guided by rotational thromboelastometry analysis. Postoperatively, she developed severe-range hypertension and increasing oxygen requirements. Laboratory evaluation demonstrated rising creatinine and transaminases with thrombocytopenia, and the patient was transferred to the intensive care unit (ICU) for close monitoring. Further testing revealed elevated lactate dehydrogenase, undetectable haptoglobin, and worsening renal dysfunction. Hematology consultation recommended initiation of eculizumab for presumed aHUS while confirmatory studies were pending. Send out complement laboratory testing confirmed the diagnosis of aHUS.

Case Two:

Discussion: Although HELLP syndrome was initially suspected due to postpartum hypertension, hemorrhage, thrombocytopenia, and organ injury, the prolonged ICU course prompted evaluation of other thrombotic microangiopathies. HUS is defined by the triad of microangiopathic hemolytic anemia, thrombocytopenia, and acute kidney injury. However, aHUS is a complement-mediated primary disorder that may present in the peripartum period, with cases in the peripartum period accounting for 7% of all atypical HUS diagnoses [1]. Delayed diagnosis and treatment may result in irreversible renal failure [2,3]. Current hypotheses to account for these peripartum associated increases include complement dysregulation resulting from the physiological stress of pregnancy. Because the clinical features of aHUS overlap significantly with preeclampsia with severe features and HELLP syndrome, timely recognition is challenging. Nonetheless, early initiation of complement inhibition with eculizumab is critical to preventing severe maternal morbidity and mortality. Early treatment with eculizumab has shown to have significantly higher rates of disease remission compared to non-treated groups (88% versus 57%) [4]. This case emphasizes the need for heightened clinical vigilance and rapid diagnostic evaluation in postpartum

patients with microangiopathic hemolysis and multiorgan dysfunction.

References: 1. NEJM 2023;389:1402-1414 2. Lancet 2022;400:1722-1740 3. Maternal-Fetal & Neonatal Medicine 2018;2853-2859 4. Obstet Gynecol 2020;135:46-58

SAT - CR - BS 3 - BR 2A - Dilemmas in Labor – 10

Percutaneous Umbilical Blood Sampling and Intrauterine Transfusion in the Setting of Fetal-Maternal Hemorrhage

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Introduction: Percutaneous umbilical blood sampling (PUBS) is a procedure performed by obstetricians for the primary indication of suspected severe fetal anemia requiring confirmation and immediate transfusion capability. The most common indications are red cell alloimmunization, non-immune hydrops fetalis, and chromosomal diagnoses.1,2 The most common complications are bleeding from the puncture site (20-30%) and fetal bradycardia (5-10%, usually resolving in 5 minutes). More serious but rare complications include pregnancy loss (1.3%) and vertical transmission of maternal infections.2

Case One: A 22-year-old G1P0 presented at 27w4d with a single episode of light vaginal bleeding and contractions after a motor vehicle accident two days prior. An exam revealed a small amount of bright red blood at the vaginal introitus with a closed cervix. Maternal-fetal hemorrhage flow cytometry showed evidence of fetal red blood cells in maternal circulation. On ultrasound, fetal middle cerebral artery (MCA) dopplers were elevated, suggesting the presence of fetal anemia. Despite an initial category I tracing on presentation, fetal heart tracing worsened to category II and began to demonstrate intermittent but frequent late and variable decelerations. Due to concern for significant maternal-fetal hemorrhage, the decision was made to proceed with a PUBS procedure for possible intrauterine fetal transfusion. An uncomplicated combined spinal epidural was performed due to the high risk of conversion to Cesarean section. A T6 level was achieved bilaterally. Opening fetal hematocrit was 26.8. Intrauterine transfusion was performed with 34 cc of 83% hematocrit, O-negative, CMV negative, leukocyte reduced, irradiated whole blood. Fetal heart tracing immediately improved back to category I post-transfusion. The patient remained stable post-procedure with reassuring fetal movement and non-stress tests prior to her discharge. Her MCA dopplers have been followed during pregnancy and remain without evidence of ongoing fetal anemia. She is scheduled for induction of labor at 37 weeks for the development of gestational hypertension.

Case Two:

Discussion: Fetal-maternal hemorrhage as an indication for PUBS is exceedingly rare. Two different studies including 500 cases examined indications for PUBS and did not report significant maternal-fetal

hemorrhage as an indication1,2 Data on this indication is primarily limited to case reports.3,4 One systematic review from 2018 by Troìa et al. identified 13 published cases. 5 More research is needed to determine if outcomes favor routine screening for fetal anemia with MCA dopplers and performing PUBS for this indication. The limited data available (including our case above) suggests that intrauterine transfusion is a feasible approach in the hands of experienced providers and with close monitoring.

References: 1. PMID 27014852 2. PMID 23978246 3. PMID: 1619613 4. PMID: 9031955 5. PMID: 30223274

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 01

Anesthetic management of a patient with achondroplasia undergoing cesarean delivery: A Case Report

Presenting Author: Shreya Majagi, MD

Presenting Author's Institution: UAMS - Little Rock, Arkansas

Co-Authors: Nadir El Shawari, MBBS - UAMS
Mark Zimmer, MD - UAMS

Introduction: We present the case of a pregnant patient with achondroplasia scheduled for cesarean delivery due to their underlying condition. This report outlines the anesthetic considerations for this patient and underscores the practicality of neuraxial anesthesia in patients with achondroplasia and other skeletal dysplasias.

Case One: The patient was a 20-year-old primigravida female measuring 116.8 cm and weighing 69.9 kg, with a calculated BMI of 51.17 kg/m². Her airway evaluation revealed Mallampati class II, decreased thyromental distance, and limited neck mobility. She had no medical or surgical history and denied any cardiopulmonary symptoms. Her mother recalled a difficult lumbar puncture attempt during childhood which had to be aborted. No spinal imaging was available. After a detailed discussion about the risks and benefits of neuraxial anesthesia and general anesthesia was undertaken, the patient opted for neuraxial anesthesia. Standard monitors were applied, ultrasound of the lumbar spine was performed to identify anatomical landmarks. Combined spinal epidural approach was attempted at L3-L4. Despite clear loss of resistance during epidural placement, multiple spinal attempts failed to yield cerebrospinal fluid. After failed attempts at spinal, an epidural catheter was placed, and a separate spinal was attempted at L4-L5 which was also not successful at finding the intrathecal space. Incremental epidural dosing with a lidocaine–epinephrine–bicarbonate mixture produced progressive lower-extremity motor and sensory block, and a dense bilateral T6 block was achieved. The cesarean delivery proceeded uneventfully, and epidural morphine was administered postdelivery. Infant had an APGAR score of 9 and was in good condition. There were no immediate complications. The patient recovered well and was discharged with infant on postoperative day two.

Case Two:

Discussion: The optimal anesthetic approach for cesarean delivery in patients with achondroplasia remains uncertain due to limited literature. A Combined spinal epidural was opted for, in hopes to gain ability to provide medications to the epidural space if needed for successful cesarian section neuraxial anesthesia. Although general anesthesia could be preferred due to potential airway management and neuraxial difficulties, recent case reports increasingly describe successful neuraxial techniques. Neuraxial placement can be challenging due to exaggerated lordosis, scoliosis, distorted surface landmarks, and narrowed epidural and intrathecal spaces (1). Nevertheless, multiple reports demonstrate that careful

planning, including pre-procedural ultrasound, can improve success.

References: 1. Melekoglu R, Celik E, Eraslan S. Successful obstetric and anaesthetic management of a pregnant woman with achondroplasia. BMJ Case Rep. 2017 Oct 25;2017:bcr2017221238. doi: 10.1136/bcr-2017-221238. PMID: 29070618; PMCID: PMC5665186.

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 02

Single shot spinal anesthesia with intrathecal dexmedetomidine for an emergent 10th cesarean delivery: a case report

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Presenting Author's Institution: Columbia Department of Anesthesiology - New York, New York

Co-Authors: James Conwell, DO - Columbia University

Introduction: Concerns regarding prolonged surgery time and blood loss during repeat cesarean delivery (CD) may lead anesthesiologists to favor a combined spinal epidural (CSE) over a spinal anesthetic in higher order repeat CD. There is growing interest in the use of intrathecal α2-adrenergic agonists for CD.1 We routinely add intrathecal dexmedetomidine (4-5 µg) to our standard solution, for its increased analgesic and anti-shivering effects, and for the prolonged block it provides (an additional 90-120 min). We have not previously cared for a patient with a 10th repeat CD, let alone emergently, and report here on the anesthetic management of such case.

Case One: A 40-year-old G10P8 at 33/4 weeks, BMI 34, presented contracting with premature preterm rupture of membranes. She had a history of 9 prior CD and was taken from our triage unit emergently to the operating room (OR) for non-reassuring fetal heart tracing (Category 1). A spinal solution was emergently drawn up with hyperbaric bupivacaine 0.75% 2ml (15mg), fentanyl 15 µg, morphine 150 µg and dexmedetomidine 5 µg (total volume 3.8ml) was administered via a 25-gauge Whitacre needle within 5 minutes of entry into the OR. A bilateral sensory block to T4 level was obtained. Following spinal placement, a phenylephrine drip at 50 mcg/min was prophylactically started and weaned off in an hour with max pressor dose of 70 mcg/min. The patient was comfortable during surgery, which lasted 113 min. She received IV dexmedetomidine 15 µg for shivering (10 µg followed by an additional 5 µg)17 and 54 min after delivery, respectively (Table 1). The PACU time was 3 h and 41 min. Pitocin and calcium chloride were administered as uterotonics. Final quantitative blood loss was 876 ml. Post-cesarean analgesia was oral acetaminophen and ibuprofen, with no oxycodone prn, in the post-operative period. The patient was discharged home on post operative day 3.

Case Two:

Discussion: The rapid sequence spinal was described as a technique to provide rapid onset anesthesia as in an emergency setting as a single shot spinal is quicker to perform than a CSE.2 In addition, there is recent evidence that spinal anesthesia is associated with lower odds for intraoperative pain than CSE anesthesia.3 As intrathecal dexmedetomidine offers the advantage of prolonging the block, it may well be that spinal anesthesia even in high order repeat CD, and in emergent cases, is reasonable approach, as exemplified in our case.

References: 1. IJOA 2025;doi:10.1016/j.ijoa.2025.104738 2. Anaesthesia. Jul 2010;65(7):664–9. 3. Anesthesiology. Nov 24 2025;doi:10.1097/ALN.0000000000005868

Table 1. 10th CS case report.pdf

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 03

Cesarean Delivery for Autonomic Dysreflexia with Synovial Sarcoma of T7 Causing Pathologic Burst Fracture

Presenting Author: Timothy Hellerer

Presenting Author's Institution: McGaw Medical Center of Northwestern University - Chicago, Illinois

Co-Authors: Alva Powell, MD - McGaw Medical Center of Northwestern University

Introduction: Primary synovial sarcoma is exceptionally rare, compromising less than 10% of soft tissue sarcomas, with spinal involvement occuring in only a minority of cases. Thoracic spinal synovial sarcoma is particularly uncommon. We present the case of a pregnant patient with acute spinal cord injury secondary to T7 burst fracture from synovial sarcoma, complicated by autonomic dysreflexia(AD)

Case One: A 39-year-old G3P1011 with a history of malignant nerve sheath tumor(status-post resection) and gestational diabetes mellitus presented at 33 weeks gestation with bilateral lower extremity numbness, weakness, constipation, and urinary retention. Magnetic resonance imaging(MRI) demonstrated pathologic T7 compression fracture with retropulsion and severe spinal cord compression. Following admission, she developed AD, requiring intensive care unit admission and continuous vasopressor administration. Intermittent fetal heart rate monitoring demonstrated recurrent fetal decelerations temporally associated with maternal hemodynamic instability, consistent with AD-related uteroplacental hypoperfusion. Based on these findings, the obstetrical team recommended cesarean delivery. Given the acute spinal cord injury, general anesthesia was selected. Standard ASA monitors were applied, with the addition of an arterial catheter for continuous blood pressure monitoring. Anesthesia was induced using a rapid sequence technique with concurrent norepinephrine infusion, etomidate, propofol, and high dose rocuronium. A remifentanil bolus was administered prior to laryngoscopy. General anesthesia was maintained with propofol and remifentanil infusions guided by bispectral index monitoring. The neonate was delivered without complication, and the patient remained hemodynamically stable intraoperatively. Vasopressor support was discontinued post-delivery, and the patient extubated to room air.

Case Two:

Discussion: This case underscores the rarity of primary spinal synovial sarcoma presenting during pregnancy and highlights strategies for maintaining maternal hemodynamic stability when neuraxial anesthesia is contraindicated. AD is a life threatening complication causing sudden increases in blood pressure in patients with spinal cord injury at or above the T6 level, necessitating vigilant management. Although neuraxial anesthesia is the preferred modality for preventing AD, it was contraindicated in this patient due to severe spinal cord compression and pathologic fracture. General anesthesia with continuous vasopressor and remifentanil infusions successfully maintained maternal hemodynamic stability while preventing episodes of AD. This case demonstrates that general anesthesia can be an

effective strategy to achieve hemodynamic stability and facilitate safe delivery in pregnant patients at risk for AD.

References: 1. PMID 38489819 2. PMID 33008797 3. PMID 32332418

IMG_5935 (1).pdf

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 04

Emergent intraoperative intraosseous catheterization during cesarean delivery in a morbidly obese parturient with sudden loss of intravenous access

Presenting Author: Sarah Baum, MD

Presenting Author's Institution: UVA Health - Charlottesville, Virginia

Co-Authors: Richard Beckett-Ansa - University of Virginia Health Systems
Catherine E. Lyons, BS, BA - University of Virginia School of Medicine

Introduction: Morbid obesity is a risk factor for challenging and precarious intravenous access, and intraosseous (IO) injection is a viable alternative in emergent scenarios. We report a case in which IO access facilitated hemodynamic management during cesarean delivery when IV access was suddenly lost.

Case One: A 32-year-old term G11P2 presented for repeat cesarean delivery. Her pregnancy was complicated by chronic hypertension, asthma, and extreme obesity (BMI 64). A combined spinal-epidural (CSE) was placed with 20mcg intrathecal fentanyl, followed by 20ml 2% lidocaine with epinephrine in divided doses to a achieve a T4 anesthetic level. Just prior to surgical incision, the patient reported pain at her IV site, which was noted to be infiltrated and nonfunctional. Concomitantly, her blood pressure dropped to 65/45, and she reported feeling faint and nauseous. Replacement vein targets were not readily visible by naked eye, nor via ultrasound scouting. Left lateral table tilt and Trendelenburg positioning were quickly instituted to augment venous return, and 50mg ephedrine was given intramuscularly. While upper extremity IV access was attempted with ultrasound guidance, the left lower extremity was exposed for attempted intraosseous catheterization with the EZ-IO system (Vidacare, San Antonio TX). Due to profound adiposity, IO placement landmarks such as the greater tubercle of the humerus and the tibial tuberosity were not palpable. Under visual estimation, the needle was inserted approximately 3cm below the presumed inferior margin of the patella, and approximately 2cm medial (see figure). A yellow 45mm EZ-IO needle was advanced through the skin until the tip was felt to rest against bone. Fortunately, one black line (5 mm) on the needle was still visible above the skin, as recommended by the manufacturer. Drilling was initiated with firm downward pressure until a loss of resistance from medullary space entry was felt. Intraosseous crystalloid and vasopressors quickly reestablished hemodynamic stability. Fetal heart rate remained stable throughout. Eventually, upper extremity IV access was secured, and the case proceeded uneventfully.

Case Two:

Discussion: The humerus is the recommended intraosseous site for obstetric resuscitation because it bypasses aortocaval compression, and typically supports higher flow rates than the tibia. In our case, the proximal tibia was chosen since it was a presumably larger target and more likely to be successfully encountered with a blind attempt, and because the patient was insensate in the lower extremities from the

epidural. Proximal tibial IO insertions have been found to be 30-40% more successful than proximal humeral insertions.1 Incorrect positioning of IO needles should be scrupulously avoided, as this may result in soft tissue extravasation and compartment syndrome. 5% of IO insertions are associated with complications, most commonly extravasation.2

References: 1. Am J Emerg Med. 2016 Sep;34(9):1831-4. 2. Curr Emerg Hosp Med Rep. 2023 Mar;11(3):1-14.

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 05

Difficult surgical exposure imposes additional hemorrhage risks: a case of extra-uterine bleeding postpartum

Presenting Author: Janet Kim, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Kait Brennan, DO, MPH - Vanderbilt University Medical Center
Edward (Ted) Yaghmour, MD, FASA - Vanderbilt

Introduction: Postpartum hemorrhage contributes to maternal morbidity and mortality. Prompt recognition is critical to avoid shock, coagulopathy, massive transfusion, and invasive interventions [1]. Although uterine atony is the most common cause, concealed extra-uterine arterial bleeding is a rare, high-risk presentation.

Case One: A 34-year-old G6P4014 at 37w0d with limited prenatal care, BMI 45, uncontrolled GDMA1, and four prior cesarean deliveries presented for her 5th cesarean delivery. EBL was 800 mL. She received tranexamic acid, oxytocin, and methylergonovine intra-operatively for intermittent atony. On POD1, an OB emergency was called for hypotension. Initial exam showed RUQ tenderness to palpation with minimal vaginal bleeding. Hemoglobin was 6.1 gm/dL. An urgent CT abdomen/pelvis demonstrated large volume hemoperitoneum in the right pelvis/extraperitoneal space and active extravasation originating from the right hemipelvis. The inferior epigastric artery (IEA) was embolized by Interventional Radiology. Resuscitation included 2 units of packed red blood cells, 3 units of fresh frozen plasma, and 1 unit of cryoprecipitate. She stabilized and was discharged on POD 4.

Case Two:

Discussion: Inferior epigastric arterial hemorrhage is uncommon after cesarean delivery but can be life-threatening [2]. In this case, several patient factors contributed to a challenging surgical exposure and increased procedural risk including obesity and a high-order repeat cesarean [3]. Early detection of extra-uterine bleeding is critical. Hypotension with a disproportionate hemoglobin drop despite minimal vaginal bleeding and firm uterine tone should trigger transfusion, urgent imaging to identify arterial extravasation, and expedited coordination for definitive therapy [2]. Transcatheter arterial embolization has been demonstrated to be an effective hemostatic strategy for IEA hemorrhage, with reported initial success rates of approximately 90% [4].

References: 1. Committee on Practice Bulletins-Obstetrics. Practice Bulletin No. 183: Postpartum Hemorrhage. Obstetrics and Gynecology. 2017;130(4):e168-e186. doi:10.1097/AOG.0000000000002351. 2. Ko SY, Park SW, Sohn IS, et al. Interventional Management for Complications Following Caesarean Section. The British Journal of Radiology. 2011;84(999):204-9. PMID: 20959367 3. Ko SF, Lin H, Ng SH, Lee TY, Wan YL. Postpartum Hemorrhage With Concurrent

Massive Inferior Epigastric Artery Bleeding After Cesarean Delivery. American Journal of Obstetrics and Gynecology. 2002;187(1):243-4. PMID: 12114920 4. Wick MC, Klocker J, Grundtman C, Jaschke W, Chemelli AP. Transcatheter embolization for the management of acute active inferior epigastric artery hemorrhages. J Endovasc Ther. 2013;20(4):561-567. doi:10.1583/13-4289.1

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 06

Buying Time in Obstetric Anesthesia: Emergent REBOA for Life-Threatening Postpartum Hemorrhage

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Co-Authors: Adam Greenwood, MD - Geroge Washington University Hospital
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Introduction: Postpartum Hemorrhage (PPH) is defined as blood loss ≥1000mL with signs of hypovolemia following delivery and occurs in 1-3% of births. PPH remains a leading cause of maternal morbidity and mortality worldwide. Management requires rapid assessment of blood loss and identification of the underlying etiology to guide therapy. In life-threatening cases, refractory to standard measures, resuscitative endovascular balloon occlusion of the aorta (REBOA) may be used. This case highlights emergent REBOA use for severe PPH when the bleeding source was not readily identifiable.

Case One: A 32 year old G2P1 at 40 weeks presented in active labor. An epidural was attempted but aborted due to imminent delivery. Following vaginal delivery, the patient developed persistent hemorrhage unresponsive to uterotonics, oxytocin infusion, and bimanual massage. She was transferred emergently to the operating room with a quantitative blood loss (QBL) of 3700mL on arrival to the OR. Emergent intubation performed and an arterial line was placed. Massive transfusion protocol was initiated. Exploratory laparotomy and hysterotomy revealed no uterine rupture. Pelvic examination identified extensive lacerations, though hemorrhage limited visualization for repair. An arterial bleed from deep sulcal laceration was suspected. With ongoing hemorrhage, and a QBL of 7600mL, general surgery was consulted and REBOA deployed. Though bleeding was reduced, a definitive bleeding source was still unidentified. The patient was transferred to interventional radiology, but no active extravasation identified. REBOA deflated in IR before transfer to the main operating rooms where an AbThera device and vaginal packing were placed. Final QBL was 8500mL. Patient received 13 PRBCs, 10 FFP, 4 platelets, and 3 cryoprecipitate. She was admitted to the ICU intubated, without vasopressor support, and extubated the following morning. She returned to the OR on postoperative days 1, 3, and 6 for abdominal closure and management of persistent lacerations. She was discharged home on postoperative day 7.

Case Two:

Discussion: Severe PPH may result in hypovolemic shock, multiorgan ischemia, disseminated intravascular coagulation, pulmonary edema, and postpartum hypopituitarism. Zone III REBOA occludes uterine arteries and most internal iliac branches but does not occlude ovarian arteries, allowing for potential continued bleeding. REBOA for massive PPH has been associated with a low in hospital mortality rate (0-7%) and may reduce blood product utilization and hysterectomy rates. Although

procedural complications are possible, the overall risk remains low. In this case, emergent REBOA served as a life-saving adjunct when conventional measures failed, and the bleeding source was unclear.

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SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 07

Delayed Postpartum Hemorrhage Requiring Multisite Intervention: The Essential Role of Obstetric Anesthesiology

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Co-Authors: Nicole Spence, MD, FASRA - Boston University Medical Center

Introduction: Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity and mortality and often requires rapid escalation across multiple clinical environments. Obstetric anesthesiologists play a key role in maternal resuscitation, hemodynamic monitoring, and interdisciplinary communication. We present a case of catastrophic delayed PPH following vaginal delivery that highlights the importance of anesthesiology-led coordination across care settings.

Case One: A 37-year-old G2P1001 at 37 weeks underwent induction for chronic hypertension with superimposed preeclampsia and insulin-dependent gestational diabetes. Given multiple hemorrhage risk factors, early type and crossmatch was obtained, and a labor epidural was placed. After an uncomplicated vaginal delivery with initial quantitative blood loss (QBL) of 639 mL, she developed delayed PPH with progressive hypotension despite uterotonics and neuraxial-assisted uterine evacuation, prompting transfusion and escalation to the operating room for dilation and curettage. Persistent hemorrhage required massive transfusion protocol activation and consultation with interventional radiology (IR). During uterine artery embolization, the patient acutely developed hypotension and increasing pelvic pressure. This was promptly recognized by the anesthesia team and communicated to IR, leading to identification and embolization of a bleeding collateral vessel. Although temporarily stabilized in the ICU, she continued to report worsening pelvic pressure. Bedside ultrasound demonstrated re-accumulation of intrauterine blood, prompting emergent return to the operating room. Exploratory laparotomy revealed extensive uterine and cervical injury with retroperitoneal hematoma, requiring supracervical hysterectomy with bilateral salpingectomy. Total estimated blood loss was approximately 7 liters. She was successfully resuscitated, extubated on postoperative day one, and recovered without further complications.

Case Two:

Discussion: This case illustrates the essential role of obstetric anesthesiologists in managing catastrophic PPH across multiple care environments. Continuous anesthesiology involvement enabled early recognition of hemodynamic deterioration, real-time communication of evolving symptoms, and timely escalation of care. Preservation of patient responsiveness during IR allowed symptom reporting that directly contributed to identification of ongoing hemorrhage. The case underscores the limitations of hemoglobin as an isolated marker of blood loss and reinforces the importance of vigilant clinical assessment, early balanced resuscitation, and effective interdisciplinary communication in optimizing

maternal outcomes.

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SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 08

Management of a parturient with severe pre-eclampsia complicated by hypokalemic periodic paralysis

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Introduction: Hypokalemic Periodic Paralysis (HPP) is a disorder characterized by temporary severe muscle weakness due to a low serum potassium level often triggered by strenuous exercise or high-carbohydrate diet(1). We report on the obstetric and medical management of a patient diagnosed with HPP after presenting with life-threatening complications of the disease, and concomitant pre-eclampsia with severe features.

Case One: A 27-year-old female (G3P0020), at 34 weeks' gestation, was transferred to the intensive care unit (ICU) for severe hypokalemia (1.4 mmol/L) after presenting with fatigue, leg swelling, and leg weakness. Lower extremity exam revealed edema, hyporeflexia (1+), and trace muscle strength (1/5). She had no significant past medical history, and her pregnancy had been uneventful. Pertinent lab results include creatine kinase (9478 U/L), cardiac troponin (1278 ng/L), magnesium (1.6 mmol/L), and creatinine (1.7 mmol/L). She was hypertensive (164/90 mmHg) with proteinuria. Electrocardiogram and transesophageal echocardiography (TEE) showed sinus tachycardia and reduced ejection fraction (25%). Fetal heart rate monitoring was consistent with category-1 tracing. A diagnosis of rhabdomyolysis secondary to HPP was made. Treatment involved crystalloid resuscitation to maintain a urine output (> 1 ml/kg/hr) and intravenous (IV) electrolyte replacement. On day 4 of admission, kidney function and electrolytes had improved. However, she developed tachycardia, dyspnea, and hypoxia secondary to flash pulmonary edema. Despite aggressive treatment with diuretics, she required emergent intubation and ventilation. Concurrently, fetal heart rate demonstrated persistent bradycardia unresponsive to intrauterine resuscitation. The interdisciplinary team decided on emergent cesarean delivery for maternal and fetal benefit. Intraoperatively, the patient remained hypoxic and required continual suctioning of pink frothy bronchial secretions. A male infant was delivered (APGAR score of 3 at 5 minutes) and required a 1-day admission to the neonatal ICU. Maternal extubation and discharge from the hospital occurred on day 2 and 8, respectively. Ejection fraction was 55% on repeat TEE.

Case Two:

Discussion: This case highlights a new diagnosis of HPP that presented with rhabdomyolysis. Rhabdomyolysis may occur due to severe muscle breakdown secondary to critically low serum potassium levels(2). One of the treatment goals of rhabdomyolysis is to minimize acute kidney injury. Impaired ventricular function (associated with pre-eclampsia) led to acute pulmonary edema due to aggressive

intravenous fluid resuscitation. This report emphasizes the challenges involved in a patient with dual pathologies that requires opposing fluid management strategies.

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SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 09

A case of undifferentiated shock and hypoxemic respiratory failure in a pregnant patient with placenta previa and vasa previa

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Introduction: The management of shock in pregnancy requires obstetric and non-obstetric considerations to ensure maternal and fetal safety. A broad clinical work-up should be obtained concurrently with aggressive hemodynamic resuscitation to ensure maternal and uteroplacental perfusion [1].

Case One: A 33-year-old G9P2062 at 29w6d with two prior vaginal deliveries, one prior dilation and curettage, active stimulant use disorder, housing instability, and SVT was admitted to the intensive care unit (ICU) for management of undifferentiated shock. The patient was initially found by a community outreach program sleeping on a bench near an area of emesis. In the emergency room, she was alert and oriented, afebrile, tachycardic to 133 bpm, hypotensive to 75/38, and had a leukocytosis of 23.7 K/uL. Four liters of crystalloid, broad-spectrum antibiotics, and a norepinephrine infusion were initiated for presumed septic shock, and she was admitted to the ICU. Chest imagining showed possible multifocal pneumonia and/or pneumonitis. Abdominal imaging showed possible pyelonephritis, however, urine culture was unremarkable. Transthoracic echocardiogram showed no vegetations and CT pulmonary angiogram showed no pulmonary embolism. Stress-dose hydrocortisone, betamethasone, and left uterine displacement were initiated. Continuous fetal heart tracing (FHT) showed a category I tracing and the tocodynamometer showed asymptomatic irregular contractions without cervical changes. An obstetric ultrasound (OBUS) showed placenta previa. On hospital day (HD) 2, the patient was noted to have frequent coughing, increased work of breathing and oxygen desaturations to 60%. High flow nasal cannula was initiated, and she was ultimately intubated for persistent oxygen desaturations. She developed ARDS with P/F of 180 and bilateral opacities on CXR. Bronchoscopy showed no mucous burden and scant pink frothy secretions. Microbiology studies, including urine, respiratory, and blood cultures, and a respiratory viral panel remained negative. Diuresis was started and by HD 4, she was extubated without complication. She was weaned off vasopressors by HD 5, and empiric piperacillin-tazobactam was coursed out. Given the rapid onset and improvement, aspiration pneumonitis was the leading diagnosis. Non-stress tests were reactive throughout and FHT remained category I. The patient was transferred to the antepartum unit on HD 6 and deemed stable for discharge by HD 8. She remained inpatient while awaiting placement at a substance use recovery facility. On HD 29, OBUS revealed vasa previa and posterior placenta previa requiring ongoing inpatient monitoring. On HD 42, at 35w6d, she delivered via uncomplicated primary cesarean section.

Case Two:

Discussion: Shock in the pregnant patient requires early identification, careful work-up, and hemodynamic support, [1, 2]. Fetal monitoring and potential for delivery should be discussed [1].

References: 1. Obstet Gynecol. 2025;146(2):207-222. 2. West J Emerg Med. 2019;20(5):822-832.

SAT - CR - BS 3 - BR 2B - Tricky Cesareans – 10

Anesthetic challenges of a cesarean delivery for a parturient with neurofibromatosis type 1 and an ICD

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Co-Authors: Kelechi B. Anyaehie, MD, MPH - UT Southwestern Medical Center
Gabriella Garcia, MD - UT Southwestern Medical School

Introduction: Neurofibromatosis type 1 (NF1) is an autosomal dominant multiorgan neurocutaneous disease involving neurofibroma tumor formation throughout the body. Obstetric patients with NF1 present with unique anesthetic challenges, specifically regarding the safety of neuraxial anesthesia in the absence of spinal imaging. This case highlights the anesthetic management for cesarean delivery in a parturient with NF1 complicated by cardiac comorbidities.

Case One: A 31-year-old G2P1 at 31 weeks presented with elevated blood pressures concerning for severe preeclampsia superimposed on chronic hypertension and non-reassuring fetal heart tones. Past medical history was significant for NF1, long QT complicated by ventricular tachycardia/fibrillation arrest status post implantable cardioverter-defibrillator (ICD) placement, pancreatic cancer status post Whipple procedure and prior cesarean delivery. Physical examination revealed reassuring airway and numerous cutaneous neurofibromas and café au lait macules throughout her body. Due to hypertension resistant to antihypertensives, the decision for repeat cesarean delivery was made. Neuraxial anesthesia was deferred due to lack of spinal imaging and potential for unknown spinal or intracranial tumor involvement. Cardiology was consulted preoperatively and recommended placement of a magnet over the ICD to mitigate the risk of inappropriate shocks during electrocautery use. Patient underwent general anesthesia with rapid sequence induction and standard monitors. Video laryngoscopy was performed to secure and assess her airway for neurofibroma involvement. The cesarean delivery proceeded without complication and both maternal and neonatal outcomes were favorable.

Case Two:

Discussion: Possible tumor involvement of the spinal cord, nerves, and soft tissues increases risk for nerve damage and hematomas during neuraxial placement in patients with NF1. Although there are no formal guidelines for managing parturients with NF1, assessment of prior CT/MRI spine imaging should be made or acquired if time permits. Airway evaluation should assess for neurofibromas that may obstruct or alter the airway. Video laryngoscopy, fiberoptic scope, and emergency airway equipment should be accessible and prepared. For those with pacemakers and ICDs, a cardiac consult may be warranted, and care should be taken to interrogate the device and determine risk for electrocautery interference. Overall, this case highlights the importance of individualized anesthetic planning, risk–benefit assessment, and early multidisciplinary collaboration when standard obstetric anesthetic approaches may not be feasible.

References: 1. GeneReviews, 2025 2. Ochsner J. 2012, 111-21

Cesarean Delivery in a Patient with Severe Peripartum Cardiomyopathy

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Co-Authors: Braydon M. Bak, MB, BCh, BAO - Duke University Hospital

Introduction: Cardiovascular disease complicates 4% of pregnancies and 26.5% of U.S.pregnancy deaths.Peripartum cardiomyopathy (PPCM), characterized by left ventricular ejection fraction (LVEF) < 45% can be difficult to diagnosis as it shares many pregnancy symptoms like fatigue, dyspnea, edema, and tachycardia.Clinicians must maintain a high index of suspicion in high-risk patients.Patients at high risk for PPCM include Black race, advanced maternal age, multiparity, and maternal cocaine use.Patients with PPCM are at higher risk for major adverse cardiac events in the peripartum period.Remarkably, as many as 70% of women recover LVEF on guideline directed medical therapy in the U.S.

Case One: A 28-year-old G1P0 with severe PPCM (LVEF < 15%) underwent cesarean delivery at 35 weeks gestation following multidisciplinary pregnancy heart team planning.The patient was admitted at 34w4d for transthoracic echocardiogram (TTE) and PICC placement.Intraoperatively, a radial arterial line was placed, norepinephrine started, and baseline TTE obtained.After hemodynamic stabilization, a L3–L4 combined spinal epidural with 3mg hyperbaric 0.75% bupivacaine, 100mcg morphine, and 15mcg fentanyl was placed for titrated surgical anesthesia.The epidural was loaded over 20 minutes with 2% lidocaine with epinephrine 1:200k and sodium bicarbonate to achieve T6 sensory level.Intravenous fluids and norepinephrine were titrated to maintain hemodynamics.Cardiothoracic surgery placed bilateral femoral sheaths and remained on standby with perfusionist and primed ECMO circuit.TTE showed hyperdynamic RV.Low-dose epinephrine (0.04 mcg/kg/min) was started prophylactically during preparation for incision.After delivery of a healthy infant, oxytocin was initiated at 18 units/hour, and vasoactive infusions were up-titrated to maintain MAP 75 with reassuring TTE.The patient tolerated the procedure without advanced cardiovascular support; estimated blood loss was 500cc.She remained hemodynamically stable in the ICU on norepinephrine and epinephrine, underwent inotrope wean, and had stable TTE at 1-week postpartum.She is now undergoing transplant evaluation at 6+ months postpartum.

Case Two:

Discussion: In patients with severe PPCM, individualized management emphasizing preload optimization, real-time echocardiographic assessment, and multidisciplinary preparedness, including immediate access to mechanical circulatory support, may allow safe use of neuraxial anesthesia for cesarean delivery.

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SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 01

Labor Epidural in a Patient with Amyotrophic Lateral Sclerosis

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Co-Authors: Anna Gitterman, MD - Johns Hopkins School of Medicine
Jamie Murphy, MD - John Hopkins School of Medicine

Introduction: Amyotrophic lateral sclerosis (ALS) is a neurodegenerative disease that affects upper and lower motor neurons, leading to muscle weakness, atrophy, and paralysis (1). There are case reports of ALS in pregnant patients (2) but the majority of the literature focuses on obstetric outcomes and does not consider anesthetic management. In this case report, we present a case of a 37-year-old female with ALS with successful labor analgesia to facilitate a vaginal delivery.

Case One: A 37-year-old G6P2042 with a history of ALS, ADHD, Hashimoto's thyroiditis, and Factor V Leiden presented to labor and delivery at 37 weeks and 4 days with contractions after spontaneous rupture of membranes. The patient's ALS course was complicated by dysarthria, spastic gait, and weakness of her upper and lower extremities. She was asymptomatic from a respiratory standpoint with normal pulmonary function testing. On admission, the patient had a labor epidural placed in the seated position at L4/5. An epidural infusion with 2mcg/mL of fentanyl and 0.125% bupivacaine was initiated at 6cc per hour with bolus doses of 3cc every 20 mins as needed. The patient developed a T11 level bilaterally. After epidural placement, the patient delivered a 3000g infant without complications. Postpartum, the patient remained on continuous pulse ox monitoring for 24 hours with no complications. She had evidence of return of motor strength in the bilateral lower extremities within 2 hours. She met all milestones as expected. By postpartum day 3, the patient's neurologic deficits and mobility were at baseline, and the patient was discharged home.

Case Two:

Discussion: Anesthetic management of pregnant patients with ALS is challenging due to the physiologic changes in pregnancy and the progressive symptoms of the disease. These patients are at high risk for aspiration, respiratory depression, unpredictable response to muscle relaxants, and hyperkalemia after succinylcholine use (3,4). There have also been some concerns about the safety of neuraxial anesthesia and analgesia in these patients (3). In this report, we describe a safe and successful epidural anesthetic utilized in a patient with ALS to facilitate an uncomplicated vaginal delivery with full return to neurologic baseline postpartum.

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SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 02

Peripartum Management of a Parturient with Bilateral Renal Angiomyolipomas and Lymphangioleiomyomatosis Complicated by Pulmonary Gel-Foam Embolization and Recurrent Pneumothorax

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Presenting Author's Institution: Department of Anesthesiology, Emory University - Atlanta, Georgia

Introduction: Lymphangioleiomyomatosis (LAM) is a rare multisystem disorder characterized by abnormal smooth muscle proliferation leading to progressive cystic lung disease and extrapulmonary manifestations, including renal angiomyolipomas (AML). Pregnancy presents unique challenges in patients with LAM, as estrogen-mediated disease progression and pregnancy-related physiologic changes increase the risk of pulmonary complications such as pneumothorax (PTX). Renal AMLs may enlarge or rupture during pregnancy, often requiring interventional management. The anesthetic care of such patients is complex, particularly when complicated by prior pulmonary embolization and recurrent PTX. This case describes the peripartum anesthetic management of a parturient with LAM and bilateral renal AMLs following pulmonary gel foam embolization and recurrent PTX.

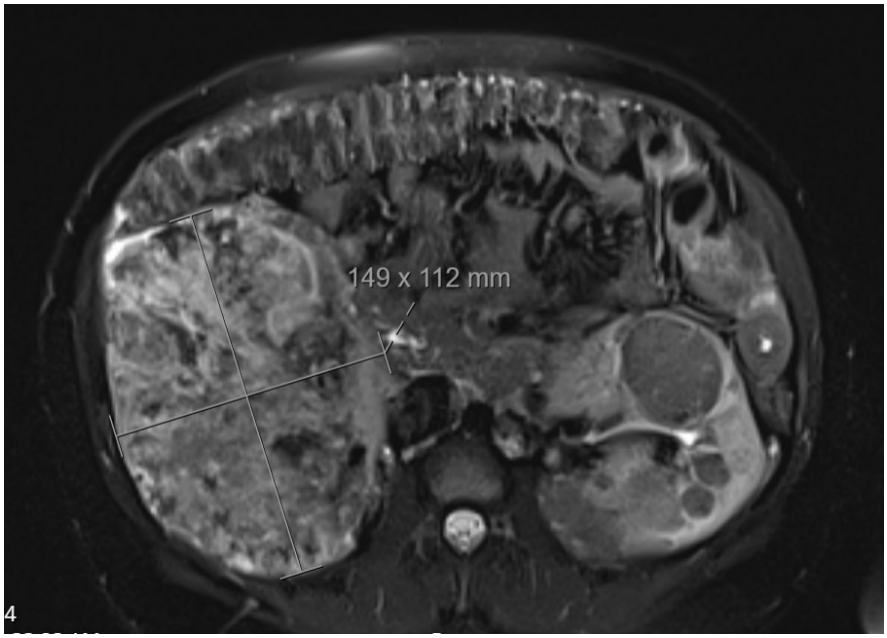
Case One: A 32-year-old gravida 2, para 1 woman at 32 weeks' gestation was admitted for planned bilateral renal artery embolization of large AMLs (right 14.9 cm, left 8.8 cm). Her pregnancy had been uncomplicated, with no prior pulmonary disease. Pre-procedural imaging demonstrated intralesional hemorrhage within both renal masses and a small right PTX, managed with pigtail catheter placement. Given the high risk of angiomyolipoma rupture, embolization was pursued following multidisciplinary discussion. An epidural catheter was placed pre-procedure, and embolization was performed under monitored anesthesia care to avoid positive-pressure ventilation. During right renal artery gel-foam embolization, the patient developed acute hypoxemia and tachycardia. Imaging revealed pulmonary gel-foam embolization, and she was admitted to the SICU for hypoxic respiratory failure managed with high-flow nasal oxygen. She subsequently delivered vaginally without anesthesia. Her course was complicated by recurrent pneumothoraces requiring surgical wedge resection and pleurodesis. Clinical findings were consistent with sporadic LAM.

Case Two:

Discussion: LAM is a rare estrogen-sensitive disease affecting women of reproductive age and is commonly associated with renal AML and recurrent PTX. Pregnancy increases disease activity and the risk of pulmonary and hemorrhagic complications. Gel-foam embolization is an effective temporizing strategy for AML hemorrhage; however, embolic migration to the pulmonary circulation may occur in patients with unrecognized vascular shunts, resulting in hypoxic respiratory failure. Recognition of this rare complication is critical. Anesthetic management should prioritize neuraxial techniques, avoidance of nitrous oxide and positive-pressure ventilation, and lung-protective strategies when general anesthesia is

unavoidable. Recurrent pneumothoraces warrant early thoracic surgical consultation and consideration of pleurodesis. This case underscores the importance of multidisciplinary planning to optimize peripartum outcomes.

References: 1. Am J Respir Crit Care Med 2016;194:748 2. Respir Med 2009;103:766 3. J Vasc Interv Radiol 2010;21:67



SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 03

Severe Hemoperitoneum After Transvaginal Oocyte Retrieval in a Patient With Advanced Rheumatoid Arthritis: An Anesthetic Challenge

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Co-Authors: Slavica Krusic, Anesthesiologist - GAK Narodni Front

Introduction: Severe hemoperitoneum following transvaginal oocyte retrieval is an extremely rare but potentially life-threatening complication of in vitro fertilization (IVF). We report the case of a 33-year-old woman with long-standing, advanced rheumatoid arthritis (RA), treated with biologic agents and chronic corticosteroids, who presented with an acute abdomen 24 hours after IVF egg retrieval.

Case One: Case report: On admission, the patient was pale and symptomatic, reporting abdominal pain, dizziness, and lightheadedness, with signs of hemodynamic compromise. Her medical history was notable for multiple major orthopedic surgeries, cervical spine involvement with severely restricted neck mobility, prior pulmonary embolism, and ischemic stroke. Additionally, she had consumed solid food two hours prior to presentation. Collectively, these factors represented significant predictors of difficult airway management and substantially increased the risk associated with general anesthesia. Given the need for urgent surgical intervention and the high risk of airway manipulation, emergency laparotomy was performed under combined spinal–epidural anesthesia with light sedation. Intraoperatively, approximately 1000 mL of blood and clots were evacuated from the peritoneal cavity. The patient received tranexamic acid and transfusion of blood products. Bilateral quadratus lumborum blocks were performed to optimize postoperative analgesia. The intraoperative and postoperative courses were uneventful, and the patient was discharged home on postoperative day five.

Case Two:

Discussion: Conclusion: This case underscores the importance of individualized anesthetic decision-making and demonstrates that regional anesthesia may represent a safe and effective alternative to general anesthesia in selected high-risk gynecologic emergencies, particularly in patients with advanced systemic disease and an anticipated difficult airway.

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SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 04

Anesthetic considerations for a patient presenting at term with newly diagnosed lymphoma complicated by large pelvic mass and neurologic deficits

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Co-Authors: Jessica Learned, MD - Dartmouth Hitchcock Medical Center
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Introduction: Case reports of anesthetic care for parturients with aggressive lymphoma are sparse, with an example of a pregnant lymphoma patient with a mediastinal mass who successfully had combined spinal epidural anesthesia for cesarean section(1). Obstetric anesthesiologists can be confronted with complex presentations and uncommon diseases in patients who require urgent delivery. Here we describe a patient with a multitude of alarming symptoms who safely received neuraxial technique for cesarean delivery.

Case One: A 33 year old G4P2 at 37w5d gestation with history of newly diagnosed Burkitt lymphoma presented with severe left subscapular pain that radiated to the chest. She also endorsed difficulty ambulating, urinating and passing stool, along with bilateral lower extremity swelling, pain and numbness. Neurologic exam demonstrated right pronator drift, distal lower extremity weakness, diminished anterior thigh sensation, and hyperreflexia. Pelvic exam revealed a fixed mass obstructing the pelvic outlet. CT PE was negative; however duplex revealed bilateral non-occlusive DVTs. A multidisciplinary team recommended urgent cesarean delivery to allow prompt initiation of lymphoma therapies. Vaginal delivery was not pursued due to the mass obstructing the pelvic outlet. MRI lumbar spine and pelvis were obtained pre-operatively to further characterize the patient's pelvic mass and rule out any spine abnormality that would preclude neuraxial anesthesia. These studies revealed a 9.7cm pelvic lymph node displacing the cervix but no lumbar spine mass. Completion spine imaging and MRI brain were deferred until postpartum as the patient could not tolerate lying flat for extended periods. On hospital day 1, the patient underwent cesarean delivery under uncomplicated combined spinal epidural anesthesia with successful delivery of a viable female infant. Completion spine imaging on hospital day 2 did reveal a T3-T4 extradural mass with resultant spinal cord compression. The patient's lower extremity sensation and motor function gradually improved with initiation of intravenous steroid therapy and thoracic spine radiation therapy.

Case Two:

Discussion: This is a notable case due to the combination of an aggressive lymphoma with pelvic lymphadenopathy necessitating urgent cesarean delivery, and neurologic symptoms concerning for CNS involvement that required further diagnostics prior to any attempt at neuraxial anesthesia. In the absence of examples in the literature, the obstetric anesthesiologists worked with a multidisciplinary team to

engage in an individualized risk-benefit analysis, complete a prompt work-up, and ultimately provide a successful cesarean delivery under neuraxial anesthesia without complication to a complex patient.

References: 1. Mahmood A, Mushambi M, Porter R, Khare M. Regional anaesthesia with extracorporeal membrane oxygenation backup for caesarean section in a parturient with neck and mediastinal masses. Int J Obstet Anesth. 2018;35:99-103. doi:10.1016/j.ijoa.2018.02.009

SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 05

ANESTHESIA IN PARTURIENTS WITH DISPROPORTIONATE SKELETAL DYSPLASIA COMPLICATED BY LUMBAR DISC HERNIATION AND SPINAL STENOSIS

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Introduction: Disproportionate skeletal dysplasias, including achondroplasia and metaphyseal chondroplasia, pose significant anesthetic challenges in pregnancy1,2. Abnormal vertebral anatomy, shortened spinal canals, and reduced intrathecal volume increase the risk of failed or high neuraxial block and neurologic injury3. Coexisting lumbar disc herniation, spinal stenosis, and difficult airway with potential for respiratory depression further complicate anesthetic decision-making at delivery4.

Case One: We report two parturients with disproportionate skeletal dysplasia and spinal pathology requiring cesarean delivery. 21-year-old G1P0 BMI 66 with skeletal dysplasia consistent with achondroplasia at 33 5/7 weeks gestation, required urgent cesarean delivery for severe pre-eclampsia. Spinal imaging revealed lumbar stenosis, a low-lying conus, and minimal cerebrospinal fluid at L2–3, making neuraxial anesthesia high risk. General anesthesia was therefore performed. Induction was complicated by rapid desaturation requiring bougie guided intubation, and extubation was notable for severe bronchospasm and hypoxemia. She now presents for a subsequent delivery with a planned neuraxial technique, with awake fiberoptic intubation if neuraxial is deemed unsafe.

Case Two: The second case was a 42-year-old P0030 with metaphyseal chondroplasia at 39 weeks gestation complicated by lumbar disc herniation and severe spinal canal stenosis. After multidisciplinary evaluation and resolution of neurologic symptoms, an ultrasound guided combined spinal epidural using 1 mL of 0.75% bupivacaine was successfully performed, allowing careful titration while minimizing the risk of high spinal block.

Discussion: Parturients with disproportionate skeletal dysplasia and spinal pathology represent a uniquely high-risk obstetric population1. Altered spinal anatomy leads to unpredictable neuraxial spread, while general anesthesia carries increased airway and respiratory risk4. Multidisciplinary planning, preoperative imaging review, and individualized anesthetic strategies are essential. Similar anesthetic considerations apply not only to achondroplasia but also to rarer skeletal dysplasias such as metaphyseal chondroplasia.

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SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 06

Neuraxial Anesthesia for a Parturient with a Spinal Cord Tumor

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Presenting Author's Institution: Resident Physician - Baltimore, Maryland

Co-Authors: Riley Hales - Fellow

Introduction: Coordination of care for neuraxial anesthesia for labor and delivery management in the setting of patients who have neurological tumors is an important topic in Obstetric Anesthesia. Each parturient must be carefully evaluated and be well informed of the risks and benefits of all their anesthesia options. We present the evaluation and management of a patient with an intramedullary spinal tumor whose infant was delivered via cesarean section (CS) under neuraxial anesthesia.

Case One: Our patient was a G2P0010 at 39w0d who was initially referred to our OB anesthesia preoperative clinic by Obstetrics. The parturient had T4-T8 pilocytic spinal astrocytoma s/p partial intradural tumor resection and laminectomy at T4-T8 in 2014. Parturient still had residual tumor at T4/T5 but improved neurological, GI, and urological symptoms. Before the visit, the patient had not seen Neurosurgery in years and had no recent imaging. After the clinic visit, she had a MRI total spine w/wo contrast that showed expected post-operative changes, no acute pathology, and no evidence of Chiari malformation. Neurosurgery was consulted for the safety of neuraxial anesthesia and stated no contraindication for spinal anesthesia since MRI spine was reassuring and showed expected post-operative changes. The obstetric team favored a scheduled CS for delivery to better control clinical variables. We discussed with the patient that when considering epidural analgesia, there may be scarring and disrupted epidural space given the laminectomy and therefore have compromised spread of local anesthetic. With spinals, there is still a risk of incomplete block due to the residual tumor at T4/T5. Although we discussed that spinal anesthesia is the most reliable, she may still require GETA. We did an extensive pre- and post-operative neurological exam, neuraxial in the form of spinal anesthesia, and Morphine for post-operative pain. The spinal block placement was uneventful, and the patient had a adequate T5 dermatomal level bilaterally. Due to stable cardiovascular history and minimal risk factors for blood loss, she only required 1 peripheral IV. Postoperatively, the parturient reported no new neurologic symptoms, and her motor and sensory exams were unchanged.

Case Two:

Discussion: This case highlights several important considerations for parturient with spinal cord tumors including identifying the best mode of delivery, the safety of neuraxial anesthesia, and understanding the appropriate workup prior to anesthesia and delivery. Although inadequate local anesthetic spread can be a limitation to neuraxial for these patients, coordination, workup, and counseling on options can often lead to safe delivery with neuraxial anesthesia. Overall, discussing cases like this may encourage providers to offer neuraxial analgesia to similar patients instead of defaulting to GETA and makes this an interesting

discussion in the obstetric anesthesia community.

References: Anesth Analg. 2006 Jul;103(1):223-8 Acta Anaesthesiol Scand. 2011 Sep;55(8):910-7

SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 07

Impact and Anesthetic Considerations of Breast Cancer in the Pregnant Patient

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Introduction: Breast cancer is the most common malignancy diagnosed during pregnancy worldwide (1,2). While many cases are detected at an early stage, some patients present or progress to stage IV disease. Metastatic breast cancer during pregnancy presents unique challenges for obstetric anesthesia mainly due to overlapping pregnancy-related physiologic changes and cancer-associated organ dysfunction. Bone and spinal metastases are particularly relevant to anesthetic planning because of their implications for the safety and feasibility of neuraxial anesthesia.

Case One: A 33-year-old G3P2 woman at 27 weeks gestation was admitted for pain management. Her history was significant for stage IV metastatic breast cancer and metastases to the liver, spine, and bilateral clavicles. After multidisciplinary discussion, delivery was planned for 28 weeks via cesarean delivery and concurrent bilateral oophorectomy in order to facilitate maternal oncologic treatment and hormone suppression. She remained inpatient until delivery. The risks and benefits of both neuraxial and general anesthesia were discussed in detail, and the patient elected to proceed with general anesthesia due to spinal metastasis and extreme discomfort with lying flat for extended periods of time. General anesthesia (GA) was induced, and video laryngoscopy was utilized for airway management. Due to patient discomfort, induction was performed with patient in reverse Trendelenburg position, and the bed lowered for airway management. The delivery proceeded uneventfully, and initiation of radiation and chemotherapy occurred prior to discharge.

Case Two:

Discussion: Discussion: Stage IV breast cancer during pregnancy presents significant anesthetic challenges due to the combined effects of metastatic disease and pregnancy-related physiological changes (3). Superimposed malignancy exacerbates risks through additional reductions in respiratory reserve, increases in metabolic deconditioning, anemia, nutritional derangements, and an increased risk of thromboembolism. GA requires meticulous airway planning to minimize the risk of hypoxemia and aspiration. Careful risk assessment is necessary for initiation of neuraxial anesthesia in a patient with superimposed malignancy. Chemotherapy-induced immunosuppression increases the risk of epidural or spinal abscess. Patient comfort is also a concern as spinal metastases may cause significant pain when lying supine, even after neuraxial block. Metastatic disease can sometimes be associated with thrombocytopenia, further complicating the decision to use neuraxial anesthesia. Furthermore, metastatic

spinal involvement increases the risk of anatomic disruption and injury from the epidural needle, potentially making general anesthesia a safer and more comfortable option (3,4).

References: 1. PMID: 20005175 2. PMID: 23813932 3. PMID: 39775436 4. PMID: 1706270

SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 08

From needle phobia to neuraxial success: a multi-disciplinary, patient-centered approach for cesarean delivery complicated by spinal muscular atrophy

Presenting Author: Autumn Lupotsky, MD

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Co-Authors: Justin Fleischer, DO - Dartmouth-Hitchcock Medical Center
Benjamin Schenkel, MD - Dartmouth-Hitchcock Medical Center

Introduction: Spinal Muscular Atrophy (SMA) is a genetic abnormality of the survival motor neuron-1 gene that causes progressive muscle atrophy and weakness due to degeneration of the spinal cord's anterior horn neurons.[1] There is currently limited data about the pregnancy course and outcome of pregnant patients with SMA.

Case One: A 27 year old G1P0 with type 2 spinal muscular atrophy (SMA) presents for pre-delivery counseling at 28 weeks gestation. Her SMA is complicated by wheelchair-dependent functional status, severe mixed obstructive and restrictive lung disease, and severe scoliosis status post thoracolumbar spinal fusion to L5. She further describes a history of significant traumatic stress associated with lifelong medical interventions, including a needle phobia requiring inhalational induction of general anesthesia in the past.

Case Two:

Discussion: Here we will describe the extensive multidisciplinary efforts, patient-centered shared decision making, and trauma informed care that ultimately led to a successful cesarean delivery under spinal anesthesia. We will highlight several tools essential to this process, including pre-delivery exposure therapy for needle phobia, procedural sedation for a term pregnant person, and neuraxial ultrasound. A retrospective study of pregnant patients with either SMA type 2 or 3 who had successful deliveries utilizing neuraxial anesthesia supports our efforts of thoughtfully balancing maternal and fetal needs with risk assessment and management of associated respiratory and spinal abnormalities.[1] Patient-centered shared decision making (SDM) was a key factor to success and patient satisfaction in this case, and there is high-quality evidence to support this practice. A randomized control trial demonstrated that SDM in choosing labor analgesia methods significantly improves childbirth outcomes. Patients who participated in SDM in this trial reported significantly higher childbirth experience scores, satisfaction scores, and perceived control and support compared to those who received routine care.[2] In reflecting on our experience, we emphasize the importance of patient-physician rapport and interdisciplinary collaboration in our modern health care settings.

References: 1. Bencivenga RP, Zoppi D, Russo A, Cassano E, Tozza S, Iodice R, Dubbioso R, Manganelli F, Ruggiero L. Pregnancy experience in women with spinal muscular atrophy: a case series.

Acta Myol. 2023 Sep 30;42(2-3):60-64. doi: 10.36185/2532-1900-316. PMID: 38090543; PMCID: PMC10712658. 2. Shahveisi M, Nourizadeh R, Mehrabi E. The effect of shared decision-making in choosing the method of labor analgesia on childbirth experience among primiparous women. PLoS One. 2023 Feb 15;18(2):e0274559. doi: 10.1371/journal.pone.0274559. PMID: 36791114; PMCID: PMC9931133.

SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 09

Management of a Parturient with a Full-Term Extrauterine Abdominal Pregnancy and Large Overlying Ovarian Cyst

Presenting Author: Lucy Xu, MD

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Alec E. Mansour, MD - Cedars Sinai Department of Anesthesiology

Introduction: An extrauterine abdominal pregnancy, in which embryo implantation occurs within the peritoneal cavity, is very uncommon (0.01% of all pregnancies) and it is exceptionally rare for these pregnancies to progress to term. Clinical diagnosis is difficult, presenting as non-specific abdominal pain, painful fetal movements, nausea, and general malaise. These cases pose significant maternal and fetal risk due to abnormal placental implantation and resultant hemorrhage. Here, we present a case of a patient with a near-term abdominal pregnancy concealed by a large overlying ovarian cyst.

Case One: The patient is a 41-year-old G2P1001 with irregular menses and a known ovarian cyst. A CT scan was ordered to evaluate the cyst after she noted increased abdominal distension and fatigue, however, a pre-imaging pregnancy test was positive. Upon presenting to L&D triage, ultrasound was notable for a 30 cm fluid-filled adnexal mass as well as an estimated 36-37 week fetus lying posteriorly. Fetal heart tones were difficult to consistently monitor however were reassuring when obtained. An MRI was obtained demonstrating an extrauterine pregnancy with subsequent CT angiogram demonstrating a placenta adherent to the external wall of the uterus without invasion of surrounding structures. After a multidisciplinary discussion, the decision was made to proceed with an exploratory laparotomy under general anesthesia for delivery of the fetus and removal of the cyst. Pre-induction epidural and arterial line were placed for postoperative pain management and hemodynamic monitoring, respectively. Rapid-sequence induction was performed and after intubation a Cordis catheter was placed and connected to a Belmont rapid infuser. The 3.6 kg baby was delivered from an extrauterine amniotic sac after displacement of the 10 kg cyst. Following delivery there was significant hemorrhage and massive transfusion was initiated. The patient was transfused a total of 13 units of PRBCs, 13 of FFP, 3 of platelets and 2 of cryoprecipitate. She was transferred to the SICU intubated postoperatively and extubated on POD1. Both the patient and baby ultimately did well and were discharged within 2 weeks following delivery.

Case Two:

Discussion: A full-term, extrauterine abdominal pregnancy is an extremely rare and dangerous obstetric condition with high potential for maternal and fetal morbidity. Meticulous multidisciplinary planning is required. Placental blood supply from nonuterine sources greatly increases the risk of catastrophic

hemorrhage with removal of the placenta. Arterial and central access should be obtained with a rapid infuser and blood products available for massive transfusion. General anesthesia is preferred, however, neuraxial analgesia for post-operative pain may be considered.

References: 1. Baffoe P. Ghana Med J 2011. PMID: 21857726 2. George R. Proc (Bayl Univ Med Cent) 2021. PMID: 34219949 3. Abdelrahman S. J Surg Case Rep 2017. PMID: 28458866 4. Dabiri T. Biomed Res Int 2014. PMID: 25544940

SOAP 2026 Abstract Figure.pdf

SAT - CR - BS 3 - BR 2B - Oncology and Neuromuscular – 10

Peripartum Considerations in a Patient with New Diagnosis of Acute Lymphoblastic Leukemia (ALL)

Presenting Author: Rex W. Michitsch, DO

Presenting Author's Institution: Walter Reed National Military Medical Center - Bethesda, Maryland

Co-Authors: John Gibbons, DO - Walter Reed National Military Medical Center

Introduction: The incidence of ALL during pregnancy is 1 in 75,000 pregnancies1, accounting for about 15% of pregnancy-associated leukemias2. The treatment of ALL in pregnancy requires a multidisciplinary approach to fully consider the spectrum of maternal-fetal risk. Anesthesiologists need to consider the implications of ALL treatment when developing their plan for peripartum anesthesia, including the use of intrathecal (IT) chemotherapy.

Case One: A 24-year-old female at 29 weeks gestation presented after diagnosis of pre-B cell ALL. Systemic chemotherapy was initiated, and a lumbar puncture was performed to investigate for central nervous system (CNS) disease and administration of IT cytarabine and hydrocortisone. She developed a post-dural puncture headache, which was ultimately treated conservatively given her mild symptoms. At 34 weeks, the patient was induced and underwent successful lumbar epidural catheter placement and vaginal delivery. She transferred on post-partum day 2 to the oncology service and continued chemotherapy.

Case Two:

Discussion: This case highlights three challenges for a patient undergoing intrathecal chemotherapy in the peripartum period: safety of epidural blood patch (EBP) with hematologic malignancy, efficacy of neuraxial anesthesia after EBP, and safe interval between IT chemotherapy and neuraxial anesthesia. There is theoretical concern for seeding of the CNS with an EBP; however, there is no evidence that this occurs. We also considered whether EBP would interfere with the placement and efficacy of labor analgesia in such short interval to planned induction of labor. Lastly, we considered the timing of labor induction after an IT dose of cytarabine. There is no available evidence on potential interactions between IT anesthetics and IT chemotherapeutic agents. After a multidisciplinary discussion, we waited five half-lives to ensure elimination prior to induction of labor. The management of this case demonstrates strategies to safely and effectively deliver labor analgesia in a parturient receiving IT chemotherapy.

References: 1. Bottsford-Miller J, Haeri S, Baker AM, Boles J, Brown M. B cell acute lymphocytic leukemia in pregnancy. Arch Gynecol Obstet. 2011 Aug;284(2):303-6. 2. Ali, R., et al. (2003). "Maternal and fetal outcomes in pregnancy complicated with acute leukemia: a single institutional experience with 10 pregnancies at 16 years." Leuk Res 27(5): 381-385. 3. Beauchesne P. Intrathecal chemotherapy for treatment of leptomeningeal dissemination of metastatic tumours. Lancet Oncol. 2010 Sep;11(9):871-9.

doi: 10.1016/S1470-2045(10)70034-6. Epub 2010 Jul 2. PMID: 20598636. 4. Gleissner B, Chamberlain MC. Neoplastic meningitis. Lancet Neurol. 2006 May;5(5):443-52. PMID: 16632315.

Common Intrathecal Chemotherapeutic Agents SOAP.pdf

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 01

Anesthetic Management of Spontaneous Hepatic Rupture in HELLP Syndrome

Presenting Author: Fatemeh Ashtari, MD

Presenting Author's Institution: Cleveland Clinic - Beachwood, Ohio

Introduction: Spontaneous hepatic rupture is a rare but life-threatening complication, occurring in 0.5–2% of preeclampsia cases and in approximately 1 in 2,000 cases of HELLP syndrome.[1] It is characterized by hepatic hemorrhage and capsular disruption and may present with epigastric or right upper quadrant pain, anemia, and hemodynamic instability. We report a case of acute liver rupture in the setting of severe preeclampsia.

Case One: A 30-year-old G4P0A2L1 woman at 25w4d gestation with a history of preeclampsia presented to an outside hospital with five days of progressive epigastric and chest pain, dyspnea, and decreased fetal movement. On arrival, blood pressure was 198/81 mmHg and fetal heart rate was 160 bpm. She was treated with IV hydralazine and magnesium sulfate. Laboratory evaluation revealed severe thrombocytopenia (55,000/μL) and elevated liver enzymes (AST 368 U/L, ALT 171 U/L) with preserved hemoglobin and coagulation parameters, consistent with HELLP syndrome. While awaiting transfer, the patient developed sudden hypotension (74/38 mmHg) with fetal bradycardia. She required epinephrine boluses and norepinephrine infusion, and magnesium sulfate was discontinued. Bedside ultrasound showed normal cardiac function without intra-abdominal abnormalities; however, fetal cardiac activity was absent. She subsequently experienced a brief tonic seizure concerning for eclampsia. The patient was emergently air-transported to a tertiary obstetric center in hemorrhagic shock and taken directly to the operating room with presumed concealed placental abruption. After induction and intubation, arterial and central venous access were obtained. On arrival, hemoglobin had decreased to 6.9 g/dL and platelet count to 67,000/μL, with worsening metabolic derangements. Massive transfusion protocol was initiated, and vasopressor support continued (norepinephrine up to 50 μg/min with vasopressin boluses). Following delivery, unexpected massive intra-abdominal hemorrhage prompted exploratory laparotomy, which revealed an 8 × 12 cm hepatic rupture involving segments V and VI with extensive hemoperitoneum. Hemostasis was achieved with topical agents and packing, and the abdomen was left open with ABTHERA. Estimated blood loss was approximately 7 liters. Intra and postoperatively the patient received 15 units PRBCs, 6 units platelets, 12 units FFP, and 5 units cryoprecipitate. Postoperatively, the patient was stabilized in the ICU before returning to OR for definitive closure and ultimately discharged on 9th day.

Case Two:

Discussion: This case emphasizes that epigastric or right upper quadrant pain in patients with preeclampsia requires urgent evaluation. Given the limited sensitivity of ultrasound for hepatic complications, CT or MRI is essential.[2] Early hemodynamic stabilization, prompt imaging, and

multidisciplinary management are critical for survival.

References: 1. Rahim MN et al. Pregnancy and the Liver. Lancet. 2025. 2. Joshi D et al. Liver disease in pregnancy. Lancet. 2010.

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 02

Refractory Postpartum Hypertension and Status Epilepticus Secondary to Eclampsia With PRES: An Anesthetic and Critical Care Challenge

Presenting Author: Hanna Campbell

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Co-Authors: Katherine Hatter, MD - Medical University of South Carolina
Eliza McElwee, MD - Medical University of South Carolina

Introduction: Eclampsia is a life-threatening obstetric emergency that may be complicated by posterior reversible encephalopathy syndrome (PRES), status epilepticus, and severe hypertension. Management often requires emergency delivery, advanced airway control, continuous EEG monitoring, and ICU level care. Anesthetic agents such as propofol play a critical role in seizure suppression and hemodynamic modulation; however, they may obscure severe postpartum hypertension. We describe the obstetric and anesthetic management of a unique case of eclampsia complicated by PRES, status epilepticus and rebound hypertension.

Case One: 25-year-old G1P1 at 29w2d presented to an outside Emergency Department after a generalized tonic-clonic seizure. On arrival, she required intravenous (IV) labetalol, initially 20mg with insufficient stabilization, followed by 40mg for sustained severe-range blood pressures. Head CT demonstrated bilateral occipital edema consistent with PRES. Given concern for eclampsia, she underwent emergent cesarean delivery under general anesthesia and required postoperative ventilation due to seizure activity consistent with status epilepticus. A loading dose of levetiracetam was administered for seizure management, and outside hospital documentation is unclear if benzodiazepines were administered as well. She was then transferred to a tertiary care intensive care unit. Upon arrival, the patient remained mechanically ventilated and sedated on propofol (5-100 mcg/kg/min), magnesium (2 g/hr), and nicardipine (5-15 mg/hr) infusions. Neurology and obstetrics were consulted and recommended continuation of levetiracetam and continuous EEG, which demonstrated no seizure activity, allowing for successful weaning of propofol. Given her blood pressure stability and lack of seizure activity, she was extubated on postoperative day (POD) 2. The patient then had recurrence of sustained severe-range blood pressures requiring additional doses of IV hydralazine and labetalol. Oral labetalol was initiated and ultimately up-titrated to 2400mg before sustained normotension was achieved. Her post-op course was further complicated by pulmonary edema requiring a five-day course of furosemide. The patient was transferred out of the ICU on POD 3 and was ultimately deemed stable for discharge on POD 7.

Case Two:

Discussion: This case underscores the complexity of anesthetic and critical care management in eclampsia complicated by PRES and status epilepticus. Propofol serves as an effective agent for seizure suppression and sedation during ventilation. However, propofol infusions may mask severe hypertension

by enhancing inhibitory GABA neurotransmission, leading to reduced sympathetic tone, resulting in reduced preload and cardiac output. Anticipation of rebound hypertension following sedation wean is critical to prevent secondary neurologic and cardiopulmonary complications.

References: Obstet Gynecol 2020;135:E237–E260 Intensive Care Med 2006;32:1075–1079 Anesthesiology 1992;76:725–733

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 03

Social Barriers and Postpartum Safety: Managing Preeclampsia with Severe Features Amid Real-World Constraints

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Co-Authors: Kait Brennan, DO, MPH - Vanderbilt University Medical Center
Patrick Hesketh, MD - Vanderbilt University Medical Center
Laura L. Sorabella, MD - Vanderbilt University Department of Anesthesiology

Introduction: Preeclampsia (PreE), an adverse pregnancy outcome (APO), confers increased risk of short- and long-term cardiovascular disease (CVD). Specifically, PreE with severe range blood pressure carries a 33 in 10,000 risk of stroke during delivery hospitalization and 7 per 10,000 risk within 90 days postpartum. Thus, vigilant antihypertensive management in the postpartum period is essential, yet women with CVD risk factors often have life stressors and impaired social drivers of health that prevent optimal disease and risk management. Novel strategies including telehealth are essential to meet our patients and our shared goals for their health.

Case One: A 29-year-old (G5P1122) with multiple CVD risk factors (chronic hypertension, uncontrolled type 2 diabetes mellitus, prior PreE, anemia, and unstable housing presented at 28 weeks of gestation with PreE with severe features (by blood pressure: 200s/100s). Labetalol was increased, nifedipine was initiated, and appropriate magnesium (fetal and maternal neuroprotection), anticoagulation, steroids, and insulin were given. Blood pressure improved until admission day 3 when refractory severe range blood pressure necessitated a classical cesarean. Blood loss was 800 mL, and 2 units of red blood cells were given due to baseline anemia. Throughout her care, the patient constantly asked to return home to care for children. Specifically, on post-operative day 1, when it was essential to continue magnesium and antihypertensive, extensive conversations were required to convince the patient of the need to not leave against medical advice (AMA) due to inability to coordinate childcare. Eventually, on post-operative day 4 despite inadequate hypertension control, the patient left the hospital due to childcare concerns.

Case Two:

Discussion: Initially, the concern centered around our patient's decision-making capacity. She expressed a desire to leave despite the need for magnesium therapy, and again later despite persistently uncontrolled hypertension. After evaluation, it was clear that she did have capacity—what she lacked was suitable childcare. Our team made every effort to support her, including involving social work, but ultimately her hypertension needed to be managed in the outpatient setting. Following guidance from obstetric and cardiology societies,2 the VUMC Women's Heart Center is actively working to improve access to telehealth and other innovative care options to help our patients achieve their health goals while accounting for the real-world challenges that can limit access to traditional medical care.

References: 1. Meng et al, Anesth analg, 2022. 2. Countouris et al, Circulation, 2025.

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 04

Catastrophic postpartum sequelae of severe preeclampsia with HELLP syndrome following cesarean delivery

Presenting Author: Paul A. Francois, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Introduction: Severe preeclampsia is a hypertensive disorder of pregnancy associated with significant maternal morbidity (1). HELLP syndrome represents a severe manifestation characterized by hemolysis, elevated liver enzymes, and thrombocytopenia (1). One important sequalae with significant morbidity and mortality is a stroke. Intracerebral hemorrhage (ICH) has been noted to be associated with higher mortality rate than other forms of stroke (2,3). Although delivery is definitive management, disease progression may continue postpartum, resulting in devastating multisystem complications (1). Awareness of evolving and delayed sequelae is essential for obstetric anesthesiologists involved in peripartum and critical care management.

Case One: A 27-year-old G1P0 at 27w0d presented with severe right-sided abdominal pain, headache, visual disturbances, nausea, and vomiting. On arrival, blood pressure was 218/111 mmHg and remained severe despite antihypertensive therapy. Initial labs revealed AST/ALT 505/506 U/L, platelets 296 K/µL, creatinine 0.71 mg/dL, and normal coagulation studies. Given refractory hypertension and worsening mental status, urgent cesarean delivery was performed under general anesthesia without complications. She did not meet extubation criteria and was admitted postoperatively to the surgical intensive care unit. Postpartum labs raised concern for evolving HELLP syndrome, with platelets declining to 126 K/µL and AST/ALT rising to 2527/3057 U/L with hyperbilirubinemia. On postoperative day (POD) 1, she developed worsening neurologic deficits. CT imaging showed a right basal ganglia intracranial hemorrhage with intraventricular extension and hydrocephalus. Neurosurgery placed an external ventricular drain, and she was transferred to the neuro ICU. Head CTA showed a possible developmental venous anomaly. She was extubated on POD3 following neurologic improvement. Despite bilirubin improvement, liver enzymes rose, peaking at AST/ALT 12927/8563 U/L. Abdominal CT imaging demonstrated extensive hepatic infarction consistent with microvascular injury from HELLP syndrome. On POD4, she developed acute kidney injury with oliguria, metabolic acidosis, and volume overload requiring continuous renal replacement therapy. Digital subtraction angiography on POD6 showed no arteriovenous malformation, and the external ventricular drain was removed on POD8. Renal function improved, allowing discontinuation of renal replacement therapy by POD10. She was transferred out of the ICU on POD13 and discharged to inpatient rehabilitation on POD17.

Case Two:

Discussion: This case illustrates the severe and progressive postpartum sequelae of preeclampsia with HELLP syndrome, including intracranial hemorrhage, hepatic infarction, and renal failure. Delivery does

not immediately arrest disease progression, underscoring the importance of multidisciplinary obstetric critical care and close postoperative monitoring to mitigate maternal morbidity.

References: 1.PMID: 11311756 2.PMID: 40376673 3.PMID: 35871180 4.PMID: 38621440

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 015

A Series of Unfortunate Events in Preeclampsia and HELLP Syndrome

Presenting Author: Kyle Kellett

Presenting Author's Institution: University of Vermont Medical Center - South Burlington, Vermont

Co-Authors: William K. Hart, MD - University of Vermont
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Introduction: Pathophysiology of preeclampsia (PEC) can lead to progressive multiorgan disease and/or HELLP syndrome with significant mortality. Clinical care includes blood pressure (BP) control, ongoing surveillance/treatment of end-organ dysfunction, magnesium ($MgSO_4$) and delivery (2,3).

Case One: 35-year-old G1P0 39w1d in spontaneous labor found to have BP of 148/83 with a UPCR of 0.37, platelet count (PLT) = 80k, elevated AST, ALT and LDH, and serum creatinine of 0.82 mg/dL. Diagnosed with PEC with severe features and HELLP syndrome, she received a $MgSO_4$ bolus and infusion with plans for vaginal delivery. Early lumbar epidural analgesia resulted in >7 hours of stable BPs (120's/70's) with T10 sensory block. Then, anesthesia was notified of symptomatic hypotension and Cat II FHR tracing. IV fluids and pressors were given without sensory block assessment. Forty-five minutes later, serum $MgSO_4$ = 10.6 mg/dL, creatinine = 1.41 mg/dL, and PLT = 70k. $MgSO_4$ was stopped, after which she underwent a stat cesarean delivery (CD) for fetal bradycardia under epidural anesthesia. Intraop, persistent hypotension and a 1L postpartum hemorrhage (PPH) required high- rate phenylephrine, additional IV oxytocin and tranexamic acid. Symptomatic hypotension (74/59) and urine output of 20 mL/H continued postoperatively. Blood transfusion 14 hours post-delivery stabilized her BP and improved urine output. POD#1, she developed severe RUQ pain with fever, tachycardia and hypoxia. Imaging revealed pulmonary edema/atelectasis, and a large perihepatic hematoma with capsular rupture and hepatic infarct. General surgery recommended against hematoma evacuation, and she went to the SICU for monitoring, transfusion, diuresis and pain control. POD#2, she was stable, out of bed with mild pain and improving PEC labs. She recovered well after discharge home POD#5.

Case Two:

Discussion: Ongoing surveillance facilitates recognition, interdisciplinary communication and treatment of evolving life-threatening complications of PEC; five organ systems in this case. Sensory block testing during hypotension is critical. A block height

References: 1. Ives CW, Sinkey R, Rajapreyar I, Tita AT, Oparil S. Preeclampsia- Pathophysiology and clinical presentations: JACC State-of-the-Art Review. JACC. 2020 Oct, 76 (14) 1690–1702. https://doi.org/10.1016/j.jacc.2020.08.014 2. Scott T, Hyers B. Magnesium in pregnancy. Open Anesthesia. Updated Sep 20, 2023. Accessed Jan 24, 2026. 3. Sibai BM. HELLP syndrome (hemolysis, elevated liver enzymes, low platelets).

A Series of Unfortunate Events in Preeclampsia and HELLP Syndrome.pdf

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 06

No Platelets, No Problem: Management of Cesarean Delivery in a Patient with Refractory ITP in the Setting of Pre-Eclampsia with Severe Features

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Co-Authors: Fatine Karkri, MD - Stanford University School of Medicine
Kimberly Mendoza, MD, PhD, MPH - Obstetrics Anesthesiology Fellow

Introduction: Immune Thrombocytopenic Purpura (ITP) is an autoimmune condition resulting in platelet destruction and impaired platelet production. Refractory thrombocytopenia complicates labor and delivery as low platelets preclude parturients from neuraxial analgesia and can predispose to hemorrhage.

Case One: We present a case of a 36-year-old G2P0010 patient with a history of childhood aplastic anemia who developed severe ITP prior to pregnancy. During pregnancy, IVIG, prednisone, azathioprine, and splenectomy were all ineffective. She had bruising and bleeding gums but no other bleeding diathesis. The patient was admitted with pre-eclampsia at 34+3 weeks. At the time of admission and through delivery, her platelet count remained < 10,000/μL despite ongoing platelet transfusion.

Case Two:

Discussion: Multiple multidisciplinary discussions were held to discuss the patient's evolving condition. Initially, induction of labor was planned with a remifentanil PCA for analgesia. However, as she developed pre-eclampsia with severe features (blood pressures rose to 180s/100s), there was increasing concern for hemorrhagic stroke provoked by pain-related blood pressure spikes or from Valsalva during vaginal delivery. Additionally, obstetricians felt the bleeding risk of a prolonged, augmented labor with a possible intrapartum cesarean delivery outweighed that of a primary cesarean delivery. NICU physicians were also concerned for fetal thrombocytopenia and significant fetal bleeding with an operative vaginal delivery. On balance, a final decision was made for a primary cesarean delivery under general anesthesia. Immediately prior to surgery, despite a platelet count of 3,000/μL, the TEG parameters were within normal limits except the MA was slightly reduced at 42.5 (52-69). A platelet transfusion was initiated prior to incision per hematology recommendation. An A-line was placed and a clevidipine infusion initiated, and induction was performed with propofol, remifentanil, and succinylcholine. She was atraumatically intubated with 6.0 mm ET tube using a videolaryngoscope. Prophylactic TXA was given after delivery of a viable female infant. Total QBL was 437ml. The patient was admitted to the medical ICU post-operatively in stable condition. A total of 3 units of platelet were transfused intraoperatively. Her platelet count peaked at 103,000/μL on postpartum day 1 but returned to < 10,000/μL prior to discharge. The patient had no bleeding complications and was discharged 6 days post-operatively on TXA and anti-hypertensives. Refractory ITP is challenging in the intrapartum period. Superimposed pre-eclampsia creates additional

challenges and necessitates urgent delivery. This case demonstrates the importance of agile multidisciplinary teamwork in the setting of dynamically changing patient conditions. Despite profound thrombocytopenia, platelet transfusion and TXA prophylaxis resulted in minimal blood loss during this patient's cesarean delivery.

References: 1. NEJM 2023; 389(6) 2. NEJM 2019; 381(10)

SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 07

Intrauterine fetal demise (IUFD) complicated by Disseminated Intravascular Coagulation (DIC) leading to ischemic stroke with hemorrhagic transformation.

Presenting Author: ABDAL-AZIZ EL-HUSSAIN, MD

Presenting Author's Institution: Washington University in St. Louis - Chesterfeild, Missouri

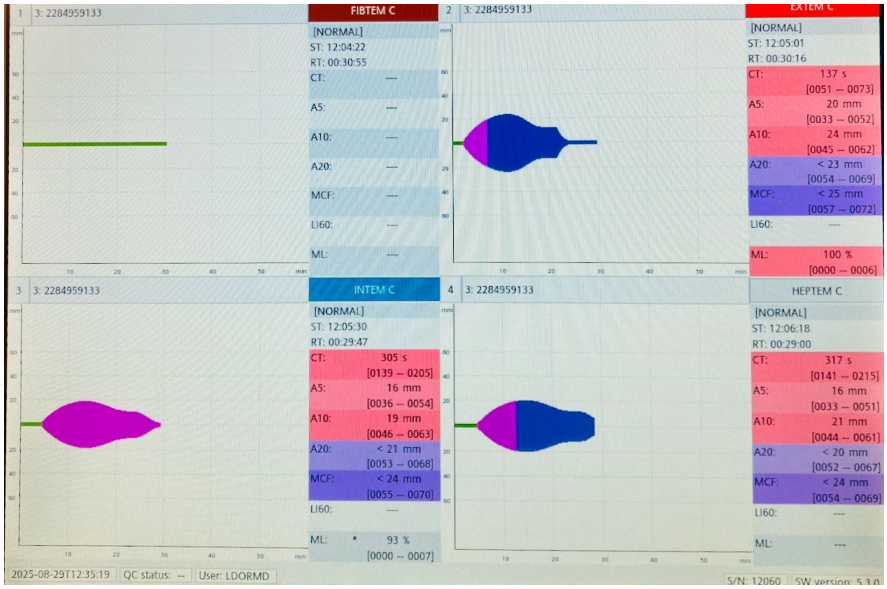
Introduction: A case with an unfortunate sequalae of events caused by IUFD complicated with Amniotic Fluid Embolism leading to DIC.

Case One: A 37-year-old G8P6 with a history of multiple substance use disorder presented with decreased fetal movement and was diagnosed with IUFD at 14 weeks and was offered management recommendations. She missed her appointment and did not answer phone calls but was ultimately admitted 12 days later for a D&C. On admission, informed consent was obtained for monitored anesthesia care with backup general anesthesia. During the intraoperative course, the SpO_2 abruptly dropped to the low 80s, and she became tachycardic but remained hemodynamically stable, so bag-mask ventilation was initiated as only a few minutes of the procedure remained. On emergence, the patient responded slightly to commands but remained deeply sedated, so a nasal trumpet was inserted to address snoring. While awaiting further emergence, bleeding was noted around the nasal airway, under the drapes, and via the Foley catheter; therefore, the differential diagnosis of amniotic fluid embolism was considered with concern for DIC. The patient's airway was secured, laboratory studies were sent including ROTEM, and the massive transfusion protocol was activated. The patient received 3 units of PRBCs, 1 unit of FFP, 3 g of fibrinogen, and 1 g of tranexamic acid. The patient was subsequently transferred to the ICU for continued management. She was extubated after 2 days and was subsequently found to have right-sided weakness, prompting activation of a stroke code, and was found to have an acute left ICA/MCA thrombus. A decision was made to proceed with mechanical thrombectomy, which was subsequently complicated by edema and petechial hemorrhages requiring hemicraniectomy. She had a complicated hospital course but was eventually discharged to a rehabilitation facility.

Case Two:

Discussion: DIC in the setting of IUFD is a rare but life-threatening medical complication that requires prompt identification and treatment. It is defined as a consumptive coagulopathy caused by the contact of tissue factor with circulating blood. This causes a cascade leading to the activation and consumption of coagulation factors. The treatment for DIC necessitates treating the underlying disorder. Rotational thromboelastometry (ROTEM) may be able to indicate whether a patient has a hypocoagulable or hypercoagulable profile and usefull for real-time data for supportive treatment with blood products and transfusion protocols.

References: 1. J Blood Med. 2022 Jan 6;13:21–44. 2. Blood Reviews. 2009 Jul 23;4:167-176.



SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 08

Disseminated Intravascular Coagulation Following Intrauterine Fetal Demise: A Case Report

Presenting Author: Elizabeth Gray, DO

Presenting Author's Institution: Ohio Health - Hilliard, Ohio

Introduction: Disseminated intravascular coagulation (DIC) is a rare, life-threatening complication of pregnancy in which a hypercoagulable state develops and triggers widespread abnormal clotting. This pathological process disrupts normal blood flow, which can cause multiorgan dysfunction and is associated with high maternal morbidity and mortality. Early recognition and management of DIC are critical, and this case report presents a patient diagnosed with DIC following placental abruption and intrauterine fetal demise at 32 weeks gestation.

Case One: This case presents a 37-year-old G3P2 32w3d female with a past medical history of epilepsy, asthma, and depression presented via emergency medical services (EMS) to the emergency department for heavy vaginal bleeding and pain. On arrival, the patient told providers that she had not felt fetal movement for nine hours. Transabdominal ultrasound revealed no fetal heart tones. Laboratory evaluation revealed anemia (hemoglobin 6.9 g/dL) and hypofibrinogenemia (28 mg/dL). In the setting of active hemorrhage and suspected placental abruption, the patient underwent emergent cesarean delivery. Intraoperatively, she received massive transfusion support, including packed red blood cells, fresh frozen plasma, platelets, cryoprecipitate, tranexamic acid, intravenous fluids, and uterotonic agents.Estimated quantitative blood loss was 3,897 mL. The patient remained intubated postoperatively and was transferred to the intensive care unit in critical condition. She was extubated on postoperative day two and discharged on postoperative day six without further bleeding complications. At two-week follow-up, she reported no abnormal bleeding. She received counseling regarding her diagnosis, future pregnancy risks, and mental health support.

Case Two:

Discussion: DIC in the setting of placental abruption and intrauterine fetal demise is a rare but life-threatening medical complication that requires prompt identification and aggressive management. Laboratory findings such as prolonged coagulation times and markedly decreased fibrinogen levels are key diagnostic indicators. Prompt correction of coagulopathy with blood products and treatment of the underlying cause are essential to reducing maternal morbidity and mortality. This case underscores the importance of rapid diagnosis, multidisciplinary management, and close postpartum follow-up. Future considerations for patients who have had DIC should include optimizing the recovery period and the prevention and management of irreversible multiorgan failure.

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SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 09

Pregnancy-Associated Thrombotic Thrombocytopenic Purpura Presenting as Severe Thrombocytopenia With Fetal Compromise

Presenting Author: A. Taylor Thomas, MD, MPH

Presenting Author's Institution: Massachusetts General Hospital - Boston, Massachusetts

Co-Authors: Elise Costa, MD - Massachusetts General Hospital

Introduction: Thrombotic microangiopathies in pregnancy are rare, rapidly progressive, and associated with high maternal and fetal mortality without prompt diagnosis and effective treatment (1). Clinical features often overlap with more common obstetric conditions such as preeclampsia, HELLP syndrome, and immune thrombocytopenia, presenting a diagnostic challenge when fetal compromise occurs.

Case One: A 43-year-old G1P0 at 31w2d presented with decreased fetal movement, petechiae, and dark urine. Obstetric evaluation revealed no fetal movement on ultrasound, biophysical profile 2/10, and a category II fetal heart tracing with minimal variability and recurrent late decelerations. Her IVF pregnancy was otherwise uncomplicated. Initial labs showed Hgb 11.0 g/dL, platelets 8K/microL, creatinine 0.6 mg/dL, AST/ALT 27/11, bilirubin 0.8mg/dL, PT/INR/PTT 10.1/0.9/25.7, fibrinogen 330 mg/dL. Given severe thrombocytopenia and non-reassuring fetal status, urgent cesarean delivery under general anesthesia was planned. Betamethasone was administered and hematology consulted. Given isolated severe thrombocytopenia without additional signs, symptoms, or lab abnormalities, the patient was empirically treated for immune thrombocytopenia with two units of platelets, 1gram of tranexamic acid, and IVIG while preparing for surgery. General anesthesia was induced and intubation was uneventful; friable mucosal tissue was noted during orogastric tube placement. A cesarean section was performed. A male infant was born with Apgar scores of 3, 8, and 9 at 1, 5, and 10 minutes and required NICU admission for respiratory support. Oxytocin and methylergonovine maleate were given for uterine atony, and an additional unit of platelets for ongoing surgical oozing. Estimated blood loss was 800mL and the patient was extubated in the OR. Intraoperatively, a blood smear showed marked schistocytosis (10-15/hpf) and near absence of platelets. LDH was 807 U/L and haptoglobin was < 10 mg/dL, confirming hemolysis. A PLASMIC score of 7 indicated 72% risk of severe ADAMTS-13 deficiency. Out of concern for thrombotic thrombocytopenic purpura, further platelet transfusion and tranexamic acid was withheld and the patient was transferred to the SICU for urgent plasma exchange after extubation. ADAMTS-13 activity returned at 11% on POD 3. She completed 6 days of plasma exchange before discharge with close follow-up. Rheumatologic evaluation revealed positive ANA and SSA without clinical autoimmune features. Low ADAMTS-13 level in the absence of an inhibitor raised concern for congenital thrombotic thrombocytopenic purpura; genetic testing is pending.

Case Two:

Discussion: For obstetric anesthesiologists, severe thrombocytopenia with fetal compromise requires

close coordination with obstetrics and hematology for timely delivery and treatment. Early collaboration and prompt plasma exchange are critical to favorable outcomes in pregnancy-associated TTP (2).

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SAT - CR - BS 3 - BR 3A - Preeclampsia and Coagulopathy – 10

Fibrinogen Replacement in Postpartum Hemorrhage due to Uterine Atony

Presenting Author: Christine A. Daly, MD, MS

Presenting Author's Institution: University of Chicago - Chicago, Illinois

Co-Authors: Leziga T. Obiyo, MD, MPH - University of Chicago

Introduction: Postpartum hemorrhage (PPH) remains a significant cause of maternal mortality in the U.S., and the rate of PPH and its associated risk factors has increased over the past two decades (1). During PPH, fibrinogen levels < 2 g/L are associated with an increased risk of progression to severe PPH (2). Although empiric treatment with fibrinogen concentrate in PPH is not associated with improved outcomes, laboratory-guided replacement is recommended for plasma levels < 2 g/L (3,4).

Case One: 37 year-old G4P3003 presenting following vaginal birth after cesarean with postpartum course complicated by PPH due to uterine atony. Initial hemorrhage labs with hemoglobin 8.1 g/dL, platelets 143,000 /μL, fibrinogen 2.7 g/L. The parturient continued to have uterine atony despite administration of uterotonics, tranexamic acid, and JADA placement. Hemoglobin remained stable on repeat labs, but fibrinogen decreased to 1.6 g/L. Fibrinogen concentrate (1,00mg) was given with an appropriate response to 2.0 g/L. However, bleeding ultimately progressed to a total quantitative blood loss (QBL) of 1,450 ml over 12 hours with a hemoglobin nadir of 6.6 g/dL, and the parturient received a one-unit RBC transfusion.

Case Two:

Discussion: Discussion: We present a case of PPH involving guideline-consistent fibrinogen concentrate administration for hypofibrinogenemia. Postpartum course was complicated by the requirement of a RBC transfusion following successful replacement of fibrinogen to 2.0 g/L. This is consistent with the emerging research on laboratory-guided fibrinogen concentrate replacement in PPH. Initial studies have observed a reduction in rates of massive hemorrhage (> 2500 ml) and large-volume transfusion rates (>4 units RBC), which were avoided in this case (5). However, despite early evidence for improvement in severe PPH outcomes, there is no association between fibrinogen concentrate administration and the need for at least one allogenic blood transfusion (3,5). It is notable that the present case examines hypofibrinogenemia in PPH due to uterine atony, as hyperfibrinolysis is likely not the primary mechanism underlying hemorrhage in this setting (2). Thus, patients with alternate etiologies of PPH involving consumptive coagulopathy such as placental abruption and amniotic fluid embolism may benefit more from fibrinogen replacement, though further research is needed. Conclusion: Given the increase in pregnant patients at risk for PPH in the U.S., laboratory-guided fibrinogen concentrate administration should be considered as it may reduce massive blood loss and mass transfusion rates. However, it may not prevent the need for at least one RBC transfusion. Therefore, the benefits of fibrinogen concentrate administration should be carefully weighed against possible risks including thromboembolic events, anaphylaxis/hypersensitivity reactions,

and increased cost of treatment.

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Fibrinogen Replacement in Postpartum Hemorrhage due to Uterine Atony.pdf

SAT - CR - BS 3 - BR 3A - Challenging Blocks – 01

Quadratus lumborum peripheral nerve catheter for refractory abdominal pain due to a degenerating fibroid in a pregnant patient.

Presenting Author: Riddhi Patodia, DO

Presenting Author's Institution: Ochsner Medical Center - New Orleans, Louisiana

Introduction: Pain from degenerating uterine fibroids during pregnancy can be severe and challenging to manage due to limitations on systemic analgesics and concerns for maternal and fetal safety. Regional anesthesia techniques may offer effective, opioid-sparing analgesia in select obstetric patients. We describe the successful use of a quadratus lumborum (QL) peripheral nerve catheter for refractory abdominal pain due to a degenerating fibroid in a pregnant patient.

Case One: A 24-year-old G1P0 woman at 23 weeks and 4 days' gestation with a known large left pedunculated fibroid and hydronephrosis status post ureteral stent placement 10 days prior presented with worsening abdominal pain. She reported baseline pain of 8/10, escalating to 10/10 with movement, resulting in markedly limited mobility. Pelvic Ultrasound demonstrated a heterogeneous echogenic left adnexal mass measuring 12 × 7 × 10 cm consistent with a degenerating fibroid. Fetal non-stress testing was reactive and reassuring for gestational age. Initial pain management included oxycodone, intravenous hydromorphone, ketorolac, and lidocaine patches with minimal relief. Despite ureteral stent removal by urology, her pain persisted. Transition to a hydromorphone PCA provided rest but inadequate analgesia, with ongoing severe pain at rest and with movement. The anesthesia team performed a right-sided single-shot QL block using 30 mL of 0.375% ropivacaine with epinephrine (1:200,000), resulting in significant pain relief. As analgesia waned, a right QL peripheral nerve catheter was placed and hand bloused twice daily with 20 mL of 0.375% bupivacaine with epinephrine. With the peripheral QL nerve block, the patient reported pain improvement to 1/10, ambulated, and participated in physical therapy. The catheter remained in place for four days, after which she was discharged on oral multimodal analgesics.

Case Two:

Discussion: This case highlights the utility of a QL peripheral nerve catheter as an effective, opioid-sparing analgesic strategy for severe fibroid-related pain during pregnancy. The QL block provided substantial functional improvement when systemic therapies failed, allowing ambulation and recovery while minimizing opioid exposure. Peripheral nerve catheters may represent a valuable option for managing refractory non-obstetric abdominal pain in pregnant patients, though further study is needed to define its safety profile and optimal dosing in this population.

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sequential analysis. J Clin Anesth. 2020;67. doi:10.1016/J.JCLINANE.2020.11000326 2. Børglum J, Moriggl B, Jensen K, Lönnqvist PA, Christensen AF, Sauter A, et al. Ultrasound-guided transmuscular quadratus lumborum blockade. Br J Anaesth. 2013;110(3).

SAT - CR - BS 3 - BR 3A - Challenging Blocks – 02

Bilateral continuous rectus sheath blocks for post-operative pain management after caesarean section in a parturient with osteochondrodysplastic dwarfism: a case report

Presenting Author: Mrinmoyee C. Kalasikam, BA

Presenting Author's Institution: University of Tennessee Health Science Center - Memphis, Tennessee

Co-Authors: Arvind Chandrashekar, MD - UTHSC Memphis

Introduction: Osteochondrodysplastic dwarfism is a genetic disorder that is marked by abnormal development of bone and cartilage, leading to short stature, skeletal deformities and spinal column disturbances. From an anesthesiology standpoint, this condition can increase the difficulty of airway management and decrease the predictability of inserting and achieving a reliable anesthetic level in neuraxial techniques, especially in obstetric patients. When this condition is combined with other comorbidities, such as pulmonary hypertension and high BMI, the complexity of anesthetic and analgesia management can increase significantly.

Case One: We report a G4P1 25-yo parturient (34 weeks) with a PMH of osteochondrodysplastic dwarfism, severe scoliosis (Cobb >100º), pulmonary hypertension, moderate persistent asthma, spina bifida occulta, wheelchair bound, morbid obesity (BMI 63), difficult intubation history, cervical disease and two previous C-sections who presented for management of her post-C-section pain after midline subumbilical vertical incision. Her gravid uterus significantly worsening her baseline compromised pulmonary function. Following combined spinal (0.1 mg morphine, 20 mcg fentanyl) epidural (90 mg of 0.5% bupivacaine), her post-caesarean incisional pain was successfully managed by continuous bilateral rectus sheath nerve blocks (16cc q180 min of 0.125% bupivacaine) for 4 days. The patient reported well controlled incisional pain (no pain at rest; mild with some activities). Only 15 mg of IV ketorolac and 5 mg Oxycodone twice a day was required for additional analgesia. Before discharge, the catheters were bolused with 15 cc of 0.5% bupivacaine and removed. The mother and her newborn were discharged with no other adverse events.

Case Two:

Discussion: This patient had several comorbidities that made post C-section analgesia challenging including obesity, severe scoliosis and pulmonary hypertension. Opioids in this setting could hinder her pulmonary toilet and potentially precipitate right heart failure. Due to these factors along with her baseline respiratory status, post-operative opioids were minimized by utilizing bilateral continuous rectus sheath nerve blocks, which provide effective block of the anterior cutaneous branches of the thoracoabdominal nerve (T7- T12) of the abdominal wall along the midline incision. Visceral pain is usually short-lived, so a reduced dose of intrathecal morphine along with ketorolac and PRN oral opioids were used. While potentially effective for both pain sources, consideration of her epidural catheter was deferred to facilitate

early mobility. This case suggests that bilateral rectus sheath blocks along with multimodal analgesia may be effective for post-caesarean pain management in patients with midline vertical incisions when traditional opioid pain management and neuraxial techniques are contraindicated or unavailable.

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SAT - CR - BS 3 - BR 3A - Challenging Blocks – 03

Management of a Postpartum Patient with an Entrapped Epidural Catheter

Presenting Author: Sigal Israilov, MD

Presenting Author's Institution: Icahn School of Medicine at Mount Sinai - New York, New York

Co-Authors: Kumiko Chino, MD - Icahn School of Medicine at Mount Sinai

Introduction: We report on a 30 year old nulliparous full-term woman who presented to our institution for routine induction of labor.

Case One: The patient was a known carrier of factor XI deficiency, with recent factor levels of 68% and no history of bleeding. She desired a labor epidural, and underwent uneventful epidural placement at the L3-L4 level. Loss of resistance was obtained with saline at 5 centimeters and the catheter was secured at 10 centimeters. After an uncomplicated ten-hour labor, she vaginally delivered a healthy baby. An hour postpartum, removal of the epidural catheter was requested. However, while attempting to pull the epidural, the anesthesiologist noted that it would not dislodge even when the patient's position was changed. The anesthesiologist placed the epidural catheter on traction overnight and attempted to remove it the next morning without success. Therefore, neurosurgery was consulted who recommended a CT of the lumbar spine. The patient, throughout this entire time, was asymptomatic and neurologically intact. The CT was remarkable for an L3-L4 catheter that was looping and possibly knotting in the patient's midline, with its distal tip intact. The patient was promptly booked for microscopic removal of a foreign body under general anesthesia, during which the epidural catheter was removed in one piece. Intra-operatively, the neurosurgeon noted intact lamina, supraspinous and intraspinous ligaments. The patient experienced an uneventful postoperative course, remained neurologically intact and was discharged from the hospital two days later. At her one-month postoperative appointment, she had no complaints and was recovering well.

Case Two:

Discussion: While entrapped epidural catheters are exceedingly rare, some management lessons exist in the literature. Prompt removal of the catheter is paramount in order to decrease the risk of infection or nerve injury.1 Initially, repositioning of the patient should be attempted to lumbar flexion, extension and lateral flexion. Continuous, strong pulling should be avoided to protect catheter integrity.2 If unsuccessful, the catheter should be placed on simple traction and secured to the skin under tension for several hours, circumstances permitting.3 If difficulty removing the catheter persists, lumbar CT or MRI should be obtained alongside a neurosurgical consultation. Care should be taken to counsel the patient throughout, providing updates and - when appropriate - reassurance.

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method for removal of knotted lumbar epidural catheter: A case report. World J Clin Cases. 2024 Apr 6;12(10):1824-1829. doi: 10.12998/wjcc.v12.i10.1824. PMID: 38660084. 3. Rafati JK, Chandrasekhar S. A practical method for removal of entrapped epidural catheters. Reg Anesth Pain Med. 2006 Nov-Dec;31(6):586. doi: 10.1016/j.rapm.2006.07.003. PMID: 17138207.

SAT - CR - BS 3 - BR 3A - Challenging Blocks – 04

Simultaneous Intravascular Migration and Knot Formation of an Epidural Catheter: A Rare Mechanical Complication

Presenting Author: Austin Martindale, MD

Presenting Author's Institution: University of Tennessee Health Science Center College of Medicine - Knoxville - Knoxville, Tennessee

Co-Authors: Benjamin Harper, MD - University of Tennessee Health Science Center College of Medicine - Knoxville

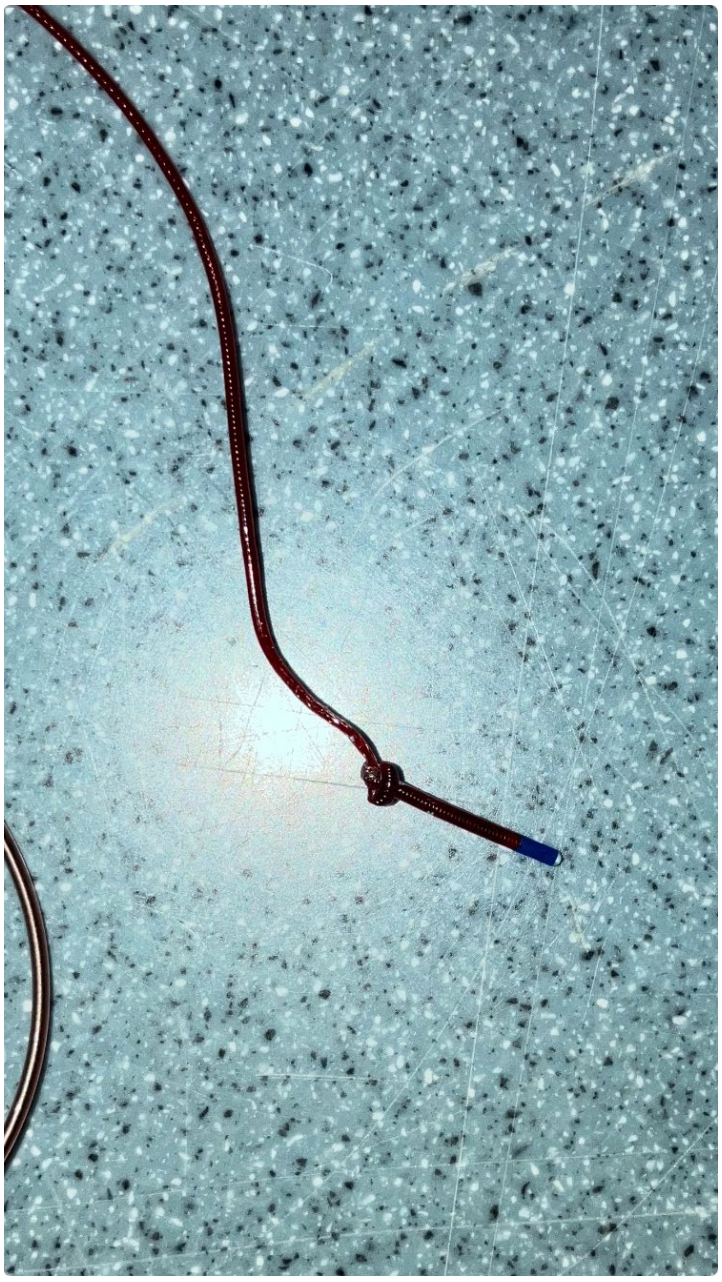
Introduction: Mechanical complications of epidural catheters are uncommon. Intravascular catheter placement occurs in ~3–7% of cases, while catheter knotting is exceedingly rare (0.001–0.01%). Simultaneous occurrence is extraordinarily rare, with only isolated reports.

Case One: A 32-year-old ASA II parturient underwent epidural catheter placement at the L4–L5 interspace for labor analgesia. This was the patient's third epidural during the same labor course. The first epidural was ineffective and removed. The second was functioning but was inadvertently dislodged during repositioning. For the third placement, loss-of-resistance to saline was achieved without difficulty, and the catheter was advanced 5 cm into the epidural space. Initial aspiration was negative, and a test dose produced no hemodynamic or neurologic changes, with adequate analgesia achieved. Approximately two hours later, the patient reported worsening contraction pain. On reassessment, she endorsed tinnitus, 9/10 pain, and diminished cold sensation below the L1 dermatome. Repeat aspiration yielded blood, raising concern for delayed intravascular migration. Catheter removal was attempted but met with immediate resistance. After repositioning and slow, steady traction, the catheter was removed, revealing a distal knot. No neurologic deficits, bleeding, or vascular sequelae occurred. The patient subsequently underwent an uneventful cesarean delivery. On postoperative day one, she reported mild left lower extremity weakness and urinary difficulty. An MRI showed no evidence of epidural hematoma. Symptoms resolved by postoperative day two, and the patient was discharged.

Case Two:

Discussion: This case highlights key teaching points. Inadequate or waning epidural analgesia should prompt reassessment, as intravascular migration may occur after initially negative testing. Excessive catheter advancement (>5 cm) increases looping and knot risk; depths ≥8 cm are associated with higher intravascular migration. Resistance during removal should raise suspicion for knotting, and forceful traction should be avoided. Preventative strategies include limiting catheter advancement to 3–5 cm and vigilance for delayed complications. Simultaneous intravascular migration and knot formation of an epidural catheter is exceptionally rare but clinically significant. Awareness and adherence to safe placement and removal principles are essential to minimize harm and improve neuraxial safety.

References: 1. Br J Anaesth 2012;109:144 2. Anesth Analg 1967;46:440 3. Saudi J Anaesth 2014;8:415 4. Anesthesiology 2004;100:683



SAT - CR - BS 3 - BR 3A - Challenging Blocks – 05

Transnasal topical sphenopalatine ganglion block for temporary symptom relief in two parturients with mild to moderate post-dural puncture headache who either declined or deferred epidural blood patch

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Co-Authors: Rimu Suzuki, RN, MSN - St. Luke's International Hospital
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Introduction: Post-dural puncture headache (PDPH) remains a significant cause of morbidity among parturients following neuraxial anesthesia. Epidural blood patch (EBP) is considered the definitive treatment, but is an invasive procedure that patients may be reluctant to accept. Transnasal topical sphenopalatine ganglion block (SPGB) is emerging as a minimally invasive bedside intervention that may provide rapid, short-term relief with a favorable safety profile.

Case One: A 33-year-old parturient underwent labor analgesia by dural puncture epidural (DPE) technique and developed postural headache 55 hours later, consistent with mild to moderate PDPH. She declined EBP but wished to actively pursue other treatment options. SPGB was performed using cotton-tipped applicators dipped in 4% topical lidocaine. Difficulty accessing the left nasal cavity resulted in partial relief from a right-sided block. A subsequent contralateral block produced complete relief. This incidental unilateral effect was consistent with the mechanism of the block, which is thought to target parasympathetic vasodilation. Mild symptoms recurred the following day, and a second SPGB was performed at 80 hours post-DPE, after which symptoms resolved.

Case Two: Another 33-year-old parturient developed mild PDPH approximately 30 hours after labor analgesia by DPE. She declined EBP and elected to undergo SPGB, with complete relief lasting approximately 10 hours. When moderate symptoms recurred, the patient deferred EBP and opted for a second SPGB at 59 hours post-DPE. Moderate symptoms persisted the following day, and the patient consented to EBP at 77 hours. Symptoms resolved shortly after EBP.

Discussion: PDPH is attributed to cerebrospinal fluid leakage following dural puncture. In both cases the dura was intentionally punctured with a 27G spinal needle per DPE technique, without documented puncture by the 18G epidural needle. Regardless of the nature of the puncture, patients may be hesitant to consent to EBP as it carries the risk of yet another dural puncture. These cases illustrate how SPGB appeals to patients with mild to moderate symptoms who want an active approach to management but are not yet comfortable consenting to EBP. Since PDPH often resolves with conservative therapy within 24-48 hours, and early EBP within 24 hours is less likely to succeed, EBP is typically recommended between 48-72 hours following dural puncture. Consequently, SPGB may also appeal to patients with early onset PDPH, who may experience substantial discomfort during the gap in management between

24-48 hours awaiting optimal timing for EBP. Like other conservative therapies, SPGB is not a definitive treatment. Randomized trials have shown mixed results, and further study is needed to clarify its role. Our experience suggests SPGB may be considered as part of a stepwise approach, providing temporary relief while preparing patients for the possibility of definitive EBP.

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SAT - CR - BS 3 - BR 3A - Challenging Blocks – 06

A Bundle of Joy and a Bundle of Nerves: Safe Epidural Placement in a Pregnant Patient with a Schwannoma

Presenting Author: Kaitlyn Dempsey, MD

Presenting Author's Institution: Naval Medical Center Portsmouth - Norfolk, Virginia

Co-Authors: Lance Charlton, MD - United States Navy
Mei (Shamii) Goh, DO - Naval Medical Center Portsmouth

Introduction: Spinal cystic nerve root schwannomas are rare tumors which are most often located in the lumbar spinal regions. These tumors pose an increased risk of potential complications with neuraxial procedures including spinal and epidural anesthesia such as neurological complications, hematoma formation, and anatomical distortion.

Case One: We present a case of a 20-year-old female gravida 2 para 0 admitted with preterm labor at 32+2 weeks gestational age with a known right-sided L5 cystic schwannoma with mild radicular symptoms. The patient reported that she was previously advised to avoid neuraxial anesthesia. Previous MRI was over a year old and prior to pregnancy. After updated non-contrast MRI and multidisciplinary discussions with her obstetric team, neurosurgery and neuroradiology, it was determined that she could safely undergo epidural placement. She was readmitted for induction of labor at 38 weeks gestational age and was able to undergo successful epidural placement and uncomplicated vaginal delivery with adequate pain control and no neurologic deficits.

Case Two:

Discussion: The presence of a large spinal schwannoma in a pregnant patient presents a significant challenge for anesthetic management given potential for increased risks with neuraxial anesthesia. This unique case highlights that with careful multidisciplinary planning and detailed pre-procedural evaluation, neuraxial anesthesia can be a safe and viable option for labor analgesia in select patients with spinal tumors.

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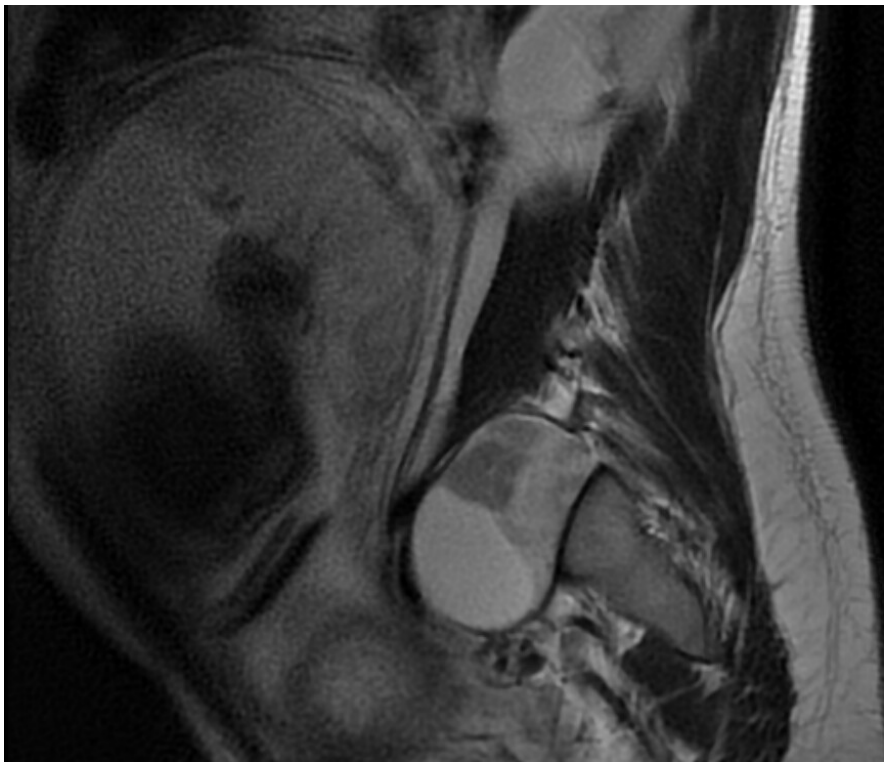

SAT - CR - BS 3 - BR 3A - Challenging Blocks – 07

Getting ahead of the pain: prophylactic epidural blood patch in a patient with substance use disorder

Presenting Author: Bryanna Buchman, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Holly B. Ende, MD - Vanderbilt University Medical Center
Laura L. Sorabella, MD - Vanderbilt University Department of Anesthesiology

Introduction: This is a case report describing the use of a prophylactic epidural blood patch in a patient with substance use disorder, as well as several prior post dural puncture headaches with prior deliveries.

Case One: A 39-year-old female presented at 39 weeks gestational age for her scheduled cesarean delivery. Past medical history was significant for tobacco use, substance use disorder, ADHD, and anemia. Her obstetric history was notable for two prior cesarean deliveries, as well as bilobed placenta and advanced maternal age. Most notably, this patient had a history of post dural puncture headache (PDPH) following each of her prior cesareans, both of which necessitated two epidural blood patches (EBP). After a risk and benefit discussion with the patient regarding general anesthesia versus neuraxial, the patient decided to proceed with a combined spinal and epidural (CSE) placement to optimize analgesia in the setting of her opioid use disorder. The procedure was uncomplicated, and prior to removing the epidural, a prophylactic epidural blood patch (PEBP) was performed. The Obstetric Anesthesia Opioid Use Disorder Service followed the patient post-operatively and no signs or symptoms concerning for PDPH developed. This approach, along with a multimodal pain regimen, helped adequately control the patient's post-operative and baseline chronic pain as well as avoid another neuraxial for PDPH.

Case Two:

Discussion: Substance use disorder during pregnancy and postpartum periods is associated with considerable morbidity and mortality1. Employing therapeutic interventions to prevent complications is an important role of the obstetric anesthesiologist. Several studies investigate the role of prophylactic epidural blood patches in routine obstetric anesthesia care. The official statement from the American Society of Anesthesiologists states that a PEBP is not as successful when compared to therapeutic EBP, and thus not recommended 2. One study found that PEBP decreased the incidence of PDPH in the setting of known dural puncture 3. Another study suggests, decreased length of hospital stay in those who received PEBP4.Although the conclusions are varied, our case described suggests prophylactic epidural blood patches may be beneficial in specific populations of patients, including those with hyperalgesia or otherwise altered pain pathways from substance use disorder. This strategy spares additional invasive procedures on a hyperalgesic patient.

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SAT - CR - BS 3 - BR 3A - Challenging Blocks – 08

Rare Neuraxial Complication in Obstetric Anesthesia: Cerebrospinal Fluid-Cutaneous Fistula

Presenting Author: Nana Yaa Kwansa, MD

Presenting Author's Institution: University of Minnesota - Minneapolis, Minnesota

Co-Authors: Iryna C. Chugaieva, MD - Department of Anesthesiology University of Minnesota

Introduction: Neuraxial analgesia is considered the gold standard for pain relief during childbirth. A cerebrospinal fluid (CSF)-cutaneous fistula is a rare but serious complication with estimated incidence of 0.16% in obstetric practice (1,2). Given the paucity of reported cases, this case highlights important diagnostic steps and supports an emerging management algorithm.

Case One: A 34 year old primigravid at 37w3d presented for scheduled external cephalic version (ECV) for which an uneventful combined spinal epidural (CSE) was performed (intrathecal dosing of 1 mL 0.25% bupivacaine and 15 mcg fentanyl). Though unsuccessful, the attempted ECV was without complication. While on the unit for observation, the patient met criteria for gestational hypertension, necessitating scheduled C-section the following morning. For the C-section, a spinal was performed (1.6 mL 0.25% bupivacaine, 15 mcg fentanyl, 150 mcg morphine). On post-operative day 1, the obstetric anesthesia team was paged to examine a slow ooze of clear fluid seen emerging from one of the neuraxial sites, saturating the patient's abdominal binder and clothes. Upon arrival at bedside, the patient denied any symptoms concerning for accidental dural puncture. However, gauze applied to the CSE site between physical exams quickly saturated with clear fluid. To better characterize this fluid, a point of care glucose test revealed glucose of 55 mg/dL, suggestive of CSF. Neurosurgery was consulted and recommended sending a fluid sample for β2-transferrin testing. They also placed a cutaneous stitch in the interim, resolving the leakage. A day later, the β2-transferrin assay yielded a positive result, the patient remained asymptomatic and was discharged without any further complications.

Case Two:

Discussion: Fluid emerging from a neuraxial puncture site is not necessarily CSF, it can be interstitial fluid due to edema, a seroma, or local anesthetic (3). POC glucose may serve as a screening tool, while awaiting β2-transferrin to confirm the diagnosis of CSF-cutaneous fistula. This case supports a developing treatment algorithm wherein less invasive methods, such as a cutaneous stitch, are favored for otherwise asymptomatic patients with persistent CSF leak (2). A blood patch may be considered for symptomatic patients, while concerns for infection warrant involvement of infectious disease and neurosurgical teams.

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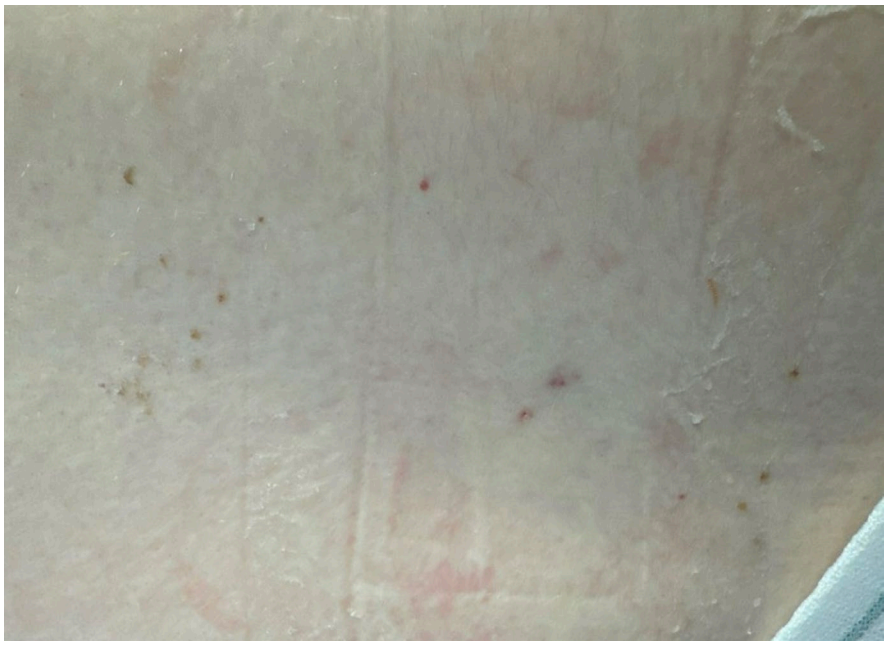

SAT - CR - BS 3 - BR 3A - Challenging Blocks – 09

Multimodal Analgesia for Postoperative Pain Control in Patient with Opioid Tolerance

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Co-Authors: Yunping Li, MD - Beth Israel Deaconess Medical Center / Harvard Medical School

Introduction: Rates of antepartum maternal opioid use have increased dramatically. However, undertreatment in this vulnerable population remains the biggest concern, requiring a multimodal pain management strategy (1). While medication assisted treatment is well established, this case highlights other pain management modalities, and the need for flexibility depending on patient symptoms.

Case One: A 36-year-old woman G8P5 at 30+0 weeks gestation presented for scheduled cesarean hysterectomy for placenta accreta spectrum (PAS) with placenta previa. Medical history was notable for polysubstance use disorder managed with high-dose methadone maintenance therapy (320 mg/day) and ongoing cocaine use. Given significant opioid tolerance, a multimodal strategy with emphasis on postop pain control was planned. Preoperatively, arterial line monitoring and large-bore IV access were established. In the operating room, a thoracic (T9) epidural catheter was placed followed by a lumbar combined spinal-epidural with spinal anesthesia of hyperbaric bupivacaine, fentanyl, and dexmedetomidine 10 mcg. After birth of the neonate, maternal agitation necessitated propofol infusion for sedation. Estimated blood loss was 2095ml, requiring transfusion of 5 units of packed red blood cells, 2 units of fresh frozen plasma, and 510ml cell saver. The procedure was otherwise uncomplicated. Postoperatively, the thoracic epidural infusion of bupivacaine 0.1% at 8 mL/hr, hydromorphone PCA (0.3 mg bolus, 6-minute lockout) was supplemented with a ketamine infusion at 0.3 mg/kg/hr, continuation of methadone with dose adjustment (210 mg AM, 160 mg PM), scheduled acetaminophen and ketorolac, and prn clonidine and methocarbamol. However, the patient reported uncontrolled pain and was transitioned from the thoracic epidural to bilateral rectus sheath catheters with continuous ropivacaine 0.2% at 10 mL/hr, resulting in improved analgesia. On POD 4, the patient developed symptomatic anemia and received one unit of pRBC. She then developed acute hypoxemic respiratory failure with diffuse bilateral pulmonary edema, concerning for TRALI, requiring intubation. She improved with supportive care and diuresis and was extubated on POD 5. Following stabilization, all infusions were discontinued and transitioned to oral medications for discharge, including methadone 175 mg twice daily, acetaminophen, ibuprofen, and clonidine as needed.

Case Two:

Discussion: This case highlights the complexity of postop pain management in obstetric patients with PAS and severe opioid tolerance. The double epidural technique planned to use a thoracic epidural for

postop pain control while preserving motor function for early mobilization (2). The rectus sheath catheter, another adjunct therapy (3), proved more effective in this patient, and reflects the dynamic nature of pain management. This case also highlights dexmedetomidine as an adjunct medication, particularly when morphine isn't used (4).

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SAT - CR - BS 3 - BR 3A - Challenging Blocks – 10

When Pain Relief Causes Pain: Morphine-Induced Sphincter of Oddi Spasm During Preterm Labor

Presenting Author: Margaret Akey

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Introduction: Morphine is known to increase sphincter of Oddi (SO) basal pressure and contractility and common bile duct pressure (1) which can trigger dose-dependent biliary colic–like pain mimicking acute abdominal emergencies (2,3,4). Diagnosis is particularly challenging during labor, as abdominal pain has multiple competing etiologies and diagnostic and analgesic decisions must account for both maternal and fetal considerations.

Case One: A 29-year-old G5P3013 at 34 weeks and 3 days gestation was admitted after a ground-level fall with preterm contractions. After placental abruption was ruled out, she received IM morphine 10 mg for early labor. Thirty minutes later, she developed severe epigastric pain with nausea, vomiting, chills, and flushing and was “writhing in pain, crying.” Vital signs were normal. The abdomen was soft with epigastric tenderness without rebound or guarding. Fetal heart rate tracing was reassuring with a stable cervical exam at 1.5 cm dilation. Labs (liver panel, lipase, lactate, INR, CBC, VBG) were within normal limits of pregnancy and EKG showed normal sinus rhythm. Obstetric differentials included placental abruption, uterine rupture, and preeclampsia/HELLP, but were deemed unlikely. Initial therapy included two doses of 0.4mg IV hydromorphone and IV pantoprazole without relief. Notable history included Roux-en-Y gastric bypass and cholecystectomy. General surgery was consulted and considered anastomotic stricture, marginal ulcer, and malignancy, but found no evidence of surgical emergency. Given the onset of epigastric pain was closely preceded by morphine administration, morphine-induced SO spasm was suspected. The decision was made to trial IV naloxone, which resulted in rapid and significant improvement in her pain after three doses of 0.4 mg each. Maternal hemodynamics were stable, fetal heart rate remained reassuring, and further diagnostic imaging was ultimately deferred.

Case Two:

Discussion: Morphine-induced SO spasm in obstetric settings poses diagnostic and management challenges relevant to obstetric anesthesia practice. Diagnosis centers on a temporal association with morphine and exclusion of obstetric and surgical emergencies. Cholecystectomy has been identified as a risk factor for opioid-induced SO spasm in several studies and case reports (2,5,6,7). Naloxone may relieve symptoms but can cause opioid withdrawal and loss of labor analgesia (2,3). Management during labor includes titration to the minimum effective naloxone dose, limiting additional opioids, continuous

maternal and fetal monitoring, and planning alternative analgesia including labor epidural if needed.

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SAT - CR - BS 3 - BR 3B - Call a Consult! – 01

New Post-conceptional Diagnosis of Marfan, Bicuspid Aortic Valve, and Ascending Aorta Dilation: Case Considerations and Multidisciplinary Management Through Pregnancy and Delivery.

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Introduction: Marfan syndrome parturients are at risk of aortic dissection even without preconceptional aortic root dilation. Patients with aortic diameter >4.5cm should be counseled against pregnancy or recommend preconceptional aortic repair. Cesarean section(C/S) might be preferred over vaginal delivery with larger aortic diameters or additional risk factors

Case One: 20-year-old primigravida with marfanoid habitus, occasional e-cigarette and cannabis use. Positive genetic testing for Marfan during first trimester. Additional testing revealed bicuspid aortic valve, mild aortic valve insufficiency, 4.5cm asymmetric aortic root dilation at the sinuses of Valsalva (Z-score +5.1), borderline dilated ascending aorta (3.3cm, Z-score +2.0), patent foramen ovale with left-to-right flow, and mildly dilated left ventricle. Negative brain and neck MRA/MRV. Lumbar spine MRI ruled out dural ectasia. Multidisciplinary management included high-risk OB anesthesiology, cardiology, CV surgery, and maternofetal medicine. Metoprolol started with HR goal < 100 and BP< 130/90, and echocardiogram surveillance q4-8 weeks. Surgeon recommended valve-sparing aortic root replacement vs Bentall with mechanical valve 3 months postpartum. Pregnancy also complicated by fetal growth restriction (EFW 11% with AC 3%). Scheduled C/S at 37w3d in tertiary center with CV surgeon and perfusionist on standby, and sterile preparation of femoral area. Anesthetic planning included large bore IVs, pre-induction arterial line, and in-line esmolol, nicardipine, phenylephrine and oxytocin. Short acting B-blockers, Calcium channel blockers, and vasopressors were available. Combined spinal epidural was done with spinal local anesthetic and opioids, and epidural sited in case additional titration needed in order to avoid need for general anesthesia. Case was uneventful with blood loss of 725ml. She was transferred to CVICU for monitoring. Discharged home for scheduled CV surgery

Case Two:

Discussion: Management of Marfan syndrome depends on aortic diameter and other risk factors for dissection (Family history of dissection, rapid growth). Women with Marfan should be counseled regarding pregnancy risks. Pre-pregnancy surgery recommended if ascending aorta >4.5cm. B-blockers might reduce rate of aortic dilation and might prevent dissection, but fetal growth should be monitored. Intrapartum goal reducing stress of labor and delivery. C/S should be considered if aortic root>4.5cm.

Multidisciplinary approach helps ensure good outcomes

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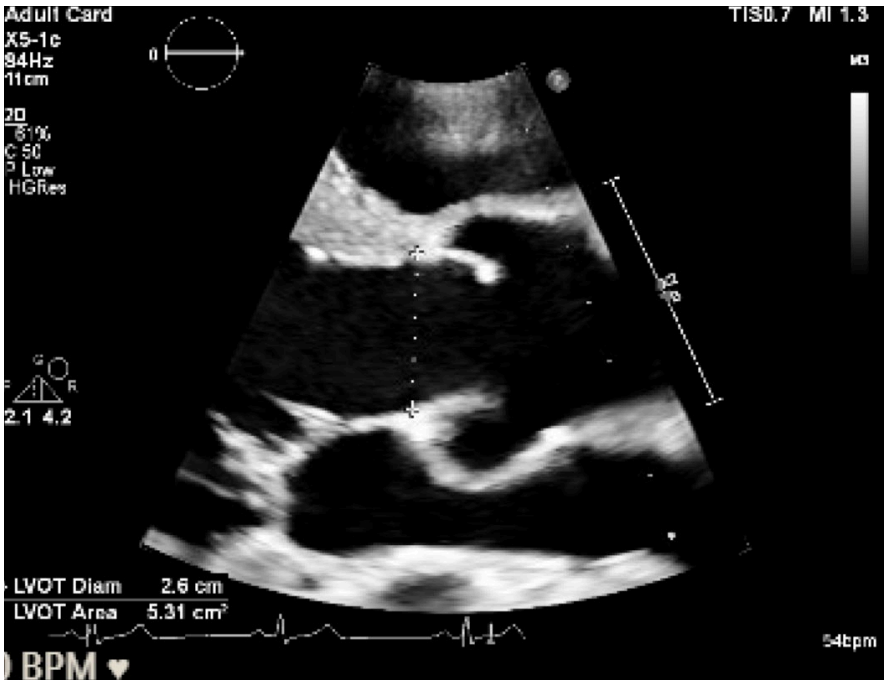

SAT - CR - BS 3 - BR 3B - Call a Consult! – 02

Through the Looking Glass: Anesthetic Challenges in Mirror Syndrome

Presenting Author: Samantha Smith, MD

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Introduction: Mirror syndrome (Ballantyne syndrome) is a rare obstetric diagnosis characterized by fetal hydrops, placentomegaly, and maternal edema ("triple edema"). Maternal presentation mirrors the hydropic fetus. Mirror syndrome may present in conjunction with or mimic preeclampsia (hypertension, proteinuria, edema), so it is crucial to differentiate these conditions and understand potential anesthetic risks. We present a case of mirror syndrome in the setting of parvovirus B19 infection and superimposed preeclampsia.

Case One: A 16-year-old G1P0 at 21.4 weeks gestation presented with fetal hydrops secondary to parvovirus B19, maternal mirror syndrome with ascites, and preeclampsia with severe features. Prenatal infectious and aneuploidy screening were unremarkable. Ultrasound demonstrated fetal ascites, VSD, cardiomegaly, abnormal umbilical artery and ductus venosus Dopplers, placentomegaly, and maternal ascites. Pre-admission course included large volume transudative paracentesis and two cordocenteses. She presented with severe hypertension, headache, nausea, and vomiting but no respiratory involvement. Laboratory evaluation revealed hyponatremia, mild hyperkalemia, and transaminitis, with a normal platelet count. She was managed with magnesium sulfate, labetalol, and nifedipine. Epidural analgesia with bupivicaine and fentanyl was administered without complication. She delivered a stillborn female infant vaginally after labor induction with mifepristone. Uterotonics and tranexamic acid were administered for postpartum hemorrhage. Hyponatremia resolved with fluid restriction, and liver enzymes normalized, allowing for discharge home on postpartum day two.

Case Two:

Discussion: Anesthetic management of mirror syndrome includes close attention to maternal volume overload, endothelial dysfunction, and risks of pulmonary edema and preterm labor. Risks may be exacerbated by administration of crystalloid and magnesium or postpartum auto-transfusion. Careful fluid restriction and respiratory monitoring are key. General anesthesia poses risks such as challenging airway management, aspiration, and rapid desaturation due to decreased functional residual capacity and pulmonary edema. Neuraxial anesthesia is preferred when coagulation parameters are favorable, but it carries the risk of exaggerated hypotension secondary to decreased intravascular volume and vasodilation. Gradual dosing and careful vasopressor use are recommended. Coagulation status should be monitored due to the potential overlap with preeclampsia. Postpartum vigilance is crucial, as pulmonary edema may temporarily worsen after delivery. Fetal demise is common, so recognizing the

delicate nature of these cases is important. Although our patient's anesthetic need was limited, her case prompted deeper understanding of this rare and potentially life-threatening condition.

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SAT - CR - BS 3 - BR 3B - Call a Consult! – 03

Peripartum cardiomyopathy: Point-of-Care Ultrasound Utilization and Anesthetic Considerations

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Introduction: Peripartum cardiomyopathy (PPCM) is a rare cause of heart failure (HF). It is defined by reduced left ventricular (LV) systolic function in the absence of an identifiable cause. PPCM is uncommon before 36 weeks' gestation, with most patients presenting postpartum. Risk factors include advanced maternal age, African ancestry, multiple gestation, hypertensive disorders, cocaine use, and prolonged beta-agonist tocolytic use. [1] Severe cases may require invasive monitoring, cardiopulmonary imaging, inotropic support, and advanced therapies such as extracorporeal membrane oxygenation (ECMO) or left ventricular assist devices (LVAD). [2] We report a case of severe PPCM requiring ECMO and subsequent LVAD implantation.

Case One: A previously healthy 23 year-old G1P0 at 38w6d presented with PPCM complicated by cardiogenic shock. Due to hemodynamic instability and worsening dyspnea, cesarean delivery was performed under general anesthesia with pre-induction invasive monitoring. Intraoperative cardiopulmonary POCUS was used to assess cardiac function, volume status, and pulmonary edema and to guide initiation of ECMO. The neonate had Apgar scores of 8 and 9 at 1 and 5 minutes, respectively. VA ECMO was initiated due to worsening hemodynamic instability following delivery. Quantitative blood loss was 990 mL. ECMO was discontinued after three days, complicated by left superficial femoral artery occlusion and pseudoaneurysm. She had persistent severe LV systolic dysfunction (ejection fraction < 20%), worsening mitral regurgitation, and progressive biventricular failure managed with diuresis, milrinone, and anticoagulation. Subsequently, she underwent percutaneous VAD placement followed by emergent HeartMate 3 LVAD implantation with ASD repair. Her course was complicated by vasoplegia and postoperative right ventricular dysfunction with LVAD suction events requiring speed adjustments. LVAD flows subsequently stabilized, and she was discharged home.

Case Two:

Discussion: Severe PPCM can lead to marked perioperative instability. Rapid hemodynamic decompensation may occur during labor and the immediate postpartum period due to acute cardiovascular changes. Therefore, careful anesthetic management is essential, as both neuraxial and general anesthesia carry risks in patients with limited cardiac reserve. [3] This case underscores two aspects: multidisciplinary perioperative planning and management, as well as the importance of vigilant hemodynamic monitoring and timely escalation to mechanical support. ECMO is a valuable tool in PPCM

management; however, it also carries potential complications. [2] In this patient, intraoperative cardiac and lung POCUS provided real-time assessment, complemented invasive monitoring, and guided prompt ECMO initiation. [4]

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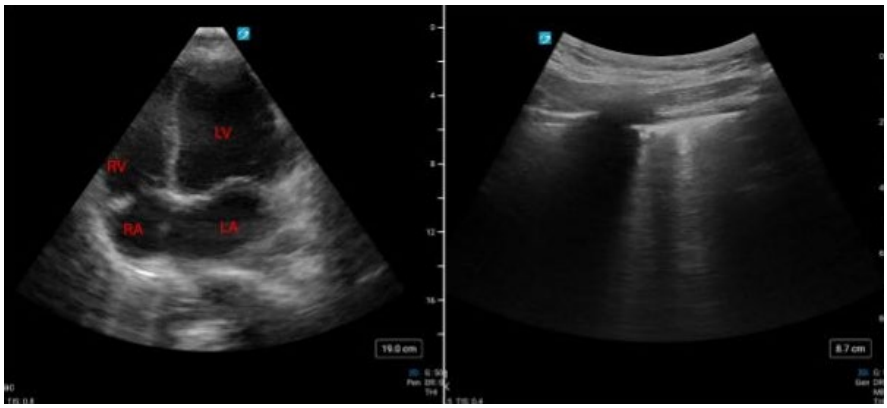

SAT - CR - BS 3 - BR 3B - Call a Consult! – 04

Laser Ablation for Idiopathic Subglottic Stenosis in Pregnancy: Should Continuous Fetal Monitoring be the Standard of Care?

Presenting Author: Erik A. Ovrom, MD

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Introduction: Idiopathic subglottic stenosis (iSGS), characterized by scarring and fibrosis of the inner surface of the cricoid cartilage, can be exacerbated by fluid retention during pregnancy. Treatment of iSGS often requires periods of apnea for laser ablation and balloon dilation. Anesthetic management for laser ablation during pregnancy is challenging due to reduced functional residual capacity and increased risk of hypoxia, and the question of whether to implement continuous fetal monitoring (CFM) intraoperatively remains unanswered.

Case One: A 37-year-old G1P0 female with a longstanding history of symptomatic iSGS requiring serial dilations was admitted at 29w4d for worsening dyspnea, stridor, and dysphonia. Her pulmonary function tests showed a moderately increased residual volume suggestive of air trapping and a mild defect in diffusion capacity. Given the lack of improvement with steroids, the patient underwent suspension micro-laryngoscopy and laser resection of subglottic scar, followed by balloon dilation and intralesional steroid injections on hospital day 8. A multidisciplinary discussion outlining the risks and benefits of CFM took place preoperatively. The proposed benefit of CFM was the anesthesia provider's ability to adjust maternal blood pressure, pCO_2, and oxygenation to improve placental blood flow and fetal gas exchange in response to the fetal tracing, especially during periods of low FiO_2 and intermittent apnea. The main risk of CFM was premature cesarean delivery due to a category 3 tracing. Clear plans to avoid delivery except in the case of terminal fetal bradycardia were instituted, given the known effect of anesthetic gases on fetal heart rate variability. Intraoperative CFM showed minimal variability but no decelerations. Apnea was well tolerated. The patient’s symptoms improved immediately postoperatively, and she was discharged the following day.

Case Two:

Discussion: Multidisciplinary care involving maternal-fetal medicine specialists, otolaryngology, and anesthesia was critical in the decision to perform CFM. Predictable decreases in fetal heart rate variability secondary to general anesthesia occur in most surgeries and do not represent fetal acidemia. Additionally, fetal heart rate patterns vary significantly based on gestational age. Using CFM data to inform clinical decision-making requires expertise to avoid causing harm. A recent systematic review by Higgins et al. reported only one case of intraoperative delivery due to reduced FHR variability and an intraoperative delivery rate of 4% due to fetal decelerations that did not resolve with repositioning or blood pressure management [1]. Based on current evidence, CFM should be reserved only for cases during

which it is reasonable to modify surgical and anesthetic management or to deliver in response to CFM changes.

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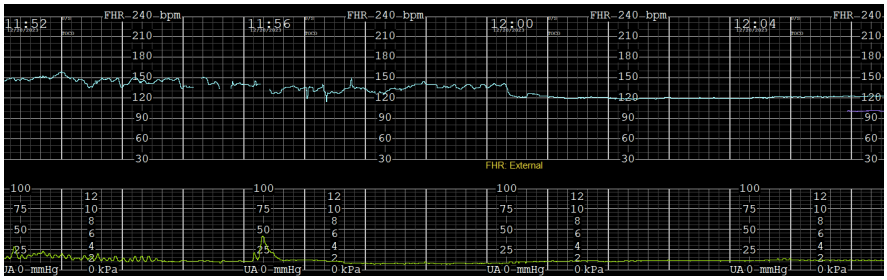

SAT - CR - BS 3 - BR 3B - Call a Consult! – 05

Paralysis, Pregnancy, and the Delivery Plan: Navigating Anesthesia in Atypical Guillain–Barré Syndrome

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Introduction: Guillain–Barré syndrome (GBS) in pregnancy is rare and diagnostically challenging. Early symptoms mimic common obstetric or musculoskeletal complaints while progression can lead to rapid neuromuscular deterioration and respiratory failure. Management requires multidisciplinary coordination to balance urgent maternal stabilization with complex anesthetic decision-making for delivery in the absence of clear evidence-based guidance.

Case One: A 28-year-old previously healthy primigravida at 30 weeks' gestation presented with progressive bilateral lower-limb pain and paresthesia that rapidly evolved to symmetric weakness, severe myalgia and respiratory failure, creating early diagnostic uncertainty and high-risk anesthetic considerations. She developed acute hypoxic respiratory failure requiring urgent intubation. Neurologic examination demonstrated flaccid quadriparesis and generalized areflexia without a clear sensory deficit. Neuroimaging excluded intracranial pathology; Cerebrospinal fluid analysis demonstrated elevated protein with pleocytosis, and later MRI revealed cauda equina nerve root thickening; infectious and autoimmune workup was negative. The patient was treated with plasma exchange and high-dose corticosteroids, resulting in gradual neurological improvement. The course was complicated by prolonged ventilatory dependence requiring tracheostomy and steroid-induced diabetes mellitus. Serial neurologic examination demonstrated progressive recovery of strength and reflexes, consistent with an atypical GBS variant, later felt to represent acute motor axonal neuropathy. Given evolving neuromuscular deficits, respiratory dependence and uncertainty regarding neurological recovery, anesthetic planning for eventual delivery posed challenges, particularly with respect to the safety and timing of neuraxial techniques. At 38 weeks' gestation, with concerns regarding her ability to tolerate the second stage of labor, the team opted for a scheduled cesarean. At this time with only minor residual weakness the patient consented for combined spinal–epidural anesthesia, which was successful without any neurological deterioration. A healthy neonate was delivered (Apgar 9). Postpartum recovery was uncomplicated. She remained hemodynamically stable and began moving her feet in recovery room. Neurologic examination on postoperative day one was unchanged from pre-CSE.

Case Two:

Discussion: This case underscores the importance of early recognition of atypical GBS in pregnancy,

repeated neurological reassessment when initial investigations are non-diagnostic, and proactive airway protection. In the absence of a single optimal anesthetic strategy for GBS, individualized, multidisciplinary decision-making is essential. This case suggests that a carefully titrated CSE may be a safe and effective option during the neurological recovery phase of GBS, even after severe disease.

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SAT - CR - BS 3 - BR 3B - Call a Consult! – 06

Peripartum Anesthetic Management of Severe Stiff Person Syndrome: Anticipatory Planning in a High-Risk Parturient

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Co-Authors: Paige Keasler, DO, DO - University of Washington
Joseph Reno, MD - University of Washington

Introduction: Stiff person syndrome (SPS) is a rare autoimmune neurologic disorder characterized by painful rigidity and stimulus-induced spasms resulting from impaired γ-aminobutyric acid (GABA) mediated inhibition (1). Obstetric anesthetic care may prove challenging due to chronic GABAergic therapy, potential interactions with anesthetic agents, postoperative hypotonia, anticoagulation, and airway or neuraxial concerns (2).

Case One: A 31-year-old G5P0 with a history of type 2 diabetes, DVT/PE on anticoagulation, and severe SPS, diagnosed at age 19, presented with recurrent pain crises and worsening spasms. She required twice monthly intravenous immunoglobulin and had been hospitalized pre-pregnancy with acute hypoxic respiratory failure secondary to a SPS exacerbation and acute COVID-19 pneumonitis requiring prolonged intubation and five plasma-exchange treatments. Her chronic regimen included diazepam 20 mg TID, baclofen 30 mg BID, and intermittent opioid therapy for multifactorial pain from SPS, pregnancy, and hydronephrosis, with frequent emergency room visits and poor response to nonsteroidal agents. Comorbidities relevant to anesthetic planning included recurrent venous thromboembolism on therapeutic anticoagulation, edentulism concerning for difficult airway management, scoliosis complicating neuraxial techniques, prolonged QT interval with sinus tachycardia on metoprolol, and severe psychiatric disease with anxiety-provoked chest wall and diaphragm muscle spasm triggers. Early obstetric anesthesia consultation emphasized continuation of antispasmodic therapy, avoidance of startle stimuli, careful positioning, multimodal analgesia with opioid-tolerant dosing, anticoagulation timing for neuraxial procedures, and preparedness for general anesthesia if neuraxial techniques failed or spasms caused respiratory compromise. When fetal status deteriorated, urgent cesarean delivery was undertaken at 34w4d which was performed under single-shot spinal anesthesia without complication. Post-operative pain was managed with a multi-disciplinary approach.

Case Two:

Discussion: Case-based literature supports early neuraxial analgesia to blunt pain-triggered spasms and avoidance of neuromuscular blockers during cesarean delivery, as postoperative weakness may persist despite normalized train-of-four monitoring. Sugammadex has been reported to reverse residual weakness more reliably than neostigmine in SPS patients, and interactions between volatile anesthetics and baclofen may contribute to delayed recovery (2). Severe SPS in pregnancy requires anesthesiologist-

led anticipatory planning. Early neuraxial strategies, continuation of disease-modifying therapy, coordinated anticoagulation management, airway and spinal assessment, contingency planning for general anesthesia, and heightened postoperative vigilance are critical to optimizing maternal safety.

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SAT - CR - BS 3 - BR 3B - Call a Consult! – 07

Anesthesia for Anterior Mediastinal Mass in Pregnancy: Anesthetic Management and Considerations

Presenting Author: Zenobia Faussett, MD

Presenting Author's Institution: Weill Cornell Medicine - New York, New York

Co-Authors: Joe E. Bryant-Huppert, MD - New York Presbyterian - Weill Cornell
Catharine Keim, MD - Weill Cornell Medicine

Introduction: Non-obstetric surgery during pregnancy involves special considerations given the physiologic changes in pregnancy including the risk of aspiration and a potentially difficult airway. Anesthesia for anterior mediastinal mass surgery risks include airway and hemodynamic collapse. We present perioperative management of a gravid woman with an anterior mediastinal mass presenting for lymph node biopsy.

Case One: 24 year old G4P3 at 21w2d presented for excisional supraclavicular lymph node biopsy. The patient was found to have an anterior mediastinal mass after 1 month of progressive dyspnea on exertion, chest pain, and tachycardia. She was able to lay flat with SpO2 94-96%. Transthoracic echo showed small pericardial effusion and evidence of early tamponade; CT demonstrated anterior mediastinal mass (7x4x7cm), lymphadenopathy, and large right pleural effusion. After interdisciplinary discussions with anesthesia, surgery, cardiology, MFM and patient, awake fiberoptic intubation was determined the safest anesthetic technique. The patient was pre-oxygenated, received 2mg midazolam, 50 mcg fentanyl, and 0.1 mcg/kg/min remifentanil infusion. The airway was topicalized with lidocaine and Williams airway was introduced. 6.0 ETT was placed atraumatically with a flexible fiberoptic scope; she remained responsive throughout intubation. Maintenance anesthesia was achieved with sevoflurane. She spontaneously breathed on pressure support and was extubated at procedure end. Pre- and post-operative FHR was stable. Chemotherapy for T-cell Acute Lymphoblastic Leukemia was initiated. Follow up studies showed significantly improved pathology. Following treatment, she underwent an uneventful vaginal delivery.

Case Two:

Discussion: Managing pregnant patients undergoing non-obstetric surgery requires adjustments for physiologic changes in pregnancy: prioritizing uteroplacental perfusion and oxygen delivery and minimizing fetal drug exposure. Anesthetic concerns for anterior mediastinal mass are equally important. Airway and hemodynamic collapse can occur with the induction of anesthesia. Mass effect or positive pressure ventilation can compromise venous return, which is further reduced on induction. Pericardial effusions can exacerbate preload reduction. This patient was at moderate-to-high risk for perioperative decompensation (Table 1). Other anesthetic techniques (local/regional anesthesia), were not suitable due to lymph node depth or risk of phrenic nerve paralysis. Supraglottic airway and asleep fiberoptic intubation allow for spontaneous ventilation, however would not protect the airway. Given synergistic

complexities bestowed by pregnancy and anterior mediastinal masses, these patients should be evaluated and treated with a bespoke anesthetic plan. For high-risk cases, awake fiberoptic intubation can be a safe option for anesthetic management.

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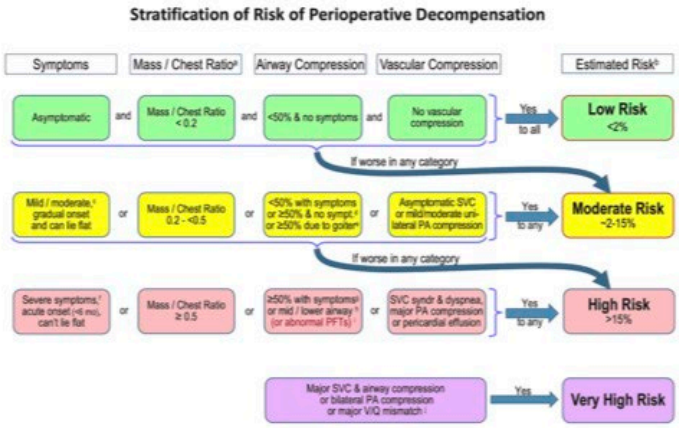

SAT - CR - BS 3 - BR 3B - Call a Consult! – 08

Dual Presentation of Severe Pre-Eclampsia and Fungemic Endocarditis in the Parturient

Presenting Author: Liz T. James, MD

Presenting Author's Institution: Ohio State University Wexner Medical Center - Columbus, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center
Uma Sasso, MD - Ohio State University Wexner Medical Center

Introduction: Infective endocarditis (IE) is a condition often caused by bacterial infection of the endocardial tissue of the heart. Though rare in pregnancy (rate < 0.01%), the condition places the parturient and fetus at significant risk for mortality and morbidity with sequelae including septic emboli, valve destruction, heart failure and preterm birth. Even more uncommon is the presentation of fungal endocarditis with initial treatment involving IV antifungals and potentially valve replacement. Symptoms of dyspnea and pulmonary edema can often be confounded by other obstetric pathology such as pre-eclampsia.

Case One: We present a 40-year-old G1P0 patient with a past medical history of previous opiate use disorder who presented at 24w4d with dyspnea, left-sided pain, and pruritis. She was admitted a few days prior for fever, found to have elevated LFTs and a UTI, and discharged after a normal RUQ ultrasound. Now, elevated blood pressures and persistently elevated LFTs led to a diagnosis of severe pre-eclampsia. HELLP and other causes of elevated transaminases were ruled out by hepatology and hematology. Nifedipine was initiated and titrated up to 60mg BID. During her prolonged hospitalization, periodic NSTs were performed and found to be reassuring. She continued to have intermittent episodes of pulmonary edema and an elevated BNP of 1311. At 26w1d, cardiology was engaged after transthoracic echocardiography demonstrated a mass on the posterior leaflet of the mitral valve with evidence of moderate to severe mitral regurgitation. Infectious disease was consulted after blood cultures grew Candida metapsilosis, recommending a two-week course of Amphotericin B. Blood cultures failed to clear. At 29w1d, the patient had worsening dyspnea despite diuresis. The decision was made to deliver to rule out pre-eclampsia-related pulmonary edema. Patient received a low dose spinal-epidural at 29w3d and delivered a female infant weighing 1355g via C-section with Apgar scores, 5, 5, and 9. The infant was sent to the neonatal ICU. Blood loss was 910 cc. The initial postoperative period was complicated by hypotension, likely due to excessive diuresis. CTAP was performed to rule out hemorrhage, demonstrating splenic and left renal infarcts. Cardiac surgery was consulted, who recommended a mitral valve repair. The patient was sent to the operating room nine days after delivery for mechanical mitral valve replacement. Her postoperative course in the ICU was unremarkable. Her blood cultures began to clear and she was discharged on POD 8.

Case Two:

Discussion: This case demonstrates the complexity of managing paturients with IE. The differential of dyspnea is large in this population, which can delay diagnosis. Furthermore, even after discerning the etiology, anesthetic planning must balance the risks and benefits to both mother and fetus. Interdisciplinary management of this patient's care at an advanced tertiary center ultimately led to a favorable outcome.

References: 1.SN Compr.Clin 2024; 6,66 2. ASM Journ 2023; 36,3

SAT - CR - BS 3 - BR 3B - Call a Consult! – 09

Eye Enucleation for Endophthalmitis in Pregnancy

Presenting Author: Ketty Consuegra, MD

Presenting Author's Institution: University of Cincinnati Medical Center - Home, Ohio

Introduction: Endophthalmitis is a rare, but serious infection of the eye that can lead to systemic disease, vision loss and possibly enucleation. In pregnancy, this infection can lead to sepsis and pose a risk to both mother and fetus. We present a case of a patient with PMH of DM and ITP who developed endophthalmitis and bacteremia with endocarditis at 24 weeks of gestation.

Case One: The patient is a 35-year-old G3P2002 with a past medical history of T2DM and ITP who presented at 24w2d gestation with severe left eye endophthalmitis and markedly elevated intraocular pressures. She reported several days of worsening eye pain, redness, drainage, and acute vision changes. On presentation, she was hypertensive, febrile, tachycardic, and tachypneic. Laboratory evaluation revealed thrombocytopenia (platelets 31), elevated transaminases, CRP, and lactate, with mild metabolic acidosis and hyperglycemia without frank diabetic ketoacidosis. Fetal ultrasound was reassuring. Empiric vancomycin and cefepime were initiated along with magnesium sulfate. Blood cultures grew group B streptococcus (GBS) and methicillin-sensitive Staphylococcus aureus; corneal cultures were positive for GBS. Transesophageal echocardiography revealed aortic and mitral valve vegetations. Despite intensive management in the MICU, including intravitreal antibiotics and antifungals, her vision failed to improve. After multiple goals-of-care discussions, the eye progressed to necrosis with loss of structural integrity, making further intravitreal therapy futile and increasing the risk of globe rupture. The patient ultimately consented to left eye enucleation during the third trimester following multiple multidisciplinary discussions. Fetal monitoring was present throughout the procedure, and a C-section tray was available with the OB team on standby if delivery was necessary.

Case Two:

Discussion: Acute endophthalmitis, an ophthalmologic emergency, is managed with intravitreal broad-spectrum antibiotics, potentially systemic antibiotics and eye enucleation in fulminant infections.1 In pregnancy multidisciplinary conversations with ophthalmology, maternal-fetal medicine, anesthesia, infectious disease, and neonatology allows alignment on antibiotic selection compatible with pregnancy, urgency of surgery, fetal monitoring strategy in the ICU and OR, as well as perioperative timing based on gestational age. As anesthesiologists, our planning must address sepsis risk, aspiration prophylaxis, hemodynamics management and other risks of general anesthesia, additionally complicated by this patient’s pregnancy status. Close communication among teams optimizes maternal and fetal stabilization, fetal safety, and surgical outcomes.

References: Dutton JJ, Anderson RL. Orbital cellulitis and panophthalmitis requiring enucleation during

pregnancy: a case report. F1000Research. 2023;12:1003.

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 01

Beyond Preeclampsia: A Case of Sickle Cell Disease, Hemolysis, and Prolonged Expectant Management in Pregnancy

Presenting Author: Chante Strong, MD

Presenting Author's Institution: UAMS - LITTLE ROCK, Arkansas

Introduction: Pregnant patients with sickle cell disease (SCD) are at increased risk for hypertensive disorders, transfusion complications, and peripartum morbidity. Hemolytic syndromes such as HELLP, delayed hemolytic transfusion reaction (DHTR), and hyperhemolysis can present with overlapping laboratory and clinical features, creating diagnostic and management challenges. Recognition of transfusion-related hemolysis is critical, as additional transfusions may worsen anemia and increase morbidity. This case highlights the importance of multidisciplinary coordination and anesthetic planning in a pregnant patient with SCD complicated by DHTR and hyperhemolysis.

Case One: A 29-year-old gravida 3 para 0202 with HbSS presented at 32+3 weeks gestation after transfer for worsening preeclampsia and anemia following recent hospitalization for sickle cell pain crisis. She had received antenatal corticosteroids and multiple packed red blood cell transfusions at an outside hospital. On arrival, laboratory evaluation demonstrated progressive anemia refractory to transfusion, elevated LDH and bilirubin, low haptoglobin, and a positive direct antiglobulin test (C3 only), raising concern for immune-mediated hemolysis. Differential diagnoses included HELLP syndrome, DHTR, and hyperhemolysis. Given concern that transfusion was exacerbating hemolysis, further transfusions were withheld. Management included IVIG and corticosteroids with close maternal and fetal monitoring. After prolonged inpatient management, the patient underwent urgent cesarean delivery for cord prolapse under coordinated anesthetic planning and was discharged in stable condition.

Case Two:

Discussion: This case illustrates the diagnostic complexity of hemolysis in pregnant patients with SCD. HELLP syndrome, chronic sickle cell hemolysis, DHTR, and hyperhemolysis share overlapping laboratory features. In this patient, worsening anemia following transfusion, complement-only DAT positivity, and reticulocytopenia favored immune-mediated hemolysis over HELLP. Importantly, delivery would not have resolved the underlying pathology and could have increased maternal risk. From an anesthetic perspective, profound anemia combined with transfusion avoidance posed significant challenges. Early neuraxial analgesia was strategically used to reduce physiologic stress and facilitate controlled conversion to surgical anesthesia. Intraoperative management emphasized strict avoidance of sickling triggers and restrictive transfusion practices, with close coordination among anesthesia, hematology, obstetrics, and the blood bank. System-level gaps included delayed access to compatible blood and initial transfusion exposure at the referring hospital. Earlier identification of transfusion risk, standardized antigen matching for SCD patients, and improved interfacility communication may reduce morbidity in

similar cases.

References: 1. Blood Adv 2020;4:327 2. Transfus Apher Sci 2019;58:102659 3. Haematologica 2016;101:e215 4. Am J Obstet Gynecol 2023;229:B2

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 02

Crisis Averted: A Multidisciplinary Approach to Sickle Cell Disease in Pregnancy

Presenting Author: Meghna Jayaraman, MD

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Co-Authors: Dan Colombo, BS - Weill Cornell Medicine

Introduction: Sickle cell disease (SCD) is an inherited hemoglobinopathy characterized by abnormal hemoglobin (Hgb) polymerization, resulting in vaso-occlusion, impaired oxygen transport, and end-organ damage. In pregnancy, SCD is associated with increased risks of vaso-occlusive crises, infection, preeclampsia, maternal mortality, fetal growth restriction, preterm birth, and perinatal mortality [1]. Although most SCD pregnancies result in favorable outcomes, careful multidisciplinary management is essential. We present the perioperative management of a patient with SCD undergoing induction of labor (IOL) and cesarean delivery (CD).

Case One: A 33-year-old G2P0100 at 33 weeks 2 days' gestation was admitted for an acute pain crisis. Her history was significant for SCD complicated by prior acute chest syndrome, pulmonary hypertension, iron overload–related myometrial damage, alloimmunization to eight clinically significant antibodies, prior intrauterine fetal demise secondary to hemolytic transfusion reaction, and asthma. Care was coordinated among maternal-fetal medicine, hematology, obstetrics, and anesthesiology. Following resolution of her pain crisis, IOL was initiated at 34 weeks 5 days' gestation with combined spinal-epidural anesthesia. Pre-induction Hgb was 6.5 g/dL, and she received one unit of crossmatched packed red blood cells. The intrapartum course was complicated by chorioamnionitis and failed IOL, prompting level 2 CD. In addition to standard monitoring, an arterial line was placed, and supplemental oxygen was administered via nasal cannula with end-tidal CO_2 monitoring. A second large-bore IV was established, and the labor epidural was titrated to a T4 surgical level using 2% lidocaine with epinephrine. Prophylactic antibiotics were administered. CD was uncomplicated without excessive blood loss. On postoperative day (POD) 2, the patient developed fever and tachycardia; infectious and hemolytic workups were negative. Empiric piperacillin-tazobactam and vancomycin were initiated, and postoperative pain was managed with hydromorphone patient-controlled analgesia. The patient was discharged on POD 7 with oral oxycodone and amoxicillin-clavulanate.

Case Two:

Discussion: Approximately 8 million individuals worldwide live with SCD. Optimal peripartum care requires coordinated multidisciplinary management, appropriate analgesia, and thorough evaluation, including blood counts, type and screen, and consideration of prophylactic transfusion. The risks and benefits of uterotonics and antifibrinolytics should be considered. While SCD alone does not dictate mode of delivery, neuraxial anesthesia is preferred for CD due to improved pain control, avoidance of airway manipulation, and reduced bleeding risk in high-risk patients [2].

References: 1. Oteng-Ntim E et al. Blood. 2015. PMID: 25800049 2. Stoddard K et al. BJA Ed. 2022. PMID: 35211325

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 03

Anesthetic Management of a Patient with Known Sickle Cell Disease Presenting with Acute Chest Syndrome and Preeclampsia with Severe Features Requiring Cesarean Delivery: A Case Report

Presenting Author: Noel Cercizi, BA

Presenting Author's Institution: Albert Einstein College of Medicine - Bronx, New York

Co-Authors: Audrey Crane, MD - Montefiore Medical Center
Xinhao Liu, MD, PhD - Montefiore Medical Center

Introduction: Pregnant patients with sickle cell disease (SCD) are at heightened risk of red blood cell sickling and subsequent vaso-occlusive episodes (VOEs) due to the pro-inflammatory, hypercoagulable state, and dilutional anemia that accompany pregnancy1. Meanwhile, hydroxyurea is typically discontinued due to its teratogenic potential2. For these patients, care focuses on trigger prevention and supportive measures including hydration and supplemental oxygen. These patients are also started on high-dose folic acid to support erythropoiesis and low-dose aspirin to mitigate risks of preeclampsia2,3. Exchange transfusion can also be used to manage anemia and decrease proportion of sickled cells2,3.

Case One: A 33-year-old G2P0010 female with known SCD presented with acute chest syndrome and preeclampsia with severe features. She was admitted to the ICU for monitoring on high flow nasal cannula, and blood pressure control requiring nifedipine infusion. While there she developed transaminitis concerning for HELLP syndrome, prompting maternal-fetal medicine (MFM) to recommend urgent cesarean following exchange transfusion. Preoperative Hgb was 12.1 g/dL (Hct 35.4%), Plts were 62 k/uL.

Case Two:

Discussion: In the setting of her respiratory compromise (HFNC 40 L/min, FiO2 50%), the patient was at high risk for complications from general anesthesia, including postoperative ventilator dependence and inability to extubate. Her concomitant thrombocytopenia and suspected HELLP syndrome placed her at elevated risk of spinal epidural hematoma from neuraxial anesthesia. Additionally, she was at risk of postpartum hemorrhage with relative contraindications to carboprost and methergine. After extensive discussion between anesthesia, MFM, OB, and the patient, it was decided to try a single spinal attempt without indwelling epidural catheter to minimize hematoma risk. General setup was on hand for emergent transition if needed. Ultimately, she underwent uncomplicated CS maintained on HFNC. Her estimated blood loss was 700 mL and she did not require blood products or uterotonics. Following delivery the patient remained stable, with improvement in BP and VOE symptoms. The neonate was admitted to the NICU and discharged two months later. This case demonstrates the complexity of decision making in obstetric cases with cardiopulmonary and hematological comorbidities and the importance of interdisciplinary communication.

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SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 04

Challenges in Diagnosis and Management of Sickle Cell Disease and HELLP

Presenting Author: Claire Herzog, MD

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Liliana Z. Goelkel-Garcia, MD - University of Minnesota

Introduction: Sickle cell disease (SCD), an inherited hemoglobinopathy, is marked by hemolytic anemia and recurrent vasoocclusive crises (VOC) affecting multiple organ systems. Pulmonary vasculature occlusion presents as acute chest syndrome (ACS), leading to hypoxemia, pulmonary infarction, and increased morbidity. Pulmonary arterial hypertension (PAH) of chronic thromboembolic etiology is a complication of SCD and can lead to right ventricular (RV) dysfunction, RV failure, and cardiovascular collapse if under-recognized. Venous thromboembolism, preeclampsia (PreE) and eclampsia, and postpartum hemorrhage have been reported in higher frequencies among SCD parturients, leading to increased risk of negative peripartum outcomes1. HELLP syndrome (Hemolysis, Elevated Liver enzymes, Low Platelets) could be difficult to distinguish from a VOC or ACS given overlapping clinical presentations and diagnostic criteria.

Case One: We describe a patient with SCD who presented at 31w6d of gestation with chest wall and extremity pain, tachycardia, dyspnea, and increased oxygen requirement (8 L). VOC was initially suspected based on the patient's history of recurrent VOC during this pregnancy; differential diagnosis also included ACS, PreE or HELLP, and pulmonary embolism (PE). Paraclinical tests found pulmonary edema, hemolytic anemia, severe thrombocytopenia, and elevated aspartate aminotransferase. Chest CT ruled out PE, but showed 3.9-cm dilatation of the main pulmonary artery raising concern for PAH. Echocardiogram revealed mild RV dilatation and mildly reduced RV function. Ultimately, laboratory findings and pulmonary edema not explained by other causes supported a diagnosis of HELLP syndrome. Delivery for maternal indication was recommended by the Obstetrics team in consultation with Obstetric Anesthesiology, Cardiology, and Hematology. Emergency cesarean section was performed under general anesthesia. A radial arterial line was used for hemodynamic monitoring. The case was completed without significant complications. The patient was transferred to the ICU and was extubated on the same day. Hypoxic respiratory failure attributed to persistent pulmonary edema improved with diuresis postoperatively. The patient was discharged on day 10 with plans for additional PAH workup as an outpatient.

Case Two:

Discussion: The complex pathophysiology of SCD and pregnancy can convolute diagnosing life-threatening conditions such as HELLP syndrome. In addition, PAH and RV dysfunction are potential

complications of SCD2 that can be detrimental in pregnancy. SCD disproportionately affects Black populations, and contributes to racial disparities in maternal morbidity and mortality. Antenatal optimization can significantly improve maternofetal outcomes.

References: 1. Boulet SL, et al. SCD in pregnancy. Matern Child Health J. 2013;17(2):200-7. doi:10.1007/s10995-012-1216-3 2. Karimi MB. Neglected PAH in Sickle Cell Anaemia during Prenatal Care. Eur J Case Rep Intern Med. 2020;7(6):001532. doi:10.12890/2020_001532

Challenges in Diagnosis and Management of Sickle Cell Disease and HELLP.pdf

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 05

Anesthetic Management of a Preeclamptic, Morbidly Obese Parturient With Von Willebrand Disease: A Case Report

Presenting Author: Isabella Griffay, MD

Presenting Author's Institution: St. Joseph's Medical Center - Clarksburg, California

Introduction: Von Willebrand disease (vWD) is the most common inherited bleeding disorder and presents anesthetic challenges in pregnancy due to impaired hemostasis and variable disease severity. Preeclampsia is multi-organ system dysfunction characterized by new onset hypertension and proteinuria or end-organ dysfunction. Morbid obesity is defined as body mass index (BMI) >40 or greater than 35 with severe comorbidities. We present a case of a preeclamptic, morbidly obese parturient with vWD of unknown type who underwent cesarean delivery under spinal anesthesia, highlighting anesthetic decision-making in a high-risk obstetric patient.

Case One: A 27-year-old G2P1001 at 35 weeks and 5 days, ASA III, presented from clinic with severe-range blood pressures (184/100 and 176/100). She denied headache or visual changes. Medical history was significant for vWD of unknown type and morbid obesity (BMI 48). She was diagnosed with vWD in childhood but had never required treatment and reported an uncomplicated prior cesarean delivery. No vWF levels had been obtained during either pregnancy. Fetal ultrasound demonstrated a cleft lip and palate. On admission, she received magnesium sulfate 4gm IV over 20min and nifedipine 10mg PO. Fetal monitoring showed a category 1 tracing. Due to persistent hypertension and concern for bleeding risk, operative delivery was planned. Labs indicated hemoglobin was 8.7. Hematology recommended IV desmopressin (DDAVP) 20mcg 30min prior to her planned procedure. However, after receiving the treatment the case was delayed 9 hours due to concurrent workload. Intraoperatively, spinal anesthesia was performed in the sitting position using ultrasound guidance due to poorly palpable landmarks and multiple failed prior attempts. Intrathecal 0.75% hyperbaric bupivacaine (1.6 mL) with morphine 200 mcg produced a T4 sensory level. Excellent surgical anesthesia to a T4 level was established. Cesarean delivery proceeded without complication. Tranexamic acid 1 g was administered after delivery. Quantified blood loss was 600 mL. Neonatal Apgar scores were 8 and 9. The baby was tolerating extrauterine life and had no apparent respiratory or feeding problems due to the cleft lip and palate. Postoperative labs on POD1 showed sodium 133 mmol/L and hemoglobin 7.7 g/dL. The patient was discharged on hospital day six following an uncomplicated recovery.

Case Two:

Discussion: This case illustrates the complex management of a parturient with multiple health issues. The safe management of this patient required careful weighing of potential risks to minimize complications. The increased hemorrhage risk was mitigated by ultrasound guided spinal anesthesia combined with pharmacotherapy. The potential progression of her severe preeclampsia increased the

urgency of delivery and complexity of intraoperative management. Complete history and consideration of all aspects of this case led to a safe, successful delivery.

References: 1. Hematol Oncol Clin North Am 2021;35:1085–1101 2. Eur J Haematol 2019;103:73–79

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 06

Platelet-sparing peripartum hemostatic management in Glanzmann thrombasthenia: prophylactic rFVIIa plus tranexamic acid for planned vaginal delivery

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Presenting Author's Institution: Department of Anesthesiology and Intensive Care Medicine, University Hospital Innsbruch - Innsbruck, Tirol

Co-Authors: Philipp Lichtenberger, MD - Department of Anesthesiology and Intensive Care Medicine, Medical University Innsbruck

Introduction: Glanzmann thrombasthenia (GT) is a rare inherited platelet function disorder with substantial risk of peripartum and postpartum hemorrhage.[1] While platelet transfusion can be effective, contemporary pregnancy management emphasizes minimizing platelet exposure where feasible to reduce alloimmunization (anti-HLA/anti-αIIbβ3), refractoriness, and fetal/neonatal risks from transplacental antibodies.[1,2] Recombinant activated factor VII (rFVIIa) is an approved option for GT in specific settings, including prevention of bleeding around invasive procedures.[3]

Case One: A 30-year-old woman (G1P0) with type 1 GT and a severe bleeding phenotype (recurrent mucosal bleeding episodes) had an otherwise uncomplicated pregnancy. Platelet antibody screening was negative; nonetheless, platelet transfusion was avoided to minimize alloimmunization risk, with two HLA-matched single-donor platelet units reserved for rescue therapy. Induction of labor at 40 weeks' gestation was scheduled following multidisciplinary coordination among hematology, obstetrics, anesthesia, and neonatology. Neuraxial techniques were avoided; labor analgesia used nitrous oxide. Tranexamic acid 1 g three times daily was started on the day labor induction began (48h before delivery) and continued until 2 weeks postpartum. rFVIIa 90 µg/kg IV was initiated at 5 cm cervical dilation (6h before delivery) and administered in a step-down schedule (Figure 1). Quantitative blood loss (QBL) was measured; scheduled laboratory and viscoelastic monitoring (ROTEM) showed no hyperfibrinolysis. A healthy neonate was delivered vaginally (Apgar 8/9/10) with stable maternal hemodynamics. Immediately after delivery, carbetocin 100 µg was administered. QBL was 600 mL during delivery. One hour postpartum, retained placental tissue required manual removal under general anesthesia with an additional 400 mL blood loss. No blood products were transfused. Postpartum, rFVIIa was continued for five days with tapering intervals while tranexamic acid was maintained orally; during rFVIIa therapy, enoxaparin 40 mg SC daily was administered, with close surveillance. No thrombotic or bleeding complications occurred.

Case Two:

Discussion: A protocolized multidisciplinary plan using TXA and rFVIIa enabled platelet-sparing management of planned vaginal delivery in GT, including an unplanned manual placental removal without transfusion. Key transferable elements include timed delivery planning, objective QBL, protocolized step-down dosing, and a predefined rescue pathway with immediate access to HLA-matched platelets.

References: [1] Fiore M, et al. Blood. 2022;139:2632–2641. [2] Rutten KHG, et al. Br J Haematol. 2025;207:1702–1708. [3] European Medicines Agency. NovoSeven (eptacog alfa activated) EPAR: Product Information (Glanzmann's thrombasthenia section). Accessed Jan 22, 2026.

Timeline.pdf

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 07

Placental Vascular Malformation: A High-Risk Cesarean Delivery

Presenting Author: Erica Chemtob, MD

Presenting Author's Institution: The George Washington University - Washington, District of Columbia

Introduction: This is a case report of a parturient with known vascular malformation of the placenta with possible arterial components, putting her at high risk of hemorrhage with delivery. Interventional radiology placed pre-delivery bilateral internal iliac balloon catheters, to be inflated intra-operatively in the event that hemorrhage occurred. Trauma surgery was on standby, perfusion managed the cell saver machine, and anesthesiology placed pre-delivery arterial line with large-bore PIV's.

Case One: 32 year old female G6P2112 at 37 weeks 3 days presented for a planned cesarean section. The patient's past medical history included history of mid-transverse c-section at 24 weeks for placental abruption complicated by hemorrhage secondary to disseminated intravascular coagulopathy. Third trimester ultrasound detected an abnormal placenta with large turbulent venous lakes. MRI imaging confirmed the vascular malformation of the placenta. Given her prior cesarean deliveries, the obstetrician team was concerned about a possible arterial component of the vascular malformation, which would put the patient at high hemorrhage risk. The patient was admitted, and received a L3-4 level epidural, a pre-delivery arterial line, and 2 large bore peripheral IVs. She was type and crossed for 6 units of pRBC and FFPs. Trauma surgery was consulted for possible emergent REBOA (Resuscitative Endovascular Balloon Occlusion of the Aorta) placement. Interventional radiology placed bilateral internal iliac balloon catheters before c-section; these catheters were not inflated. The patient was then transported to the main operating room for c-section. The baby was delivered with APGARs of 8 and 9. Hemorrhage ensued which resulted in interventional radiology inflating the balloon catheters. The uterus and placenta were exteriorized, showing a placenta accreta and suspected increta. Therefore, the decision was made to proceed with hysterectomy. The patient underwent a rapid sequence intubation using video laryngoscopy. The patient was given 4 units of donor pRBC, cell saver, tranexamic acid, calcium, and phenylephrine infusion. Hysterectomy and salpingectomy were performed. The patient was extubated in OR, in stable condition, and transported to IR for embolization of bilateral internal iliac arteries and bilateral uterine arteries. Final EBL was 1500mL due to these implemented steps. She was discharged home on post-operative day 3, stable, and with minimal pain.

Case Two:

Discussion: Vascular malformation of placenta with arterial components puts patients at high-risk of hemorrhage with delivery. Prophylactic bilateral internal iliac balloon catheterization can reduce blood flow to the placenta and uterus, leading to reduced blood loss. These cases with large placental vascular malformation often require management of a multidisciplinary team of anesthesiologists, obstetricians, interventional radiologists and trauma surgeons in order to maximize patient safety and minimize risk.

References: 1. PMID: 33828954 2. PMID: 37527770

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 08

Cerebral Vasoconstriction Syndrome in Peripartum Patient

Presenting Author: Meron Teklu, BA

Presenting Author's Institution: Icahn School of Medicine at Mount Sinai - New York, New York

Introduction: 66% of patients with Reversible Cerebral Vasoconstriction Syndrome (RCVS) develop symptoms within one week of delivery, often after a normal pregnancy.4

Case One: 26 y.o. female G1P1 at 39w4d with PMH of Graves disease, admitted for IOL from clinic in setting of new oligohydramnios with non-reassuring fetal heart rate tracing. IOL was started with Pitocin and soon went in for her planned cesarean section under an epidural and spinal. During closure, patient became hypotensive to SBP 40s, received phenylephrine 400 mcg and ephedrine 10 mg bolus. SBP increased to >200. Acutely developed headache, visual changes and then had witnessed first time seizure for a few minutes with b/l UE flexion/tonic clonic activity, signs of increased ICP, and signs of hypoxemia. Aborted with Versed 4. Stroke code was called; patient had CT head without acute findings and CT angiogram with right M2 occlusion. She was taken for a possible mechanical thrombectomy. Angiography resulted patent right MCA and multifocal segmental narrowing in distal R ACA and MCA branches, most c/w RCVS. She received IA verapamil, keppra, and admitted to SICU where she had complete resolution of symptoms. Follow up CTA head/neck shows resolution of high grade Right M2 stenosis.

Case Two:

Discussion: In a nationwide UK analysis, 20-38% of eclamptic seizures occur without prior documentation of hypertension or proteinuria.1 RCVS can present similarly in normotensive patients, making differentiation challenging without vascular imaging.3 Multifocal segmental arterial narrowing that self resolves, is pathognomonic for RCVS.2 While phenylephrine and ephedrine are generally considered safe, excessive or rapid blood pressure changes can precipitate neurological events in susceptible individuals. No evidence-based preventive regimen exists; management remains experience-based and focuses on trigger avoidance, careful blood pressure control, and early recognition.5

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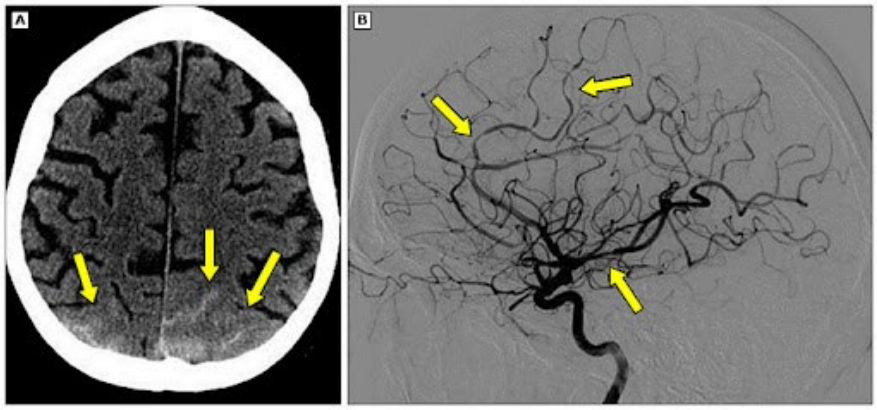

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 09

When Dialysis Meets Delivery: Anesthetic and Multidisciplinary Challenges in a Pregnant Patient with Type 1 Diabetes, End-Stage Renal Disease on Intensive Dialysis, and Chronic Hypertension

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Co-Authors: Tiffany Angelo, DO - Stony Brook University Hospital
Michael Lu - Stony Brook University Hospital

Introduction: Pregnancy in women with end-stage renal disease (ESRD) is rare and high risk, with complications including preeclampsia, preterm birth, and fetal growth restriction. Even with dialysis, historical live birth rates were 40–50% (1). Outcomes improve with intensive hemodialysis; near-daily regimens prolong gestation and increase live birth rates compared with conventional schedules (2, 3). Superimposed chronic hypertension (cHTN) and type 1 diabetes mellitus (T1DM) further elevate maternal and fetal risk through end-organ progression and glycemic instability (4). Optimal management requires multidisciplinary coordination among obstetrics, nephrology, endocrinology, and anesthesiology.

Case One: A 32-year-old G2P0101 with T1DM complicated by retinopathy, neuropathy, gastroparesis, and nephropathy presented at 32 weeks with ESRD on near-daily dialysis, cHTN, anemia, and anti-Kell alloimmunization. Her prior pregnancy ended in preterm cesarean for preeclampsia with severe features at 33 weeks. On admission, she had labile systolic pressures of 160–190 mmHg requiring high-dose labetalol, nifedipine, and IV hydralazine. Dialysis was performed six times weekly for volume and metabolic optimization. Fetal echocardiography showed a transient pleural effusion that resolved with intensified dialysis. Glycemic control was challenging despite an insulin pump, necessitating endocrinology-directed adjustments and supplemental NPH. At 34 weeks, recurrent severe-range pressures raised concern for superimposed preeclampsia versus cHTN/CKD progression. After multidisciplinary discussion, repeat cesarean was performed under spinal anesthesia following preoperative dialysis. Estimated blood loss was 481 mL with stable perioperative hemodynamics. Magnesium sulfate was withheld due to toxicity risk in ESRD. Postoperatively, she resumed thrice-weekly dialysis, with pressures controlled on labetalol and nifedipine. Mother and neonate were discharged stable.

Case Two:

Discussion: This case illustrates the complexity of peripartum management in ESRD with T1DM and cHTN. Intensive dialysis was critical for maternal metabolic stability and fetal wellbeing, likely contributing to resolution of fetal pleural effusion. Prior studies show increased dialysis frequency improves fetal growth and survival while reducing complications such as polyhydramnios (2, 3). Blood pressure management required individualized targets balancing renal perfusion and avoidance of severe

hypertension. Avoiding magnesium underscores anesthetic challenges in weighing eclampsia prophylaxis against toxicity risk, particularly when severe hypertension may reflect poorly controlled cHTN rather than preeclampsia. Multidisciplinary care enabled favorable maternal and neonatal outcomes despite overlapping high-risk comorbidities.

References: 1. American Journal of Kidney Diseases23.1 (1994): 60-63. 2. Nephrology Dialysis Transplantation31.11 (2016): 1915-1934. 3. Hemodialysis International 20.3 (2016): 339-348. 4. Seminars in dialysis. Vol. 16. No. 5. 2003.

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 10

Multidisciplinary Management and High-Risk Cesarean Delivery in Mosaic Turner Syndrome with Complex Aortic Pathology: A Case Report

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Presenting Author's Institution: UC Davis - Sacramento, California

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Introduction: The physiologic changes of pregnancy increase stress on the cardiovascular system. Turner syndrome is a sporadic chromosomal disorder characterized by partial or complete deletion of one X chromosome and is associated with congenital cardiovascular abnormalities, most notably bicuspid aortic valve, coarctation, and dissection of the aorta.1 Only about 10% of individuals with Turner syndrome, usually those with mosaicism, can achieve spontaneous pregnancy; however, pregnancy in this population is high risk and associated with increased maternal and fetal complications, including preeclampsia, preterm birth, Cesarean delivery, and aortic dilation or dissection.1,2 These risks are driven by pregnancy hemodynamic and hormonal changes and require close surveillance and multidisciplinary management.3

Case One: A 28-year-old G4P2112 at 31w2d presents to the hospital with worsening dyspnea at rest and rising brain natriuretic peptide (BNP). The patient has a history of mosaic Turner Syndrome with 2 separate aortic dissections, she is status post aortic root replacement for Type A dissection in the setting of a previous bicuspid aortic valve as well as a separate Type B dissection status post endovascular repair complicated by residual chronic suprarenal aortic aneurysm. Echocardiography demonstrated a well-seated bioprosthetic valve and EF of 65%. She had consultations with OB Anesthesia, MFM, cardiology, vascular, and cardiothoracic surgery for delivery planning. Despite normal echo findings, her worsening NYHA status and elevated BNP suggested evolving HFpEF and the decision was made to deliver via Cesarean section at 32w1d for maternal decompensation. Anesthetic management focused on minimizing aortic shear stress, supporting cardiac output, and minimizing volume overload. Intraoperatively, invasive arterial access was established and a modified combined spinal epidural with reduced intrathecal dose was selected to allow for gradual onset of sympathectomy and controlled hemodynamics. Her C-section was uncomplicated. She was discharged on post-op day 2.

Case Two:

Discussion: Pregnancy in patients with Turner syndrome with associated aortopathy confers substantial cardiovascular risk, particularly in the third trimester when physiologic increases in cardiac output and blood volume peak. While traditional cardiac risk scoring models (mWHO, ZHARA, CARPREG) have focused on anatomic lesions, in this case clinical decision making was guided by functional capacity, i.e. physiological, changes. Recent literature supports a possible role for NYHA class in cardiac risk modeling.4 This case highlights the importance of early anesthesia consultation, multidisciplinary

coordination, and an individualized anesthetic to optimize maternal and fetal outcomes in parturients with complex aortopathy.

References: 1. J Cardiovasc Dev Dis 2021;8:138 2. Obstet Gynecol Surv. 2020 Sep;75(9):566-575. 3.Exploration of Medicine 2.5 (2021): 423-434. 4.Int J Cardiol Congenit Heart Dis 2023;15:100486

SAT - CR - BS 3 - BR 3B - Blood, Platelets, Vessels – 11

Peripartum Management of Hypodysfibrinogenemia

Presenting Author: Rachel Brock, MD

Presenting Author's Institution: University of Colorado Anschutz Medical Center - Westminster, Colorado

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Introduction: Hypodysfibrinogenemia is a rare congenital quantitative and qualitative fibrinogen disorder that may manifest as bleeding, thrombosis, or both. Its management during the peripartum period poses unique challenges due to the potential for both hemorrhage and thromboembolic events. We present successful multidisciplinary management of a parturient with familial hypercoagulable hypodysfibrinogenemia.

Case One: A 31-year-old G1P0000 at 37 weeks and 4 days' gestation with a history of hypercoagulable familial hypodysfibrinogenemia presented for planned induction of labor. She had a strong family history of venous thromboembolism and was followed by hematology. She was maintained on therapeutic Enoxaparin for possible pulmonary embolism earlier in pregnancy. On admission, her fibrinogen was 61 mg/dL; she received 68.9 mg/kg fibrinogen concentrate (based on admission weight 72.6 kg), increasing her level to 121 mg/dL. An additional 27.5 mg/kg was administered, increasing her fibrinogen to 179 mg/dL. A combined spinal-epidural was placed without complication. She had a spontaneous vaginal delivery with estimated blood loss of 750 mL and received oxytocin and carboprost tromethamine for uterotonic support. On postpartum day 1, her fibrinogen was 147 mg/dL; she received an additional 13.8 mg/kg fibrinogen concentrate and resumed therapeutic Enoxaparin that evening. She was discharged in stable condition on postpartum day 2.

Case Two:

Discussion: There are no evidence-based management guidelines for hereditary fibrinogen disorders; recommendations rely largely on expert consensus. Women with these conditions have increased risks of miscarriage (~30%), placental abruption (~8%), and postpartum hemorrhage (~20%). Although neuraxial anesthesia is often avoided due to concern for hematoma, a 2023 multicenter study found no epidural hematomas among patients diagnosed after delivery who received neuraxial anesthesia. A minimum fibrinogen of 150 mg/dL is often recommended for labor and neuraxial placement. Point-of-care viscoelastic hemostatic assays can aid real-time fibrinogen replacement, particularly in postpartum hemorrhage. Fibrinogen concentrate is the preferred replacement therapy, with cryoprecipitate as an alternative when unavailable. Antifibrinolytics are generally avoided due to thrombosis risk, except in postpartum hemorrhage. This case underscores the delicate balance between bleeding and thrombosis in hypodysfibrinogenemia and illustrates how laboratory-guided replacement, risk-balanced anticoagulation,

and multidisciplinary collaboration among obstetric, hematology, and anesthesia teams enable safe neuraxial anesthesia and favorable maternal outcomes.

References: 1. Casini A. Blood. 2025;145(8):801–810. doi:10.1182/blood.2024025712. 2. Hugon-Rodin J, et al. J Thromb Haemost. 2023;21(8):2126–2136. doi:10.1016/j.jtha.2023.04.035. 3. Valiton V, et al. Haemophilia. 2019;25(5):747–754. doi:10.1111/hae.13825.

SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 01

Peripartum Cardiomyopathy Increases the Risk of Venus Thromboembolism and Coagulopathy: A Complex Physiology of Hemostatic Morbidity

Presenting Author: Jeffrey Q. Lee, MD

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Abstract :

Introduction

Peripartum cardiomyopathy (PPCM) is an idiopathic cardiomyopathy defined by slowly progressing left ventricular dysfunction, which has the potential risk of thromboembolic complications. The pathophysiology and morbidities surrounding thromboembolic events in women with PPCM remain understudied. As such, this study aims to compare the hemostatic and cardiopulmonary complications of PPCM patients relative to general pregnancies.

Methods

Using data from the TriNetX Network, we conducted a retrospective cohort analysis of women who were diagnosed with PPCM. The primary outcome assessed was presence of both hyper- and hypocoagulable states, specifically through venous thromboembolism (VTE), coagulopathy, and postpartum hemorrhaging (PPH), respectively. Secondary outcomes included mortality, heart failure, ICU admission, arrhythmias, ischemic stroke, LV thrombus, defibrillation/cardioversion, as well as laboratory values spanning CBC, BMP, cardiac markers, and coagulation factors.

Results

Following baseline matching of cohorts, VTE risk was found to be significantly higher (HR = 6.32, 95% CI: 4.07 - 9.81, $p < 0.001$) while PPH was not significant (HR = 0.83, 95% CI: 0.62 - 1.12, $p = 0.22$). Secondary outcomes were only found to be significant across heart failure (HR = 86.95, 95% CI: 51.2 - 147.6, $p < 0.001$), ICU admission (HR = 23.45, 95% CI: 14.63 - 37.60, $p < 0.001$), arrhythmias (HR = 14.48, 95% CI: 9.64 - 21.73, $p < 0.001$), and coagulopathy (HR = 5.16, 95% CI: 2.98 - 8.95, $p < 0.001$).

Conclusion

Compared to the general population, PPCM indicates an increased risk of thromboembolism with an increase in coagulopathy, but without a corresponding increase in PPH. This emphasizes the need for greater risk stratification in hemostatic management focused on cardiovascular decompensation.

References: 1. J Thorac Dis 2024;16:645–660

SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 02

Contemporaneous reported clinical outcomes of pregnancy in maternal cardiac patients: a systematic review

Presenting Author: Cheryl Achary, FRCA

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Co-Authors: Steve Harris, FRCA - UCLH
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David Walker, FRCA - UCLH
fiona Walker, MRCP - UCLH

Abstract :

Contemporaneous reported clinical outcomes of pregnancy in maternal cardiac patients: a systematic review
C.Achary, C.Smith, F.Walker, D.Walker and S.Harris.

Abstract
Introduction
Due to a combination of increasingly older maternal populations and improved survival from congenital heart disease into adulthood, cardiac disease is now the leading cause of maternal mortality in the UK and the USA. The aim of this review is to share updated contemporaneous reported outcomes of pregnancies in women with cardiac disease, to provide improved clarity for shared decision making.

Methods
Reports of pregnancy outcomes in adult women with cardiac disease published in the preceding 10 years (2012-2022) were systematically reviewed. We reported pooled estimated rates of maternal cardiac complications, maternal death and the most reported complications for obstetric and neonatal outcomes. Where studies report outcomes for cases and controls, pooled effect size of maternal cardiac disease on the risk of an adverse maternal cardiac event or death was estimated. Cardiac conditions reported across the studies were further grouped by the modified WHO score, and outcomes for each category were also reported.

Results
136 studies, of which 25 were case control designs, were included. 51,290 women across 36 geographical regions were represented. Women with cardiac disease had more than a 50x (RR 55.96 (95% CI: 18.45-169.74)) increased risk of a cardiac complication and more than 60x (RR 61.37 (95% CI: 34.69 – 108.55)) increased risk of death in the peripartum period (Figure 1). A pooled estimated 16.83% (95% CI: 14.3-19.53%) of women with cardiac disease suffered a cardiac complication, and a pooled estimated 2.93% (95% CI: 2.13-3.84%) did not survive beyond the puerperium.

Pooled rate of Caesarean section delivery was 48.01% (95% CI: 42.33 – 53.75%). Obstetric and Foetal adverse outcomes were also raised compared to nationally reported UK outcomes from the general obstetric population. A pooled estimated 9.8% (95% CI: 6.96-13.52%) of women suffered a PPH event.

Rate of premature birth were 21.83% (95% CI: 18.38 – 25.72%). 20.16% (95% CI:14.89-26.72%) of foetuses delivered were small for gestational age and 1.26% (95% CI: 0.76-2.09%) did not survive past the first 30 days of life.

Conclusion
Although the risks of suffering a cardiac complication during pregnancy are still relatively small for women with cardiac disease, their risks are dramatically higher than the baseline population. Risks of obstetric and foetal complications are also raised.

Future work should be aimed at standardising reported outcomes in this complicated and vulnerable group of patients. This would lay the foundation for more precise disease specific outcomes.

References:

References

Full list available at: https://github.com/tagimoucia-cheryl/to_share/blob/main/SR/references/sr_references.txt

sr_soap_figure.pdf

SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 03

Anesthetic management in cardiac surgery during pregnancy: a 16-year clinical study of 138 patients

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Abstract :

Objective: Cardiac surgery during pregnancy represents the highest-risk clinical scenario with high maternal and fetal mortality. This retrospective study summarizes our 16-year experience in perioperative anesthetic management and maternal-fetal outcomes.

Methods: This study pooled clinical data from two major national cardiovascular centers in China, including 138 patients who underwent cardiac surgery during pregnancy (2010–2025). Patients were divided into two groups by fetal management: Cardiac surgery with fetus in situ or Cesarean delivery (CS) prior to cardiac surgery.

Results: A total of 138 patients undergoing cardiac surgery during pregnancy were included. The most common etiologies were aortic dissection (35.5%) and valvular heart disease (28.3%). All patients underwent preoperative multidisciplinary team discussion. The median time from presentation to surgery was 19 days. 61 patients (44.2%) underwent emergency surgery. The utilization rate of intraoperative transesophageal echocardiography (TEE) was 64.5%, and that of advanced hemodynamic monitoring with cardiac output measurement (FloTrac or pulmonary artery catheter) was 42%. Continuous fetal heart rate monitoring was employed in 37.0% of cases. Intraoperative autologous blood transfusion was used in all patients, and the incidence of massive transfusion (>10 units of red blood cells) was 3.6%. The median of the peak intraoperative vasoactive-inotropic score (VIS) was 5 $mg.kg^{-1}.min^{-1}$. Immediate

extubation in the operating room was achieved in 12.3% of patients, and multimodal regional analgesia was applied in 15.9% of cases. The median duration of postoperative mechanical ventilation was 21 hours, and the median intensive care unit (ICU) length of stay was 3 days. There were 4 maternal deaths. No intraoperative maternal death occurred; all four deaths occurred postoperatively between 10 and 30 days after surgery. The overall fetal-neonatal mortality rate was 23.9%. In the Cardiac surgery with fetus in situ group, there were 3 intraoperative fetal deaths and 25 postoperative fetal deaths, which occurred at a median of 10 days (range, 4-20 days) after maternal surgery. In the CS prior to cardiac surgery group 5 neonates died after delivery.

Conclusion: Maternal and fetal safety during cardiac surgery in pregnancy is highly dependent on precise, anesthesia-centered perioperative management. The core principles include: 1) conducting comprehensive preoperative evaluation (multidisciplinary discussion, risk stratification); 2) assuming the role of the central coordinator for in-operating room resuscitation, aligning multidisciplinary efforts towards unified goals; and 3) implementing goal-directed interventions (comprehensive monitoring, precise blood management, vasoactive drug administration and enhanced recovery principles).

References:

1. Eur Heart J 2025;46:4462

2. Eur Heart J 2018;39:3165

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SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 04

Avoidance of Long-Acting Neuromuscular Blocking Agents Decreases the Risk of Postoperative Pulmonary Complications in Pregnant Patients Undergoing Fetoscopic Myelomeningocele Repair

Presenting Author: Claire Naus, MD

Presenting Author's Institution: Texas Children's Hospital/Baylor College of Medicine - Houston, Texas

Co-Authors: Rebecca M. Johnson, MS, CCRP - Baylor College of Medicine
David G. Mann, MD, DBe - Baylor College of Medicine/Texas Children's Hospital

Abstract :

Introduction: Pulmonary edema has been described as a frequent complication of fetal surgery. In open fetal surgery, it is often attributed to tocolytic agents (e.g., magnesium sulfate) and irrigation fluid.[1] Despite a highly restrictive intravenous fluid (IVF) strategy and the absence of irrigation fluid in fetoscopic surgery, a high rate of "pulmonary edema" has been described in fetoscopic myelomeningocele (fMMC) repairs.[2] We hypothesized that some component of the postoperative pulmonary complications (PPCs) in patients undergoing fMMC repair could be due to atelectasis caused by residual neuromuscular blockade in the setting of magnesium sulfate administration. In 2022, we implemented quantitative train-of-four (TOF) monitoring, and as a result of universally low TOF ratios (TOFr< 90%) despite full reversal, we stopped using long-acting neuromuscular blocking agents (NMBAs) in fMMC repair. In this impact study, we evaluated whether patients who received NMBAs intraoperatively were at higher risk of being diagnosed with pulmonary edema or requiring oxygen on postoperative day 1 (POD1).

Methods: We compared two groups of patients: those who received long-acting NMBAs versus those who did not. The primary outcomes were the rate of pulmonary edema diagnosis (dxPE) and oxygen requirement on POD1 (O_2POD1). Group differences in outcomes were assessed using Fisher's exact test; effect sizes were reported as OR [95% CI]. We compared baseline characteristics (age, parity, BMI, IVF/colloid administration, procedure duration) using Mann-Whitney U test and reported as median [IQR]. Univariable logistic regression was performed to assess for an association between total magnesium dose, first postoperative magnesium level, and final TOFr (from Mar 2022) with postoperative pulmonary outcomes.

Results: From 2020 to 2026, 147 patients underwent fMMC repair. 51 patients received NMBAs (Jan 2020-Mar 2022); 96 did not (Mar 2022-Jan 2026). 12.2% of patients receiving NMBAs had a dxPE compared with 1.0% of those who did not (OR 13.3 [1.6-111.5], p=0.006). 38.8% of patients who received NMBAs required O_2POD1 compared with 18.8% of those who did not (OR 2.74 [1.31-5.73], p=0.015). There were no differences in age, parity, BMI, colloid volume, or procedure duration between groups. Less IVF (400 mL [250-700]) was administered in the NMBA group compared to the no-NMBA group (800 mL [500-1000]), p < 0.001). There was no relationship between total magnesium dose, first postoperative magnesium level, or final TOFr with postoperative pulmonary outcomes.

Conclusion: The risk of PPCs is significantly higher among pregnant patients who receive long-acting NMBAs during fMMC repair when magnesium sulfate is given for tocolysis.

References: 1.Paediatr Anaesth 2017;27:873.
2.Am J Obstet Gynecol 2021;225:678.

SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 05

Rethinking Reversal: Sugammadex Use During Pregnancy in Nonobstetric Surgery

Presenting Author: Kalli J. Fautsch, MD

Presenting Author's Institution: Mayo Clinic - Rochester, Minnesota

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Andrew C. Hanson, MS - Mayo Clinic
Corrine Nelson, DO - IU School of Medicine Department of Obstetrics and Gynecology - Maternal Fetal Medicine
Emily E. Sharpe, MD - Mayo Clinic - Rochester

Abstract :

Background: Sugammadex is widely used to effectively and rapidly reverse neuromuscular blockade. However, its potential binding to progesterone and theoretical risk of preterm labor and fetal anomalies has raised concerns about its use in pregnancy. A 2019 Society for Obstetric Anesthesia and Perinatology statement recommended avoiding sugammadex in patients undergoing surgery during pregnancy. However, there is limited and conflicting data regarding the safety of sugammadex in pregnancy. We conducted a retrospective study to evaluate our hypothesis that there would be no differences in observed obstetric, maternal, or fetal outcomes in pregnant patients who underwent nonobstetric surgery and received sugammadex or neostigmine for neuromuscular blockade reversal.

Methods: This retrospective cohort study included pregnant patients who underwent nonobstetric surgeries in our hospital system between October 1, 2016 and December 31, 2023. Patients were categorized based on neuromuscular blockade reversal (sugammadex or neostigmine). Demographic, anesthetic, surgical, and obstetric characteristics were collected. The primary aim was to assess the prevalence of preterm labor and pregnancy loss in patients who received sugammadex vs neostigmine. Secondary aims assessed the prevalence of sugammadex use, residual neuromuscular blockade, and postoperative nausea and vomiting (PONV).

Results: The study included 101 nonobstetric surgeries performed on 100 pregnant women during 100 pregnancies: sugammadex was used in 20 (20%) of procedures and neostigmine was used in 81 (80%) of procedures. Demographic and obstetric characteristics were similar between groups. Preterm labor occurred in 10/100 (10%) pregnancies (1/20 [5%] sugammadex vs 9/80 [11.2%] neostigmine). Premature rupture of membranes occurred in 5/100 (5%) pregnancies (1/20 [5%] sugammadex vs 4/80 [5%] neostigmine). There were no maternal or fetal deaths, new fetal anomalies, or residual neuromuscular blockade observed in either group. PONV occurred in 17 patients (21%) exposed to neostigmine and 2 patients (10%) exposed to sugammadex. Two postoperative complications occurred in the neostigmine group. The first (G1P0, 32+4 weeks) developed post-extubation hypoxic respiratory failure requiring reintubation and ICU admission. The second (G1P0, 31+5 weeks) developed postoperative tachypnea and tachycardia requiring ICU admission. No postoperative complications were observed with sugammadex. Additional outcomes are listed in Table 1.

Conclusions: We describe the successful use of sugammadex in pregnancy for nonobstetric surgeries. Although conclusions regarding safety cannot be drawn from our small, retrospective analysis, no

adverse maternal/fetal events were observed. Our findings add to the limited but growing evidence supporting the reevaluation of sugammadex use in pregnancy.

References: 1. Gaston IN. Anesth Analg. 2023 Jun 1;136(6):1217-1219
2. Noguchi S. Int J Obstet Anesth. 2023 Feb 53(103620):1-5

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SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 06

Beyond Severe Maternal Morbidity: Exploring Reasons for ICU Transfer during Delivery Hospitalizations

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Abstract :

Background: Intensive care unit (ICU) admissions occur in fewer than 1% of delivery hospitalizations. However, only about one-quarter of these admissions include Centers for Disease Control and Prevention (CDC) criteria for a severe maternal morbidity (SMM) event.[1] This finding suggests that many ICU admissions may not be driven by these most severe clinical indications, or that indications for ICU care are not captured in ICD codes. Our objective is to explore the reasons for ICU admission in delivery hospitalizations requiring ICU care but not involving a SMM event.

Methods: We conducted a retrospective cohort study using the Premier Database to examine delivery hospitalizations that included ICU admissions (10/2015-12/2020). We used ICD-10 codes to identify SMM and charge codes to identify transfusions and services usually provided in ICUs. We performed descriptive analyses stratified by SMM status to compare ICU admissions not meeting SMM criteria to those that did. Multivariable logistic regression models compared ICU-level resource utilization by SMM status. Covariates examined were patient and hospital characteristics, payor status, location of care, and comorbidities.

Results: Among 4.8 million delivery hospitalizations, 35,837 patients were admitted to the ICU. Of ICU admissions, 8,508 (23.74%) met SMM criteria. ICU-specific services codes more commonly charged to patients with SMM compared to those without SMM: invasive blood pressure monitoring (22.3% vs 4.2%) and invasive cardiac monitoring (2.2% and 0.2%). Blood product administration occurred in 50.1% of SMM admissions compared with 4.7% of non-SMM admissions. Codes for IVF amounts suggest that SMM patients received higher volumes of IVF. Median ICU length of stay was similar between groups (Table 1a). Several medical and obstetric comorbidities showed a strong association with non-SMM ICU admission including: cardiomyopathy, preeclampsia with severe features, and pulmonary hypertension (Table 1b).

Conclusions: We examined the non-SMM and non-transfusion reasons birthing people are admitted to the ICU and found evidence to suggest that neither enhanced monitoring nor expected indications account for all ICU admissions. Although we could not include all possible indications, these findings show that ICU admission may be driven by concern for clinical deterioration among patients with high-risk

comorbidities, rather than the presence of SMM itself. ICU admission may carry consequences, including reduced access to obstetric-specific care (e.g., fundal assessments, lactation support), limited opportunities for mother–infant bonding, and restricted visitation. Clinical teams may undertake internal audits to evaluate the appropriateness of ICU admissions, allowing them to thoughtfully assess opportunities to improve maternal care, including consideration of patient experience within the critical care setting.

References: 1. Himmelwright, RS, Under revision at: *Anesthesia & Analgesia.* 2026.

Table 1a. ICU-level resource utilization in patients with and without SMM

	SMM (including at least 4u RRBC transfusion) (n=8508)	No SMM (n=27329)
Invasive BP monitoring	1897 (22.3%)	1142 (4.2%)
Telemetry	204 (2.4%)	256 (0.9%)
Invasive cardiac monitoring	186 (2.2%)	50 (0.2%)
ICU nursing	55 (0.6%)	252 (0.9%)
Blood product administration	4260 (50.1%)	1295 (4.7%)
IV fluid administration	7961 (93.6%)	24502 (89.7%)
Volume (L)	7.5 [3, 13.7]	3.5 [1.1, 6.5]
≥ 3L	6299 (74.0%)	15077 (55.2%)
≥ 5L	5404 (63.5%)	9654 (35.3%)
≥ 10L	3204 (37.7%)	3095 (11.3%)
Diuresis	765 (9.0%)	671 (2.5%)
ICU length of stay	3.1 ± 6.2 2 [1, 3]	2.5 ± 3.9 2. [1, 3]

Table 1b. Model for ICU admission among patients without SMM event

Condition		
Cardiomyopathy	11.73 (10.20, 13.49)	<0.001
Preeclampsia with severe features	7.34 (7.05, 7.65)	<0.001
Pulmonary hypertension	7.07 (5.24, 9.56)	<0.001
Arrhythmias	3.95 (3.49, 4.47)	<0.001
Placenta accreta spectrum	5.65 (4.92, 6.50)	<0.001
Preterm birth	3.76 (3.64, 3.88)	<0.001
Congenital heart disease	4.01 (3.36, 4.79)	<0.001
Valvular heart disease	3.47 (3.01, 4.00)	<0.001
Coronary/ischemic/atherosclerotic	2.09 (1.61, 2.71)	<0.001
Chronic renal disease	2.26 (1.99, 2.55)	<0.001
Aortopathies	2.92 (1.99, 4.27)	<0.001
Other cardiac disease	2.25 (1.14, 4.42)	0.019
Preeclampsia	2.25 (2.17, 2.33)	<0.001
Chronic hypertension	2.04 (1.95, 2.13)	<0.001
Neuromuscular disease	1.60 (1.49, 1.72)	<0.001
HIV/AIDS	1.66 (1.25, 2.20)	0.001
Bleeding disorder, preexisting	1.51 (1.41, 1.61)	<0.001
Preexisting diabetes mellitus	1.82 (1.71, 1.93)	<0.001
Advanced maternal age	1.48 (1.41, 1.56)	<0.001
Asthma, acute or moderate/severe	1.20 (1.15, 1.26)	<0.001
Placental abruption	1.58 (1.46, 1.70)	<0.001
Substance use disorder	1.27 (1.22, 1.33)	<0.001
BMI greater or equal to 40	1.30 (1.23, 1.38)	<0.001
Thyrotoxicosis	1.42 (1.18, 1.71)	0.000
Gestational diabetes mellitus	1.29 (1.24, 1.35)	<0.001
Gastrointestinal disease	1.12 (1.07, 1.17)	<0.001
Major mental health disorder	1.17 (1.12, 1.22)	<0.001
Bariatric surgery	1.25 (1.05, 1.49)	0.012
Preexisting anemia	1.08 (1.04, 1.12)	<0.001
Multiples gestation	1.07 (1.00, 1.14)	0.054
Connective tissue or autoimmune disease	1.02 (0.84, 1.25)	0.844
Prior cesarean birth	0.92 (0.89, 0.96)	0.000
Placenta previa, complete or partial	0.96 (0.84, 1.09)	0.520

SAT - RA - BS 3 - BR 1 - Cardiac and Misc – 07

Arrival Physiology and Racial Disparities in Pregnant Trauma: A National Analysis

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Abstract :

INTRODUCTION

Black women experience maternal mortality rates 2-3 times higher than White women. Trauma is a leading cause of non-obstetric maternal death, yet the factors driving racial disparities in pregnant trauma outcomes remain poorly understood. Using the National Trauma Data Bank,
we sought to identify contributing factors to outcome disparities among severely injured pregnant patients by examining injury patterns, physiologic presentation, in-hospital care, and mortality.

METHODS

Retrospective cohort of pregnant trauma patients with ISS >15 (2019-2021) from the National Trauma Data Bank. We compared Black and White patients on: (1) anatomic injury severity using Injury Severity Score (ISS) and Abbreviated Injury Scale (AIS) by body region; (2) physiologic status at arrival; (3) in-hospital interventions including surgical procedures, transfusions, and ICU utilization; and (4) mortality. Sequential regression models assessed whether presentation physiology mediated outcome disparities.

RESULTS

Among 669 patients (402 White, 267 Black), injury burden was equivalent: mean ISS (26.3 vs 27.6, p=0.17), head AIS (3.07 vs 3.08, p=0.88), and number of severely injured body regions (1.72 vs 1.78, p=0.95) were similar. Despite equivalent anatomic injury, Black patients presented with significantly worse physiologic status: higher rates of hypotension (18.0% vs 10.2%, p=0.005), lower SBP (108 vs 115 mmHg, p=0.008), and lower GCS (11.3 vs 12.1, p=0.03). Notably, in-hospital care showed no disparities: rates of hemorrhage surgery (25% vs 21%), blood transfusion (36% vs 33%), and time to intervention were similar. Mortality was higher for Black patients (10.9% vs 8.2%), but this difference was attenuated when adjusting for arrival hypotension (OR 1.36→1.11).

DISCUSSION

Among severely injured pregnant women, Black and White patients sustained equivalent injuries but present in markedly different physiologic condition. When controlling for this difference, differences in-hospital treatment plans disparities become non-significant, suggesting comparable in-hospital care. These findings indicate that outcome disparities may originate predominantly before hospital arrival. Contributing factors may include delayed recognition of injury severity, barriers to emergency activation, and socioeconomic factors such as residence in areas with resource-constrained prehospital systems

and longer transport times to trauma centers. Further research into these prehospital factors may help identify targets for intervention.

References:

SAT - RA - BS 3 - BR 1 – Potpourri – 01

Ankle Blood Pressure as a Predictor of Neonatal Outcomes in Obese Women Undergoing Cesarean Delivery (CD) under Spinal Anesthesia (SAB)

Presenting Author: Srija Konduru, BS

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Abstract :

Introduction: Spinal-induced hypotension management in patients with obesity is challenging. While brachial blood pressure (BP) measurement is the standard of care, it is often technically difficult[1] and may fail to detect distal hemodynamic changes. The agreement between arm and ankle BP measurements in this population remains poorly defined. We aimed to evaluate the interchangeability of these measurement sites and hypothesized that ankle-based hypotension thresholds are independently associated with neonatal morbidity.

Methods: In this prospective observational study, we enrolled term patients with obesity undergoing scheduled CD under SAB. Paired non-invasive BP measurements were obtained from the arm and left ankle at three time points: baseline (supine and with left uterine displacement), after SAB, and post-delivery. Agreement was assessed using Bland–Altman analysis. The primary outcome was NICU admission. We defined hypotension using 22 thresholds (11 for systolic BP (SBP)) and 11 for mean arterial pressure (MAP)) at both sites. Multivariable logistic regression, adjusting for BMI and hypertensive disorders of pregnancy (HDP), was used to identify independent predictors of NICU admission.

Results: Ninety-seven women with BMI of 43.1 ± 7.9 kg/m² and gestational age of 38.6 ± 0.9 weeks, of which 38.1% with HDP were analyzed. Bland–Altman analysis revealed a systematic negative bias, with arm measurements consistently lower than ankle measurements (mean bias for SBP: -13.8 to -21.0 mmHg; MAP: -5.5 to -12.3 mmHg). The limits of agreement exceeded clinically acceptable ranges (> 40 mmHg for SBP). The incidence of NICU admission was 22% in patients with HDP vs 7% in those without ($p = 0.045$). In multivariable models, ankle hypotension, specifically a decrease of ≥ 30% from baseline, was a strong independent predictor of NICU admission. This association was significantly more robust for ankle MAP (adjusted OR 33.2, 95% CI 2.66–413.51, $p = 0.007$) than for ankle SBP (adjusted OR 13.4, 95% CI 1.36–131.65, $p = 0.026$) (Table 1). Hypotension measured at the arm at any threshold was not associated with NICU admissions.

Conclusion: In patients with obesity undergoing CD under SAB, arm and ankle BP measurements are not interchangeable. However, ankle-site monitoring provides unique predictive value for neonatal risk. A drop in ankle MAP of ≥ 30% from baseline is a strong independent predictor of NICU admission, likely reflecting the detection of occult aortocaval compression that standard arm monitoring misses. Ankle MAP monitoring may offer a superior guide for hemodynamic management in this high-risk population.

References: 1. Anesth Analg 2018;127:408–411

Ankle Blood Pressure as a Predictor of Neonatal Outcomes in Obese Women Undergoing Cesarean Delivery (CD) under Spinal Anesthesia (SAB).pdf

SAT - RA - BS 3 - BR 1 – Potpourri – 02

Prevalence and Severity of Anemia in Term Pregnant Women Admitted for Delivery: A Retrospective Study

Presenting Author: Monica S. Siaulys, PhD, Md

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Abstract :

Background: Anemia during pregnancy remains a significant public health concern and is associated with adverse maternal and neonatal outcomes, particularly in the presence of obstetric hemorrhage. While its prevalence has been extensively studied in low- and middle-income countries and within public healthcare systems, data regarding pregnant women assisted in private hospitals are scarce.

Objectives: This retrospective observational study aimed to evaluate the prevalence and severity of anemia in term pregnant women admitted for delivery at a large private maternity hospital in southeastern Brazil, as well as its association with sociodemographic factors, obstetric characteristics, comorbidities, peripartum blood loss, and transfusion requirements.

Methods: After approval by the institutional Research Ethics Committee, electronic medical records of women admitted for vaginal delivery or cesarean section between 01/2023, and 01/2024, were reviewed. Women aged ≥18 years, ASA II, with pregnancies at term (≥37 weeks), and with hemoglobin levels measured at hospital admission were included. Exclusion criteria comprised recent hospitalization, blood transfusion during pregnancy, active or chronic infections, oncologic disease, and incomplete records. Anemia defined as hemoglobin < 11.0 g/dL (WHO criteria) was classified as mild, moderate, or severe.

Results: Of 9,783 admissions screened, 699 women met the inclusion criteria. The overall prevalence of anemia at admission was 15.0%, with all cases classified as mild (10.4%) or moderate (4.6%); no cases of severe anemia were identified. The median hemoglobin concentration was 12.6 g/dL, reflecting a generally favorable hematologic profile in this population. No significant associations were observed between anemia and maternal age, body mass index, race, educational level, parity, number of prenatal visits, fetal presentation, type of delivery, smoking status, previous bariatric surgery, or use of aspirin, enoxaparin, iron supplementation, prenatal vitamins. In contrast, anemia was significantly associated with the presence of thrombophilia and thrombocytopenia. Additionally, anemic women experienced greater peripartum blood loss and higher transfusion rates. Increasing volumes of blood loss were strongly associated with the presence of anemia at admission.

Conclusions: Even in a private healthcare setting with high prenatal care coverage and favorable socioeconomic conditions, anemia at the time of delivery remains clinically relevant. Although predominantly mild or moderate, anemia was associated with increased blood loss and transfusion

requirements, underscoring the importance of systematic screening and proactive management of anemia during pregnancy to improve maternal safety.

References:

Eweis M, et al. Prevalence and determinants of iron deficiency anemia during third trimester of pregnancy: a cross-sectional study. Clin Nutr ESPEN. 2021;44:194–9.

SAT - RA - BS 3 - BR 1 – Potpourri – 03

A retrospective analysis of neuraxial anesthesia failures for postpartum tubal ligation procedures: could umbilical sparing be to blame?

Presenting Author: Caroline L. Thomas, MD

Presenting Author's Institution: The University of Chicago Department of Anesthesia and Critical Care - Chicago, Illinois

Co-Authors: Allyson Dewey, BS - The University of Chicago Pritzker School of Medicine

Abstract :

Background: Prior studies suggest high neuraxial anesthetic failure rates in patients undergoing postpartum tubal ligation.[1-3] Several providers at our institution have identified repeated instances of “umbilical sparing”, which occurs when the patient develops a full neuraxial anesthetic block with the exception of residual sensation around the umbilicus. The goal of this study was to evaluate anesthetic failures for patients undergoing postpartum tubal ligation and to measure the potential implications of umbilical sparing.

Methods: This was a sub-analysis of patients with umbilical sparing identified via a retrospective analysis of all patients undergoing postpartum tubal ligation after vaginal delivery at a single academic institution between 2013-2023. Demographic, obstetric, and anesthetic characteristics were compared in patients with and without umbilical sparing. The primary outcome was the rate of umbilical sparing and the rate of anesthetic failure (defined as conversion to general anesthesia, administration of deep sedation, or repeat neuraxial procedure) due to umbilical sparing.

Results: Of 363 patients who underwent postpartum tubal ligation, 40 (11.0%) patients had umbilical sparing. Of the 40 patients with umbilical sparing, 19 met criteria for anesthesia failure. Three patients required general anesthesia due to umbilical sparing, 4 patients underwent a second neuraxial procedure, and 14 received sedation (Figure 1). Within the entire cohort, there were 69/363 events of neuraxial anesthesia failure (19%). Nineteen (27.5%) of the anesthetic failures occurred due to umbilical sparing. Of the 40 cases of umbilical sparing, 21 (52.5%) resolved with subcutaneous periumbilical lidocaine infiltration alone.

Conclusions: Umbilical sparing was likely implicated in up to 28% of neuraxial anesthesia failures for PPTL in our cohort. Approximately half of patients with umbilical sparing underwent successful PPTL after the injection of subcutaneous periumbilical local anesthesia by the surgeon. We postulate that umbilical sparing, likely from alternative embryological innervation of the umbilicus, may be frequently misidentified as neuraxial anesthesia "failure". When recognized, umbilical sparing is skin deep and may be treated successfully with periumbilical local anesthetic infiltration by the surgeon in a portion of cases.

References:

1. Viscomi PMID 7576672
2. McKenzie PMID 28985581
3. Ansari PMID 38508961

Fig 2. Umbilical sparing_SOAP.pdf

SAT - RA - BS 3 - BR 1 – Potpourri – 04

Optimizing Anesthetic Practice for Cervical Cerclage: A Quality Improvement Study

Presenting Author: Cecilia Uong, MD

Presenting Author's Institution: Beth Israel Deaconess Medical Center - Boston, Massachusetts

Co-Authors: Samantha L. Armstrong, BS - Beth Israel Deaconess Medical Center / Harvard Medical School
Nathaniel Greenbaum, MD - Beth Israel Deaconess Medical Center
Philip E. Hess, MD - Beth Israel Deaconess Medical Center / Harvard Medical School

Abstract :

Background: Spinal anesthesia (SP) is the preferred anesthetic for cervical cerclage due to risks associated with general anesthesia (GA) in the pregnant patient. The rate of SP failure varies from < 1% to as high as 17%[1,2] and may be due to procedural, medication or technical aspects, as well as patient characteristics.[3] We hypothesized that modifiable factors may be associated with SP failure and can be used to optimize local practice and rates of SP success.

Objective: To identify factors associated with SP failure for cerclage.

Methods: We conducted a single-center retrospective review at a tertiary academic medical center of all cerclage placements between June 2024 and July 2025. Data collected included the spinal needle type, local anesthetic and dose, patient characteristics, and proceduralist (solo staff or supervised resident or CRNA, OB-trained or general anesthesiologist). The primary outcome
was unsuccessful SP defined as repeat placement, deep sedation (propofol 100 µg/kg/min, IV fentanyl 100µg) or conversion to GA. Secondary outcomes were procedure duration and medications used. T-test, Chi-squared and Fisher's exact test were used with P≤0.05 for significance.

Results: 100 records were reviewed; those with incomplete data (n=5) and patient request for GA (n=2) were excluded. 93 cases were analyzed. SP was unsuccessful in 18 cases (19.4%; 95CI: 11.9%-28.9%), with GA required in 7 (7.5%; 3.1-14.9%), and deep sedation was used in 10 (10.8%; 5.3%-18.9%). SP failures in 17 cases were detected at or prior to surgical start time. The associations with SP failure are shown in the **Table**. Only maternal age, local anesthetic and surgical duration showed significance. Time from room entry to spinal placement was not significant (P=0.61); time from entry to surgical start was also not significant (P=0.12, difference 4.5 min). SP failure was associated with prolonged time (>40 min) from OR entry to surgical start (13.5% v 42.1%; P=0.009) but not spinal procedure longer than 20 min (P=0.76).

All failed SP requiring conversion to GA were performed by non-OB trained physicians: 4 due to inability to obtain CSF and 2 due to poor block and 1 due to prolonged surgery; due to small numbers this was not significant (P=0.18). We identified 3 cases of PDPH with prolonged SP procedure time (P=0.048), time to surgical start (P=0.006) and surgical duration (P=0.004).

Discussion: We identified a high incidence of SP failure in our population that could not easily be explained by the selected factors. SP failure was associated with longer operative time, likely due to patient discomfort and delays in sedation. The use of GA (7.5% of cases) was exclusive to non-OB trained staff which suggests an opportunity for improvement. Although we did not identify statistically

significant factors that correlated with SP failure, there were associations that warrant further investigation and quality improvement study.

References:

1 PMID 15766337
2 PMID 4014732
3 PMID 19420004

SOAP Cerclage Study Table 1.pdf

SAT - RA - BS 3 - BR 1 – Potpourri – 05

Trends in Neuraxial Dosing for Cervical Cerclage at a Large Academic Medical Center

Presenting Author: Catharine Keim, MD

Presenting Author's Institution: New York Presbyterian - Weill Cornell Medicine - Hoboken, New Jersey

Co-Authors: Klaus Kjaer, MD, MBA - New York Presbyterian - Weill Cornell Medicine

Abstract : Optimal neuraxial dosing for cervical cerclage remains a challenge. Inadequate block may require anesthetic supplementation, whereas prolonged block leads to increased PACU stays, use of resources, and patient dissatisfaction[1]. As the initial step of a quality improvement project to establish dosing guidelines at our institution, this retrospective, descriptive study analyzed current trends in neuraxial dosing, rates of anesthetic supplementation, and recovery times within our department. Between January 1, 2025 and December 31, 2025 sixty-two cerclage procedures were performed. All were done under spinal anesthesia except for one case, which was excluded. Local anesthetic type and dose, use of intrathecal adjuncts, use of anesthetic supplementation, time to readiness for discharge, and time to actual discharge are summarized in Table 1. Regarding supplementation, one case in the bupivacaine group resulted in a failed spinal and conversion to general anesthesia, with the remainder of cases using modest doses of IV fentanyl or versed. All of these cases had used intrathecal opioids. Two cases in the chloroprocaine group used inhaled nitrous oxide, neither of which had used intrathecal opioids. There was no significant difference in rate of supplementation between groups. The mean (standard deviation) surgical time was 19.7 (9.5) minutes. Due to inconsistent documentation, time of post-anesthesia evaluation note was used as a surrogate for discharge readiness, which is completed once a patient can ambulate and void. The mean (SD) time from discharge readiness to actual discharge was 49.4 (47.8) minutes. Discharge readiness was faster with low-dose chloroprocaine compared to low-dose bupivacaine ($p=0.035$) and high-dose bupivacaine ($p=0.015$). Actual discharge time was faster with low-dose chloroprocaine compared to high-dose bupivacaine ($p = 0.024$). No other group comparisons were significant.

Several important observations were made. Despite representation from 26 different providers and no established departmental guidelines, dosing choices were relatively uniform. Conclusions about statistically significant differences between groups were limited by very small group sizes. While recovery times were faster in the low-dose chloroprocaine group, 2/3 cases used nitrous oxide. Recent studies suggest the ED90 of chloroprocaine is closer to 60mg[2]. Next steps should explore recovery times and rates of supplementation at this dose. Additionally, documentation regarding return of motor function and ability to void was largely absent. Improvements in this process are needed to characterize reasons for prolonged recovery times. Finally, we identified a significant delay from discharge readiness to actual discharge, which needs to be explored further. Tailoring an anesthetic to avoid prolonged recovery may have no impact on actual outcome if non-anesthetic factors are delaying discharge.

References: *1.Anesth Analg.*2022;134:624-632
2.Int J Obstet Anesth.2025;61:104323

Trends in Neuraxial Dosing for Cervical Cerclage at a Large Academic Medical Center.pdf

SAT - RA - BS 3 - BR 1 – Potpourri – 06

Hypopituitarism in pregnancy does not increase the risk of PPH despite disruption to oxytocin axis

Presenting Author: Alexander Meshel, MD

Presenting Author's Institution: Icahn School of Medicine at Moutn Sinai - Stamford, Connecticut

Co-Authors: Fariha Hanif, BS, MPH - SUNY Downstate Health Sciences University
Edward Sutanto, BS - CUNY School of Medicine
Andrew Warburton, MD - Icahn School of Medicine at Mount Sinai

Abstract :

Introduction

Hypopituitarism is a complex condition disrupting at least one of the pituitary axes important in regulating blood pressure, electrolyte balance, and importantly basal oxytocin levels, making it a crucial consideration in obstetric anesthesia management. This study aims to retrospectively compare outcomes between pregnancies with and without Sheehan Syndrome.

Methods

This study used data from the TriNetX Global Collaborative Network to conduct a comparative analysis between pregnancies with and without hypopituitarism. The primary outcome assessed was postpartum hemorrhage, with secondary outcomes spanning uterine atony, shock, sepsis, and ICU admission. Furthermore, key laboratory metrics were gathered such as sodium, prolactin, estrogen, testosterone, TSH, and ACTH.

Results

Following baseline matching to 1,577 patients, Kaplan-Meier analysis between the two groups found insignificant differences in PPH [HR CI = 0.67-1.93, p = 0.7140). Secondary outcome analysis only found significant increased hazard in uterine atony (HR = 1.41, 95% CI: 1.03 - 1.94, p = 0.034), and insignificant differences in shock, sepsis, and ICU admission. Laboratory value analysis found significant differences in median thyrotropin (p = 0.006) and sodium (p < 0.001), with insignificant differences in prolactin, corticotropin, estrogen, and testosterone.

Conclusion

As the hypothalamic-pituitary axis maxes oxytocin to maintain uterine tone, hypopituitarism should see a decrease in basal oxytocin and subsequent increased PPH risk. However, findings show that while uterine atony had a higher risk, it did not translate to significant rates of PPH, shock, sepsis, or ICU admission. This suggests pituitary dysfunction alone may not necessarily confer directly to clinically significant hemorrhagic risk.

References: 1. Matern Fetal Med 2021;3:213–220

SAT - RA - BS 3 - BR 2 - High Risk and Crisis Management – 01

Frequency, Characteristics, and Management of Parturients with Fontan Circulation Delivering with Anesthesia: A Multicenter Retrospective Cohort Analysis

Presenting Author: Kate J. Frost, MD

Presenting Author's Institution: Brigham and Women's Hospital - Boston, Massachusetts

Co-Authors: Sharon C. Reale, MD - Brigham and Women's Hospital

Abstract :

Background

Improvements in care have led to patients with Fontan circulation increasingly surviving to adulthood, with a concurrent rise in the rate of deliveries, from 2.4 cases per 1 million in 2000 to 30.3 per 1 million in 2018.[1] While pregnancy is not strictly contraindicated, women with Fontan circulation are considered a modified World Health Organization risk class III or IV, which carries a high risk of morbidity and mortality.[2] Our study aims to describe the frequency, characteristics and anesthetic management of parturients with Fontan circulation in a large sample of deliveries drawn from the 70+ hospitals in the Multicenter Perioperative Outcomes Group consortium.

Methods

In this multicenter, retrospective, observational study, we identified obstetric anesthetic delivery records for patients aged 15-44 who delivered between 2016 and 2023. We queried the database for cases meeting criteria for potential Fontan circulation using ICD codes for related cardiac conditions. We performed manual chart review to determine if the patient had Fontan circulation and abstracted parameters related to anesthetic management and outcomes.

Results

Across 64 institutions, we identified 891,706 deliveries, 68 of which involved a parturient with Fontan circulation, with an overall frequency of 7.6 per 100,000 deliveries. Nearly 50% of parturients with Fontan circulation were on anticoagulation during pregnancy. 63.3% of Fontan patients underwent a cesarean delivery (CD), compared to 45.2% of all admissions. The median gestational age at delivery was 35 weeks, with 33.8% of parturients with Fontan circulation delivering preterm compared to 6.2% of all admissions. For parturients with Fontan circulation who underwent CD, 40% received an epidural, 34.3% a combined spinal epidural (CSE) (of which over 90% were sequentially dosed), and 31.4% general anesthesia with endotracheal intubation. During CD, over 50% of patients had arterial lines, 42.6% received a vasopressor infusion and 1.5% received an inotropic infusion. 25% of deliveries were complicated by severe maternal morbidity compared to 2.5% of all admissions, and 8.8% required post-delivery intensive care admission; however, there were no postoperative intubations, cardiac arrests, or 30-day mortalities observed.

Conclusions

In this large, multicenter study examining the frequency, characteristics and anesthetic management of parturients with Fontan circulation, we found that approximately half of patients delivered via cesarean delivery, with an approximately even split between epidurals, CSEs, and general anesthetics. Most CSEs were sequential, suggesting that anesthesiologists are mindful of the risks of Fontan physiology. Severe

maternal morbidity complicated approximately one-quarter of Fontan deliveries, underscoring the significant associated risk and vigilance required in this patient population.

References:

1. Sobhani *Am J Obstet Gynecol MFM* 2023

2. Wolfe *Am J Obstet Gynecol MFM* 2021

Frequency Characteristics and Management of Parturients with Fontan Circulation Delivering with Anesthesia.pdf

SAT - RA - BS 3 - BR 2 - High Risk and Crisis Management – 02

Outcomes of Temporary Mechanical Circulatory Support in Peripartum Patients with Amniotic Fluid Embolism

Presenting Author: Fariha Hanif, BS, MPH

Presenting Author's Institution: SUNY Downstate Health Sciences University

Co-Authors: Daniel Katz, M.D. - Icahn School of Medicine at Mount Sinai
Edward Sutanto, BS - CUNY School of Medicine
Andrew Warburton, MD - Icahn School of Medicine at Mount Sinai

Abstract :

Introduction

Amniotic fluid embolism (AFE) is an uncommon but serious obstetric emergency with significant associated morbidity and mortality. AFE remains the second leading cause of maternal death and the primary cause of peripartum cardiac arrest, with mortality rates cited between 20-60%. Temporary mechanical circulatory support (tMCS) including ECMO, IABP, and Impella® may have a role reducing maternal mortality in AFE. The aim of this study is to explore the differences in outcomes between peripartum patients who suffered from an AFE and received tMCS compared to those who did not.

Methods

We conducted a retrospective study using the TriNetX Global Collaborative Network of patients who experienced AFE and received ACLS in pregnancy, excluding terminated pregnancies and abortions. Patients were stratified based on tMCS administration with ECMO, IABP, or Impella® placement. Odds ratio for cardiogenic shock, heart failure, and pulmonary overload were calculated for both groups.

Results

133 non-tMCS AFE and 25 tMCS AFE patients were identified using the TriNetX Global Collaborative Network. non-tMCS AFE and tMCS AFE showed a 26.3% and 40% mortality rate, respectively, though not statistically different (OR = 1.87, 95% CI: 0.77 - 4.54, p = 0.226). Further analysis demonstrated significantly increased odds of cardiogenic shock (OR = 7.57, 95% CI: 3.01 - 19.02, p < 0.001), heart failure (OR = 4.56, 95% CI: 1.87 - 11.12, p = 0.001), and pulmonary overload (OR = 4.44, 95% CI: 1.77 - 11.16, p = 0.002) in the tMCS group.

Conclusion

Patients requiring tMCS were significantly more likely to have concomitant cardiogenic shock, heart failure, and pulmonary overload compared to those who did not receive tMCS, despite both receiving

ACLS. In spite of the additional morbidity, the tMCS population did not demonstrate a statistically significant difference in mortality, suggesting tMCS as a potential rescue therapy in AFE. Future research can contribute to a better understanding of the utility of tMCS in patients with AFE leading to arrest requiring ACLS.

References:

SAT - RA - BS 3 - BR 2 - High Risk and Crisis Management – 03

Emergency Surgery in Pregnancy Isn't the Catastrophe We Fear: Outcomes After 55 Emergent Non-Obstetric Cases

Presenting Author: Christopher Mukasa, MD

Presenting Author's Institution: Brigham and Women's Hospital/Harvard Medical School - Boston, Massachusetts

Co-Authors: Ricardo Kleinlein, PhD - Brigham and Women's Hospital/Harvard Medical School
Vesela P. Kovacheva, MD, PhD - Brigham and Women's Hospital/Harvard Medical School

Abstract :

Introduction: Incidence of non-obstetric surgery in pregnancy is reported to be as high as 2% (1,2). Many of these surgeries are emergent requiring rapid intervention, however, adetailed analyses of current practice are lacking. We sought to determine the management and outcomes of emergent non-obstetric surgeries in pregnant patients.

Methods: All patients who underwent non-obstetric surgeries during pregnancy at five hospitals in our large healthcare system from 2015 to 2024 were included. IRB approval was obtained with a waiver of patient consent. Emergency surgeries were defined as those requested by surgeons to start within one hour. All relevant data were extracted from electronic medical records using manual chart review.

Results: Of 2,009 procedures requiring anesthesia during pregnancy 55 cases (2.7%) involving 54 unique patients were emergent. The patient characteristics are summarized in the Table. Twenty cases (36.4%) occured in the first, 20 (36.4%) in the second and 15 (27.2%), third trimester. The three most common indications were ovarian torsion (45.5%), appendicitis (25.5%), and bowel obstruction (14.5%). Fifty-three cases (96.4%) were done under general anesthesia with endotracheal intubation. Of those, 84.9% were rapid sequence inductions, 49.1% utilized video laryngoscopy, and 88.7% utilized volatile anesthetics. Reversal technique for non-depolarizing neuromuscular blockade varied with 54.3% of patients receiving neostigmine and glycopyrrolate, 23.9% receiving neostigmine and atropine, and 8.6% receiving sugammadex. Thirteen cases (23.6%) utilized intraoperative fetal monitoring of which 76.9% (n=10) were continuous. Notably, no patients required intraoperative cesarean for fetal distress and all went on to have live births. Thirteen patients (23.6%) delivered preterm neonates, but none were previable. Median 1- and 5-minute Apgar scores for all neonates were 8 and 9 respectively.

Conclusion: Our data demonstrate that serious obstetric and neonatal outcomes are uncommon after emergent non-obstetric surgery although the indications and anesthetic management varies. Further research is warranted to determine best practices and implications of anesthetic technique associated with optimal maternal and neonatal outcomes.

References:

1. Balinskaite et al. Ann Surg. 2017 Aug;266(2):260-266.

2. Ní Mhuireachtaigh et al. J Clin Anesth. 2006 Feb;18(1):60-6.

Median Age at Time of Surgery (Years)	32 (IQR 28.5-35.0)
Median Gravidity	2
Median Parity	1
Median Gestational Age at Time of Surgery (Weeks)	16 (IQR 9.5-23)
Patient Race	
American Indian or Alaska Native	0.0% (n=0)
Asian	5.5% (n=3)
Black or African American	16.4% (n=9)
Native Hawaiian or other Pacific Islander	0.0% (n=0)
White	61.8% (n=34)
Other	14.5% (n=8)
Did not disclose	1.8% (n=1)
Patient Ethnicity	
Hispanic	25.5% (n=14)
Non-Hispanic	74.5% (n=41)
Known Pregnancy at time of Surgery	
Yes	98.2% (n=54)
No	1.8% (n=1)
Surgical/Anesthetic Characteristics	
Indication for Surgery	
Ovarian Torsion	45.5% (n=25)
Appendicitis	25.5% (n= 14)
Bowel Obstruction	14.5% (n=8)
Obstructing Nephrolithiasis	5.5% (n=3)
Hemorrhagic Adnexal Mass	3.6% (n=2)
Cholecystitis	1.8% (n=1)
Multi-Pressor Shock Requiring Exploratory Laparotomy	1.8% (n=1)
Soft Tissue Infection	1.8% (n=1)
Anesthetic Type	
General (ETT)	96.4% (n=53)
General (LMA)	0% (n=0)
MAC	1.8% (n=1)
Neuraxial	1.8% (n=1)
Obstetric/Neonatal Outcomes	
Live Birth	100% (n=54)
Median Gestational Age at Time of Delivery (Weeks)	38.9 (IQR 36.9-39.6)
Delivery Type	
Vaginal	74.5% (n=41)
Primary Cesarean	21.8% (n=12)
Repeat Cesarean	3.6% (n=2)
Median Apgar at 1 Minute	8
Median Apgar at 5 Minutes	9
Preterm %	23.6% (n=13)
Previable %	0%

SAT - RA - BS 3 - BR 2 - High Risk and Crisis Management – 04

Identifying timepoints of critical communication breakdown in the care of obstetric patients: A cross-sectional cohort survey-based study

Presenting Author: Jordan A. Francke, MD, MPH

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Co-Authors: Pedro Gallardo, MD - Brigham & Women's Hospital
Mahathi K. Kosaraju - Brigham & Women's Hospital
Noor A. Raheel, MD, MPH - Brigham and Women's Hospital
Kerry Thayer, RN - Brigham & Women's Hospital
Hope Y. Yu, MD - Brigham & Women's Hospital

Abstract :

Introduction

Communication failures are a major contributor to adverse perinatal outcomes and patient psychological distress.[1] The Joint Commission's 2024 Sentinel Event Annual Review cited communication failures as one of the top causes of never events.[2] Labor and delivery units (LDU) are uniquely vulnerable due to frequent invasive exams, rapid clinical transitions, and divergent maternal-fetal needs.[1] However, there is a paucity of data on where in the continuum of care obstetric patients face communication challenges, and which subpopulations are at higher risk. We aimed to identify critical timepoints of communication breakdown in the peripartum continuum to inform targeted quality improvement (QI) interventions. We hypothesized that communication quality would vary across care phases, with exploratory analyses assessing disproportionate impact on patients of different racial/ethnic backgrounds and educational levels.

Methods

Funded by the 2025 SOAP DEI Mentored Grant, we conducted a cross-sectional survey-based cohort study of postpartum patients at our quaternary LDU. An a priori power analysis projected a need to enroll >200 patients to detect a >20% difference in communication score. An interdisciplinary team iteratively developed a survey tool to assess patient-reported communication quality with staff during discrete timepoints in their antepartum, intrapartum, and postpartum phases of care using a 5-point Likert scale (1=poor and 5=excellent). Surveys were administered on postpartum day (PPD) 1 and were available in English, Spanish, and Haitian Creole. The primary outcome was median communication score by care phase. Secondary analyses compared scores by mode of delivery, procedure type, and demographics. Median communication scores were compared using analysis of variance (ANOVA) across care phases, with secondary comparisons using two-sided *t* tests; statistical significance was α=0.05.

Results

To date, 117 patients have been enrolled (Table 1). Median (±SD) communication score differed by care phase: antepartum 4.49±0.89, intrapartum 4.80±0.14, and postpartum 4.75±0.22 ($p < 0.05$).

Communication scores did not differ significantly by mode of delivery, patient age, education level, race, or ethnicity ($p > 0.05$). They also did not differ based on procedural (PIV placement, Foley catheter insertion, or epidural/spinal anesthesia procedure) versus non-procedural context ($p > 0.05$).

Discussion

Despite overall high patient-reported communication scores, antepartum communication was rated significantly lower than intrapartum and postpartum communication, identifying a critical and actionable target for QI. These findings support phase-specific intervention strategies. Ongoing enrollment will evaluate communication disparities related to limited English proficiency and the impact of targeted interventions using pre- and post-implementation communication scores.

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LEP SOAP Table 1 28 2026b.pdf

SAT - RA - BS 3 - BR 2 - High Risk and Crisis Management – 05

Maternal Outcomes by Mode of Delivery in Pregnant Patients with Valvular Heart Disease: A Retrospective Cohort Study

Presenting Author: Heather Acuff, MD, PhD

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Matthew Fuller, MS - Duke Anesthesiology
Ashraf S. Habib, MMBCh, MSc, MHSc, FRCA - Duke University School of Medicine
Johanna Quist-Nelson, MD - University of North Carolina at Chapel Hill School of Medicine

Abstract :

Background
The prevalence of valvular heart disease (VHD) in pregnancy is approximately 1%.[1] Patients with left-sided stenotic lesions may have difficulty accommodating hemodynamic changes such as increased cardiac output.[2] While regurgitant lesions are usually well tolerated during pregnancy due to decreased afterload, stenotic lesions pose a cardiovascular challenge through hemodynamic changes of pregnancy (increased blood volume, higher heart rate and cardiac output).[2] Vaginal deliveries are generally recommended for obstetric patients with stable cardiac disease and have benefits of reduced blood loss, enhanced recovery, and reduced risks of thrombosis and infection.[2,3] Further investigation into maternal outcomes by mode of delivery, anesthesia type, and specific valvular lesions can better inform obstetric and anesthetic management.

Methods
We conducted a retrospective cohort study using the Premier database in obstetric patients ≥18 years with a delivery visit between 1/1/16-9/30/20 and ICD-10 diagnosis codes for birth >25 weeks gestation and VHD. Exposure was delivery mode (intended vs actual, vaginal vs cesarean). Outcomes were non-transfusion severe maternal morbidity (SMM), blood transfusion (≥4 units red blood cells), intensive care unit (ICU) admission, 90-day hospital readmission, and hospital stay length. Multivariable logistic regression models compared outcomes by delivery mode for left- vs right-sided and stenotic vs regurgitant lesions. Lesion severity was unable to be assessed. Results are reported as mean difference (hospital stay length) and adjusted odds ratios (aOR) (all other outcomes) with 95% confidence intervals (CI).

Results
7996 patients with VHD were included. Compared with vaginal delivery, intended cesarean delivery was associated with greater risk of ICU admission (left stenotic, both regurgitant) and blood transfusion (left regurgitant). For actual delivery mode, compared with vaginal delivery, cesarean delivery was associated with greater risk of SMM (both regurgitant), blood transfusion (both regurgitant), ICU admission (left stenotic, both regurgitant), readmission (left regurgitant), and longer hospital stay (both stenotic, left regurgitant).

Conclusion

This study presents a large cohort that reaffirms expert guidance to attempt trials of labor in most patients with VHD.[5] Among patients with VHD, intended vaginal deliveries were not associated with higher risks of SMM, readmissions, or longer hospital stays compared with intended cesarean deliveries. Cesarean deliveries were generally associated with greater risk of ICU admissions. Actual cesarean deliveries in patients with regurgitant lesions (particularly left-sided) were associated with greater risks of morbidity outcomes than stenotic lesions.

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Additional_File_Outcomes_Delivery_Mode_Valvular_Heart_Disease.pdf

SAT - RA - BS 3 - BR 2 - High Risk and Crisis Management – 06

Risk Factors for Neonatal Acidosis Among Patients with Umbilical Cord Prolapse: a Single Center Study

Presenting Author: Hannah Berland, MD

Presenting Author's Institution: Baylor Scott & White Medical Center-Temple - Temple, Texas

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Diana Villazana-Kretzer, DO - Baylor Scott & White Medical Center-Temple
Niraj Vora, MD - Baylor Scott & White Medical Center-Temple

Abstract :

Objective: Umbilical cord prolapse (UCP) is a rare obstetric emergency associated with significant risk of fetal hypoxia and metabolic acidosis. This study aimed to identify maternal and clinical characteristics associated with neonatal acidosis (NA) among patients with UCP.

Study Design: We conducted a retrospective observational cohort study at a single institution. Patients who delivered live born infants at our hospital from January 1, 2019 to December 31, 2024 with UCP and had complete umbilical cord blood gas pH data were included in the final analysis. NA was defined as a cord blood gas pH less than 7. We compared patients with and without NA using bivariate analyses and then performed a multivariate logistic regression using variables of interest to identify characteristics independently associated with NA.

Results: There were 67 patients who had UCP during the study period and 17 were excluded due to missing cord blood gas pH values. All 50 patients included in the final analysis had a cesarean delivery, 6 (12%) had NA and 44 (88%) did not. Four (67%) patients with NA were diagnosed with preeclampsia compared to 8 (18%) of patients without NA (p = 0.02). Complete data for the cohorts are presented in *Table 1*. In our multivariate analysis, preeclampsia was independently associated with NA (aOR 27.49; 95% CI 1.86–405.73; p = 0.02). Gestational age (aOR 6.00; 95% CI 0.85-43.9; p = 0.07) and time from entering the operating room until delivery (aOR 1.68; 95% CI 0.85-3.32; p = 0.14) were not independently associated with NA. The c-statistic of this multivariate model was 0.91.

Conclusion: We found that among patients who had UCP, patients who had preeclampsia were approximately 27 times more likely to have a neonate with NA. Although preeclampsia is not a common risk factor for UCP, its association with NA may reflect placental dysfunction and reduced fetal reserve, increasing susceptibility to neonatal acidosis during UCP. Iatrogenic prematurity and unmeasured disease severity such as growth restriction or oligohydramnios may also contribute. The time from entering the operating room to delivery was similar between neonates who did and did not have NA. The c-statistic of 0.91 suggests that our multivariate logistic regression has high predictability. Study limitations include small sample size and missing cord blood gas data. Future large studies are needed to determine additional risk factors for NA in the setting of UCP.

References:

Table 1 - SOAP.pdf

SAT - RA - BS 3 - BR 2 - Rare Conditions – 01

Anesthetic Management for Parturients with Klippel-Trenaunay Syndrome: A Case Series

Presenting Author: Amanda Ruiz, MD

Presenting Author's Institution: Mayo Clinic Rochester - Rochester, Minnesota

Co-Authors: Emily E. Sharpe, MD - Mayo Clinic - Rochester

Abstract :

Background: Klippel-Trenaunay Syndrome (KTS) is a rare congenital overgrowth disease hallmarked by bone and soft tissue hypertrophy of one or more limbs, venous varicosities, and cutaneous capillary malformations.[1] Complications and co-morbidities of KTS are heterogenic and include lymphatic malformations, venous thromboembolism, hypercoagulability, bleeding from vascular malformations, anemia, chronic pain, and scoliosis.[2] Management of parturients with KTS can present a challenge to anesthesiologists.[3]

Methods: A review of the electronic health record within our health system was completed searching for patients diagnosed with KTS who had encounters for cesarean delivery (CD), vaginal birth, dilation & curettage, or cerclage placement between January 1, 2000 and September 1, 2025. Institutional review board exemption was obtained. Demographic, obstetric, and anesthetic details were abstracted from the medical records.

Results: We identified six patients with KTS who underwent six cesarean deliveries, three vaginal deliveries, and one cerclage placement (Table 1). Of the patients who had CD, two had spinal anesthesia, three had general anesthesia, and one had epidural anesthesia. Of the patients who had vaginal deliveries, none had neuraxial analgesia, one had intravenous analgesia, and two had an unmedicated delivery. There were no complications related to neuraxial anesthesia. Three patients experienced postpartum hemorrhage.

Discussion: Multidisciplinary planning is recommended in KTS to optimize safe outcomes during delivery. Venous malformations in the pelvis could complicate deliveries and should be closely evaluated with pelvic ultrasound or MRI to guide shared decision-making on best mode of delivery and preparation for emergent scenarios. Patients should be screened for spinal arteriovenous malformations and the use of anticoagulation when deciding between neuraxial or general anesthesia. Considerations for airway management include careful assessment of venous malformations in the head or neck. Hemorrhage in the setting of vascular malformations or anticoagulation should be anticipated; with recommendation for large-bore intravenous access and consideration of invasive hemodynamic monitoring. Lastly, patients should be monitored closely in the postpartum period for complications such as delayed hemorrhage or thromboembolism.

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Case	Gravida/para	Gestational age	BMI	KTS sequelae	Comorbidities	Procedure or delivery method	Anesthesia type	Access and monitors	Notes and complications
1	G2P0010	17w1d	45	Lymphedema bilateral legs, hemangioma on posterior neck, redness of bilateral legs, right leg varicosities	None relevant	Cerclage placement	General	20 g and 16 g PIV	Hemorrhage with 1600 mL estimated blood loss
	G2P0010	20w3d	46			Vaginal delivery	IV pain medication	-	Stillborn, postpartum pulmonary embolism
	G3P0110	39w0d	43			Cesarean delivery	General	-	CD due to abdominal cerclage; postpartum hemorrhage with estimated blood loss 1200 mL
	G4P1111	38w1d	48			Cesarean delivery	General	18 g PIV	Repeat CD due to abdominal cerclage
2	G5P2021	37w5d	-	Port wine stains on back, varicose veins on both legs, venous malformations on abdomen and pelvis	Kasselbach Merritt Syndrome, chronic DIC, Factor XI deficiency, thrombocytopenia	Cesarean delivery	General	-	Repeat CD
	G6P3022	37w3d	30			Cesarean delivery, tubal ligation	Spinal	-	Repeat CD; postpartum hemorrhage with estimated blood loss 1000 mL
3	G4P3003	39w0d	34	Gestational diabetes, superficial thrombophlebitis, papillary thyroid cancer status post thyroidectomy	None relevant	Vaginal delivery	Unmedicated	PIVx1	Anesthesia consult during pregnancy with MRI imaging review, neuraxial risk/benefit discussion, and contingency planning for emergencies; unmedicated delivery due to patient preference
4	G1P0000	38w2d	-		None relevant	Cesarean delivery	Spinal	Arterial line, 14 g PIV, 14 g PIV	Elective CD for sequelae of KTS; postpartum hemorrhage with estimated blood loss 1000 mL
5	G1P0000	37w5d	30	Varicosities of pelvis, vulva and left lower extremity	None relevant	Cesarean delivery	Labor epidural	20 g PIV	Multidisciplinary planning with emergency plans; CD for arrest of labor
6	G2P0010	29w6d	29	Left thigh, leg, and buttock hypertrophy, swelling, varicose veins, and pain	Chronic pain, asthma	Vaginal delivery	Unmedicated	-	-

Abbreviations: BMI, body mass index; KTS, Klippel-Trenaunay Syndrome; PIV, peripheral intravenous; IV, intravenous; DIC, disseminated intravascular coagulation; MRI, magnetic resonance imaging; g, gauge; mL, milliliters; CD, cesarean delivery

SAT - RA - BS 3 - BR 2 - Rare Conditions – 02

Inhibiting TRPV4 ameliorated the hyperalgesia in sciatic nerve injury-induced neuropathic pain via restraining the SGCs activation

Presenting Author: Mingjie Mao

Presenting Author's Institution: Women's Hospital of Nanjing Medical University - Nanjing, Jiangsu

Abstract :

Neuropathic pain (NP), characterized by persistent pain, affected amount of population worldwide.

Activated satellite glial cells (SGCs) and following neuroinflammation in dorsal root ganglia (DRG) were recognized main pathological changes of NP. Recently, increased Transient Receptor Potential Vanilloid 4 (TRPV4) has been reported in several animal model of NP, while the specific role of TRPV4 on NP remain poorly elucidated. Hence, we aimed to explore whether inhibiting TRPV4 improved hyperalgesia in NP rats and explored the underlying mechanisms. Using sciatic nerve injury (SNI) model, we found significant decreased paw withdrawal mechanical threshold (PWMT) and paw withdrawal thermal latency (PWTL) accompanied by upregulated algogenic substances as well as proinflammatory cytokines in the SNI rats when compared with the Sham group. In addition, GFAP+ SGCs, and TRPV4 increased remarkably in the SNI group. Moreover, TRPV4 was mainly co-labeled with neuron-specific nuclear protein (NeuN) in DRG. After using TRPV4 agonist and antagonist, the rats were divided into Sham, SNI, SNI+GSK, and SNI+HC groups. Compared with the SNI group, inhibiting TRPV4 in the SNI+HC group decreased the GFAP+ SGCs and partly reversed the ascending algogenic substances as well as proinflammatory cytokines, accompanied by improved PWMT, and PWTL. However, activating TRPV4 failed to further increase GFAP+SGCs, algogenic substances as well as proinflammatory cytokines, nor did it deteriorate behavior in the SNI+ GSK group when compared with the SNI group. In conclusion, inhibiting TRPV4 in sensory neurons might decreased activated SGCs and neuroinflammation in DRG and then ameliorated the hyperalgesia.

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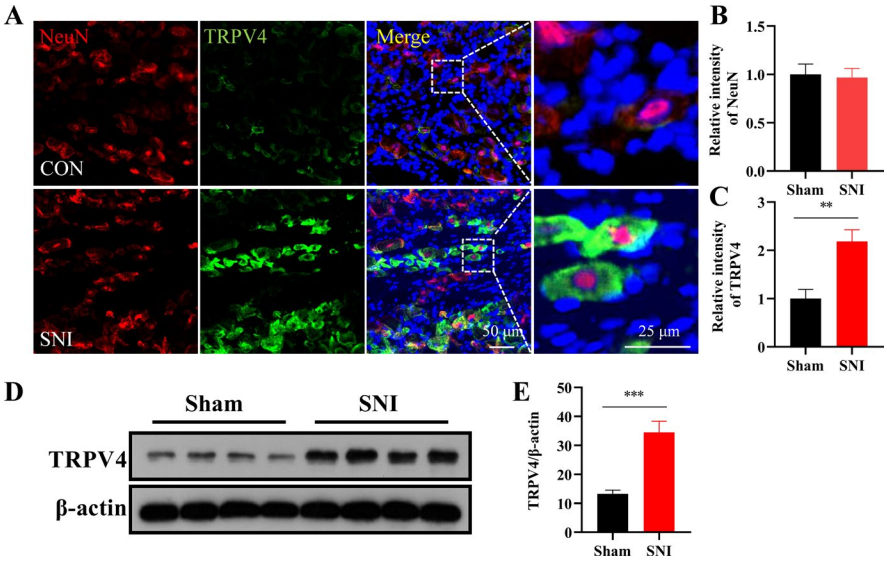

SAT - RA - BS 3 - BR 2 - Rare Conditions – 03

Acute Fatty Liver of Pregnancy Increases Postpartum Hemorrhage and ICU Admission: Implications for Peripartum Anesthesia

Presenting Author: Edward Sutanto, BS

Presenting Author's Institution: CUNY School of Medicine - New York, New York

Co-Authors: Fariha Hanif, BS, MPH - SUNY Downstate Health Sciences University
Benjamin M. Hyers, MD - Icahn School of Medicine at Mount Sinai
Andrew Warburton, MD - Icahn School of Medicine at Mount Sinai

Abstract :

Introduction

Acute fatty liver of pregnancy (AFLP) is a rare, life threatening obstetric emergency characterized by maternal liver failure, posing significant challenges to peripartum anesthetic management. This retrospective study aims to understand maternal mortality, morbidity, and outcomes of AFLP patients compared to normal pregnancies.

Methods

This study used data from the TriNetX Global Collaborative Network to conduct a comparative analysis between peripartum women with and without AFLP. The primary outcome assessed was postpartum hemorrhage, with secondary outcomes including acute kidney injury (AKI), encephalopathy, portal hypertension, acute pancreatitis, hypoproteinemia, coagulopathy, and acute renal failure. Liver labs, complete blood count, basic metabolic panel, antithrombin III, and various other coagulation markers were also compared.

Results

After baseline matching by demographics and comorbidities, groups standardized to 73,130 patients across 170 HCOs were compared with Kaplan-Meier analysis. All outcomes assessed except ICU admission saw statistically significantly higher risk in patients with AFLP including PPH (HR = 1.37, 95% CI: 1.31 - 1.43, $p < 0.001$), AKI (1.70, 1.54 - 1.87, $p < 0.001$), encephalopathy (1.93, 1.61 - 2.31, $p < 0.001$), portal hypertension (7.37, 5.26 - 10.32, $p < 0.001$), acute pancreatitis (2.90, 2.54 -3.31, $p < 0.001$), hypoproteinemia (1.89, 1.56 - 2.29, $p < 0.001$) , coagulopathy (1.28, 1.16 - 1.41, $p < 0.001$), acute renal failure (1.70, 1.54 - 1.87, $p < 0.001$), and mortality (1.29, 1.13 - 1.46, $p < 0.001$).

Conclusion

AFLP is associated with broad, multi-system increases across maternal morbidity and mortality, with high risk of PPH and renal and hepatic consequences. These patients should be carefully monitored in their pre-peri-and post-

partum care with a multidisciplinary team. Given the increased risk of coagulopathy, increased consideration in neuraxial anesthetic choice should be considered.

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SAT - RA - BS 3 - BR 2 - Rare Conditions – 04

Anesthetic and Obstetric Outcomes in Pregnant Individuals with Sickle Cell Disease: A Retrospective Observational Study at a Tertiary Academic Center

Presenting Author: Margarita V. Blajeva, MD, MBA, FCAI

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Co-Authors: Gita Rahavan, MD, FRCPC - University of Toronto
Fernanda SL Oliveira, MD - University of Toronto
Javiera Vargas, MD - Clinica Alemana Santiago

Abstract :

Introduction:
Pregnancy in individuals with sickle cell disease (SCD) poses significant risks for maternal and fetal morbidity and mortality. Pregnancy-related physiological changes—including anemia, increased oxygen consumption, and a prothrombotic state—may exacerbate underlying organ dysfunction and precipitate vaso-occlusive crises (VOC). Despite improvements in multidisciplinary care, data on obstetric anesthetic management in this high-risk population remain limited.

Objectives:
To evaluate anesthetic techniques, pain management strategies, transfusion requirements, and maternal and neonatal outcomes among pregnant individuals with SCD at a tertiary academic center.

Methods:
This retrospective observational study included 87 pregnancies in individuals with SCD who delivered at a Tertiary Academic Center, between January 2014 and January 2019. Data were extracted from obstetric and anesthetic records. Outcomes assessed included VOC frequency, labor analgesia and cesarean delivery techniques, neuraxial block performance and failure, intraoperative pain, hemorrhage and transfusion requirements, length of stay, ICU admission, and maternal and neonatal outcomes.

Results:
VOCs occurred in 72% of pregnancies and were the leading cause of antepartum hospitalization. Labor induction was performed in 39% (34/87) due to recurrent VOCs. Neuraxial labor analgesia was used in 61% (53/87), frequently requiring optimization: 24.5% required higher-concentration infusions, 64% received repeated manual top-ups, 17% needed catheter replacement, and 38% required supplemental IV opioids. Cesarean delivery was performed in 53% (46/87) of cases, primarily under neuraxial anesthesia. General anesthesia was used in five cases - two for fetal bradycardia and three following failed neuraxial extension. Despite adequate neuraxial technique, 30% of cesarean patients were complicated by intraoperative pain requiring adjunct opioids or sedatives. Postpartum complications included acute chest syndrome, opioid-related adverse effects, and hospital readmissions. There were no maternal deaths, though neonatal morbidity and mortality occurred.

Conclusion:
Pregnancy in individuals with SCD is associated with a high burden of VOCs, complex pain management, and a notable incidence of intraoperative pain despite neuraxial anesthesia. These findings highlight the

need for proactive, multidisciplinary anesthetic planning and tailored protocols to address the unique challenges of this population. Further prospective studies are warranted to improve outcomes and establish evidence-based anesthetic guidelines.

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SAT - RA - BS 3 - BR 2 - Rare Conditions – 05

Failed Induction of Labor Rates in Class Three Obesity: A Retrospective Study

Presenting Author: Hannah Schmucker, MD

Presenting Author's Institution: Ochsner Clinic Foundation - New Orleans, Louisiana

Co-Authors: Allison G. Clark, MD - Ochsner Clinic Foundation

Abstract :

Introduction
In women of reproductive age, the most common health problem is obesity (1). Obesity poses serious risks during pregnancy such as thromboembolism, hypertensive disorders, and preterm delivery (2). Because of increased complications, women with obesity are more likely to have an induction of labor (IOL) (3). Studies show an increase in failed IOLs requiring cesarean section with obesity compared to normal weight (3). However, data on the rate of failed IOL specifically in class 3 obesity, BMI ≥40, is lacking. Acquiring quantitative data on rates of failed IOL in this population can be helpful in counseling these complex patients during pregnancy.
This study aims to quantify the rate of failed IOL, defined as delivery by cesarean after attempted IOL, in specific groups of obesity (BMI 40-49.9, BMI 50-59.9, BMI ≥ 60). The secondary objectives aim to determine if class 3 obesity increases the risk of labor complications including epidural catheter-related outcomes, maximum oxytocin doses, postpartum hemorrhage, postpartum infection, APGAR scores, and NICU admission. We hypothesized that patients with class 3 obesity will have high rates of failed IOL and higher rates of comorbidities and complications compared to patients with an elective cesarean delivery.

Methods
This is a retrospective cohort study using medical records of patients at Ochsner Baptist. Records were reviewed for patients meeting study inclusion and exclusion criteria during 1/2020-9/2025. The patient population under investigation is patients who underwent singleton IOL ≥ 34 weeks at the time of induction. The population is divided into three groups: (1) BMI 40-49.9 (2) BMI 50-59.9 (3) BMI ≥ 60. The reference group is primary elective cesarean deliveries.

Results
Preliminary results show interesting data for BMI groups 40-49.9, 50-59.9, and ≥ 60. Failed IOL rates were respectively 37.5%, 52.4%, and 100%. The average maximum oxytocin rates were 19.8, 23.4, and 40 milliunits/min. The percentage of replaced epidurals were 13%, 9.5%, and 50%. The percentage of NICU admissions were 9.7%, 11.9%, and 50% compared to 15% in controls. The average APGARs at 1 minute were 7.6, 7.3, and 6 compared to 7.53 in controls.

Discussion
In this study both failed IOL and maternal & neonatal complications increased with increasing BMI. This data will be helpful in educating providers and patients regarding the safest mode of delivery.

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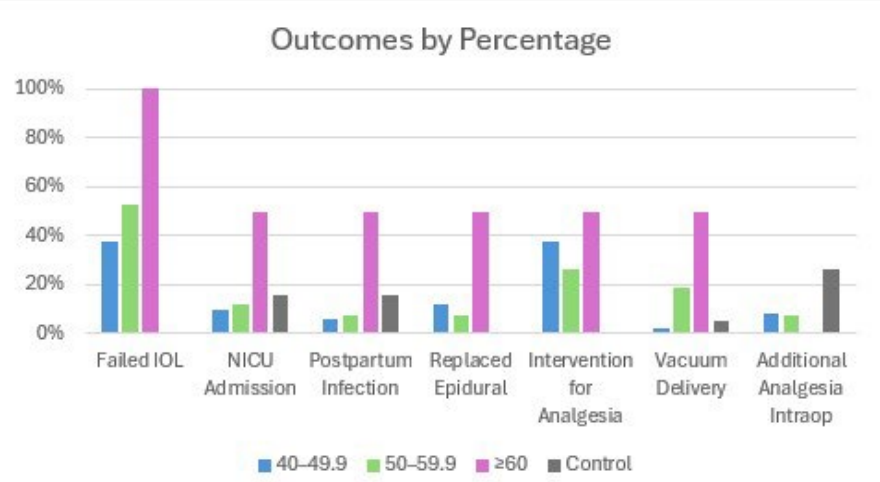

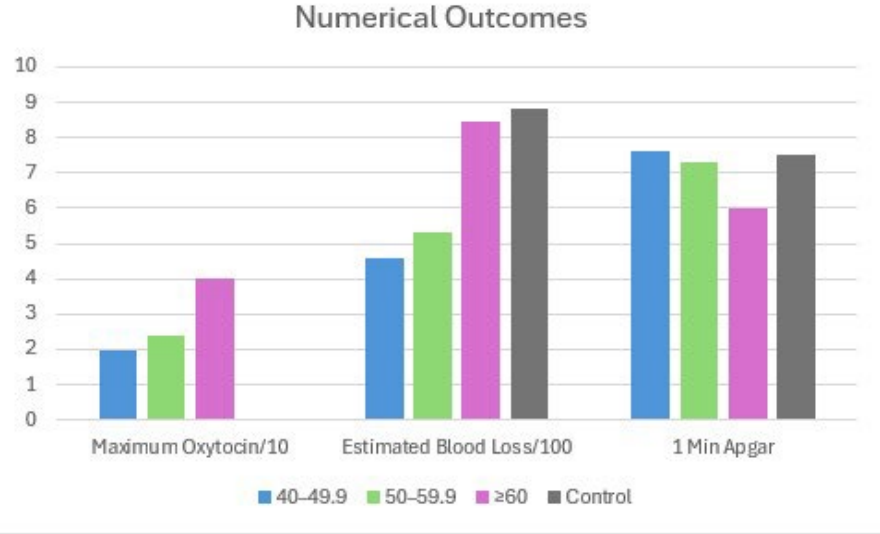

SAT - RA - BS 3 - BR 2 - Rare Conditions – 06

Postpartum Plasma-Derived Exosomes Confer Mitochondrial Stabilization and Neuroprotection against Ischemic Stroke

Presenting Author: Creed Stary, MD, PhD

Presenting Author's Institution: Stanford University School of Medicine, Department of Anesthesiology, Perioperative and Pain Medicine, and by Courtesy, Ophthalmology - Palo Alto, California

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Lijun Xu, MD - Stanford University School of Medicine, Department of Anesthesiology, Perioperative and Pain Medicine

Abstract :

Background: Women are at higher risk of cerebrovascular accidents (CVAs) in the postpartum period, yet our prior work (1) in mice demonstrated that the postpartum period in parallel affords robust protection against experimental CVA, suggesting evolutionary adaptations that reduce injury in the event of CVA. The molecular mechanisms governing adaptive neuroprotection during the postpartum period remain unknown. We hypothesized that circulating exosomes contain bioactive cargo (such as Hsp20) that confer neuroprotection against ischemic injury during the postpartum period. Methods: Exosomes were isolated from plasma of postpartum female mice (ppExos) and from age-matched nulliparous female mice (conExos). In separate experiments, exosomes were isolated from serial blood samples obtained from healthy human volunteers during pregnancy (3^{rd} trimester) and again on postpartum day 2. Exosomal size and protein markers were confirmed *via* nanoparticle tracking analysis and Western blotting. Protection with exosome treatment was assessed *in vitro* using mouse neuronal and astrocyte cultures and human retinal pigment cell line subjected to simulated ischemia, after which mitochondrial integrity and reactive oxygen species (ROS) production were evaluated by live cell imaging. Neuroprotection *in vivo* was assessed by measuring infarct volume and neurobehavioral scores 24h after 1h transient middle cerebral artery occlusion (MCAO) in young adult male and female mice, and in aged female mice treated intravenously 2h post-MCAO with either ppExos or conExos. Changes in mitochondrial dynamics were assessed by immunofluorescence and Western blot. Human exosomes were sent for proteomic assessment (SomaScan^{TM}), and validated by immunoblot. Results: ppExos significantly ($p < 0.05$) reduced infarct volumes and improved neurological deficits post-MCAO in both young adult males and females, and in aged female mice, compared with conExo treatment. *In vitro*, ppExos significantly reduced ROS generation in all cell types after simulated ischemia and reduced mitochondrial fragmentation in astrocytes. Mitochondrial fusion proteins Mfn2 and Opa1 were elevated in maternal postpartum brains, and were significantly

preserved in both astrocyte and neuronal cell cultures after *in vitro* ischemia with ppExo treatment. Proteomics revealed significant upregulation of heat shock protein 20 (Hsp20) in human ppExos, while Western blot validated elevated Hsp20 in both human and mouse ppExos compared with conExos. Simulated ischemia significantly reduced Hsp20 levels in astrocyte and neuronal cultures, an effect reversed by ppExos treatment but not with conExos. In conclusion, ppExos represent a previously unrecognized, naturally optimized neuroprotective agent that enhances mitochondrial resilience and antioxidant defenses associated with enhanced Hsp20 expression. These findings establish a novel platform for sex-informed, cell-free therapies in ischemic CVA.

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SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 01

Recovery and mental health outcomes in patients with placenta accreta spectrum after cesarean delivery under neuraxial anesthesia

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Amanda Koire, MD, PhD - Brigham and Women's Hospital/ Harvard Medical School
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Abstract :

Introduction: Prior analyses show heterogeneity in anesthesia management for placenta accreta spectrum (PAS). Severe postpartum hemorrhage (PPH) from PAS frequently necessitates intervention and hysterectomy with higher associated risk of serious morbidity and post-traumatic stress disorder (PTSD). While neuraxial anesthesia (NA) is recognized as safe and effective for cesarean delivery (CD) for suspected PAS, it is unknown whether NA with a higher degree of wakefulness may contribute to PTSD after recovery from PAS surgery. This study evaluates mental health recovery in patients with PAS undergoing CD under NA. We hypothesize that patients awake under NA will have higher PTSD after experiencing high-compared to low-morbidity PAS.

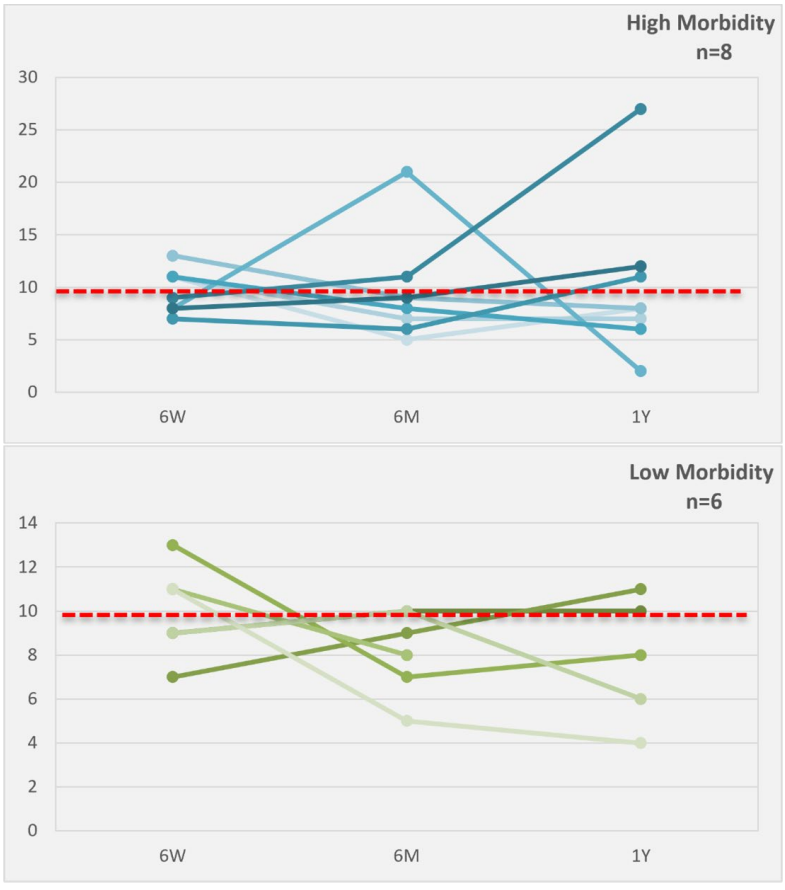
Methods: After IRB approval, patients with suspected PAS who delivered between Sept 2021, and Jul 2023 were prospectively captured in a database: antenatally suspected PAS by radiologic or clinical risk factors, having CD with or without hysterectomy, and receiving NA. High-morbidity PAS was defined by transfusion of $\geq$ 4 packed red blood cells, hysterectomy or intensive care unit admission. Obstetric variables, confirmation of NA, and sedation exposure to midazolam, dexmedetomidine, or propofol were obtained. Patient-reported mental health outcomes were collected by validated instruments: the Edinburgh Postnatal Depression Scale (EPDS) at 6 weeks, 6 months, and 1year along with 5 questions regarding trauma symptoms adapted from the Perinatal PTSD Questionnaire (PPQ) at 6 months and 1year. An EPDS 10 or higher is suggestive of possible depression.

Results: Forty-six eligible patients, 21(46%) with high morbidity, were identified. Demographics were similar between groups. Of high and low-morbidity cases, 81% vs 76% had suspected PAS by imaging. Exposure to anesthesia consultation was high in both groups (90 vs 96%). High-morbidity patients had higher blood loss and transfusion (1863 $\pm$ 1251 vs 1054 $\pm$ 134 mL; 9 (42%) vs 2 (8%) patients). Exposure to sedation during surgery was 62% vs 2% in the high vs. low-morbidity groups. The median [IQR] EPDS scores at 6 weeks, 6 months, and 1year were not significantly different in low vs high morbidity groups: 3 [0-6], 3 [0.5-6.5], and 2 [0-5.1] vs 4 [0 -9], 7 [3-9], 5.5 [2-10.5], respectively. Evolution for any EPDS $\geq$ 10 over time by PAS morbidity is shown in the Figure. There was no significant difference in trauma symptoms at 6 weeks, 6 months or 1 year.

Conclusion: We found no statistical difference in EPDS or average trauma symptom scores between high and low-morbidity PAS groups managed with NA. The benefit of high pre-delivery risk identification, anesthesia consultation, and higher sedation provided may mitigate differences even among high-morbidity PAS patients. For psychological recovery over time, patterns of acute vs. later EPDS scores by PAS morbidity under NA warrant further study.

References:

1. PMID: 35073282
2. PMID: 29481427
3. PMID: 33177069
4. PMID: 3651732
5. PMID: 12168121



Patterns of EPDS Scores Across the Recovery Period in Low and High Morbidity PAS Outcomes

SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 02

Humanizing the Cesarean Experience: Standardizing Trauma-Informed, Patient-Centered Care in the Obstetric Operating Room.

Presenting Author: Darragh O'Reilly, MBBS, MSc, FCAI

Presenting Author's Institution: BC Women's Hospital, University of British Columbia - Vancouver, British Columbia

Co-Authors: Kathryn Clark, MBChB D.ABA FRCPC - BC Women's Hospital, University of British Columbia
Naima Kotadia, MD FRCPC - BC Women's Hospital, University of British Columbia

Abstract :

Cesarean delivery (CD) is a common surgery that can be internalized as a distressing experience, particularly when patients perceive loss of autonomy, limited communication, or separation from support persons.[1] Approximately 33% of patients report their birth experience as traumatic, with unplanned CD having a higher association.[2] Although trauma-informed, patient-centered principles are increasingly recognized in maternity care; their consistent application for cesarean delivery remains variable and poorly described.

Objective

To describe a multidisciplinary team (MDT) initiative to standardize formal, trauma-informed, patient-centered practices in CD care.

Methods

An MDT at a tertiary center with over 7000 annual deliveries and a CD rate of 42% undertook a practice standardization initiative to formalize patient-centered CD practices which previously existed but were used inconsistently. The initiative focused on establishing shared values between patients and providers, staff education, and embedding patient-centered options into existing workflows, rather than introducing new interventions. Following this consultation, a standardized set of practices was offered when clinically appropriate for elective and urgent CD, including: presence of a support person during neuraxial anesthesia placement; entry of a support person into the operating room at time of fetal delivery for patients under general anesthesia, when feasible; immediate skin-to-skin contact following delivery when maternal and neonatal conditions suitable; use of a live video feed (mounted on a boom within the birthing person's view) (fig.1) of the neonatal warmer allowing observation of neonatal care when separation is clinically indicated; temporary draping with urinary catheter insertion and abdominal preparation to support privacy and dignity; patient-selected music in the operating room; and inclusion of additional support people, such as a doula, midwife, or additional parent, when appropriate. Clinical flexibility was maintained to prioritize patient safety and accommodate timely patient care based on clinical urgency.

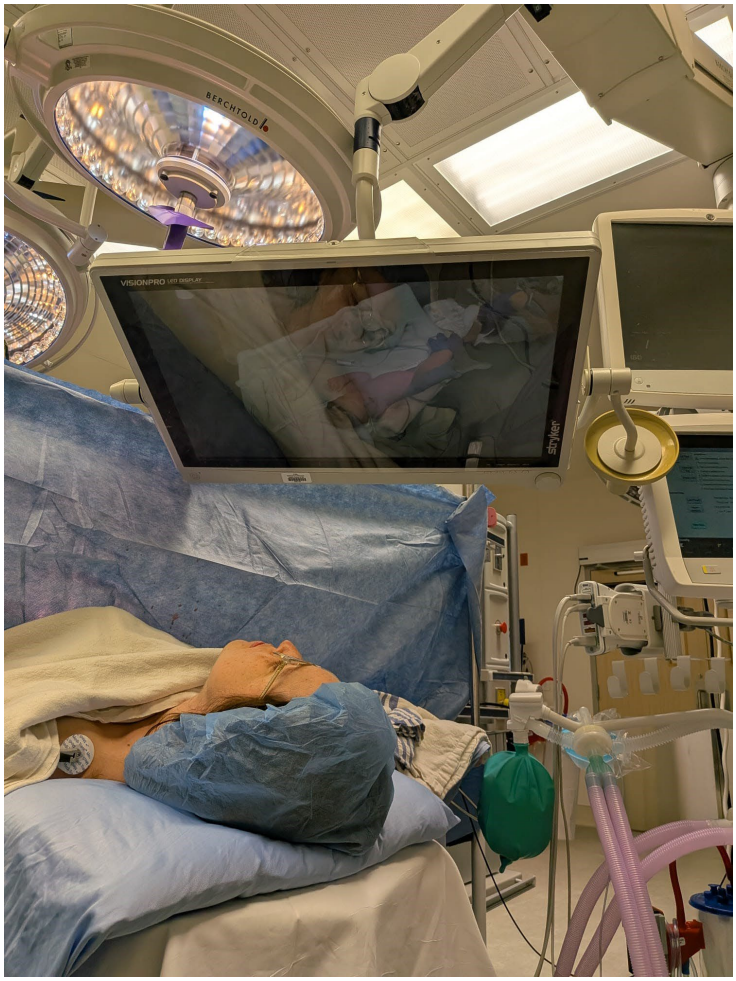
Results

Standardization of the suite of practices offered to birthing persons improved consistency in CD care without compromising safety or disrupting operating room workflow. Informal patient feedback highlighted greater feelings of involvement, respect, and emotional support. Staff reported improved communication, clearer expectations, and greater awareness of the emotional impact of CD.

Conclusions

Formalizing variable patient-centered practices into standardized protocols may help provide trauma-informed care for cesarean birth. This may be generalizable to other centers seeking to embed trauma-informed principles into operative maternity care. Future work will focus on developing a preoperative patient-preferences tool to further support patient engagement and individualize care plans.

References: 1.Psychiatr Q. 2021;92(4):1839-1853
2.Birth. 2000;27(2):104-111.



SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 03

"I didn't think it was what my story would be": A qualitative analysis of maternity patients' experiences in critical care

Presenting Author: Anna Stout

Presenting Author's Institution: NHS Lothian - Edinburgh, Scotland

Co-Authors: Laura Gill - NHS Fife
Bathsheba Tingey - NHS Lothian
Angus Turnbull - NHS Lothian

Abstract :

Introduction

Maternal critical care admission is associated with increased risk of adverse maternal outcomes. While the clinical course is well described, patients' emotional, social and cognitive experiences are less understood. Previous research has identified the intensive care unit (ICU) environment, being a mother in ICU and transfer from ICU as challenges[1]. Despite increased focus on critical care follow-up, little is known about this patient group. We aimed to explore the lived experiences of maternity patients admitted to ICU to inform follow-up service development.

Methods

Following Caldicott approval, maternity patients admitted to ICU in our institution from 2022-2023 were invited to share their experiences of critical illness. Exclusions were: stillbirth/neonatal death, active complaints, need for an interpreter, current pregnancy, or ongoing critical care/palliative follow-up. Data were collected via 1:1 interviews, focus groups, semi-structured telephone or secure email discussions. Comprehensive notes were taken and written consent for analysis obtained. Themes and subthemes were generated through inductive thematic analysis.

Results

Twelve patients shared their experiences and five provided consent for analysis. Four overarching themes were generated; *experiences of motherhood*, *relationship with baby*, *memories*, and *reflection*. Participants described motherhood through guilt, comparison, and disrupted birth stories; separation from their baby, and the tension between mother-focused and baby-focused care; memories of personal items, and moments lost; and reflections on understanding the experience, timing of emotional processing, and the longer term impacts for them and their family.

Discussion

Consistent with previous qualitative studies, challenges included separation from the baby and limited understanding of events surrounding admission. In contrast, the ICU environment did not prove particularly difficult. Instead, participants emphasised comparisons with other parents' experiences, maternal guilt and the lack of a birth story. Storytelling helps us to make sense of a situation, and sharing birth stories has been shown to create community and support maternal identity[2]. Personal items such as photographs and family-recorded diaries of the admission supported recall and interpretation of the experience. In response to these findings, peer support, the opportunity to share diverse birth stories in a safe environment, and the use of structured written timelines of events will form part of future maternal critical care follow-up within our service.

References: 1. Hinton L, Lock L, Knight M. Maternal critical care: what can we learn from patient experience? A qualitative study. BMJ Open 2015; 5: 2006676. Doi:10.1136/bmjopen-2014-006676
2. Johnson NL, Scott SF, Brann M. "Our birth experiences are what binds us": women's motivations for storytelling about birth to build motherwisdom. Communication Studies 2020; 71(4): 649-668

SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 04

Birth experiences of stigma and discrimination amongst critically ill pregnant patients: a prospective case-control patient-reported outcome pilot study

Presenting Author: Craig Thomas

Presenting Author's Institution: Columbia University - New York, New York

Co-Authors: Ralph Alberto - Columbia University
Yael Sarig - Columbia University
Walter M. Taylor, MD - Columbia University

Abstract :

Background

Medically complex obstetric patients with severe maternal morbidity are admitted to our Critical Care Obstetrics (CCOB) service on the labor and delivery unit ante- and postpartum. Their care necessitates an increased number of interactions with care providers, including the anesthesia service, potentially causing stigma, bias, and discrimination (SBD). Data on patients' experiences of SBD and how they influence outcomes in critically ill obstetric patients is lacking. We designed a pilot study to assess patients' postpartum recovery and SBD, hypothesizing CCOB patients will have poorer short-term outcomes than healthy obstetric patients.

Methods

Between 09/2025-01/2026, patients with known chronic comorbidities (planned CCOB), and those with new acute diagnoses (unplanned COOB) were enrolled postpartum, along with matched controls (to age, delivery mode, self-reported race of CCOB patients). Study survey used 2 validated instruments: OBsQoR-10 to measure postpartum recovery and an adapted 19-question Birth Equity Patient Reported Experience Measure (PREM)[1] to measure SBD (scored 19-95). Other data was extracted from EMR. Data is presented as median [interquartile range]. Comparisons between groups (control vs planned vs unplanned) used ANOVA or otherwise indicated tests.

Results

We enrolled 47 patients 24-48h postpartum: planned CCOB (n=20), unplanned CCOB (n=10) and matched controls (n=17) (Table 1). There were no significant differences in maternal age, BMI, race, or delivery mode between groups. Gestational age and maternal diagnoses were different between groups. ObsQoR-10 scores differed significantly (P=0.047) across groups with unplanned CCOB patients having the lowest score (poorest recovery). Experiences of SBD were higher for planned (93 [84-95]) and unplanned (92.5 [74.75-95]) CCOB patients vs controls (89 [77-95]), though this difference was not significant (P=0.87). Additional PREM results from 6 questions are included in Table 1.

Discussion

This pilot study provides preliminary insight into experiences of SBD and outcomes for critically ill obstetric patients. Postpartum recovery was found to be significantly different between groups with unplanned CCOB patients having the poorer recovery. Our study suggests that the PREM survey can be used immediately postpartum to record patients' experiences of SBD. We identified trends in reported experiences of SBD (highest for planned and unplanned CCOB vs controls) in this at-risk cohort of patients with severe maternal morbidity though these findings should be confirmed in larger cohorts.

References:

1. https://www.health.state.ny.us/community/pregnancy/nyspqc/projects/docs/birth_equity_toolkit.pdf

SOAP 2026 Abstract - CCOB Patient Experience Table FINAL.pdf

SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 05

Critical Care Obstetrics (CCOB) Program Year One: Risk Stratification and Outcomes for Patients who Received Care on Labor and Delivery (L&D) and Those Transferred to an Intensive Care Unit (ICU)

Presenting Author: James Conwell, DO

Presenting Author's Institution: Columbia University - New York City, New York

Co-Authors: Ralph Alberto - Columbia University
Jessica Morgan, MD - Columbia University
Ashley Munoz, RN - New York Presbyterian- Morgan Stanley Children's Hospital
Yael Sarig - Columbia University
Jean-Ju Sheen, MD - Columbia University

Abstract :

Background

From 2020-2022, the maternal ICU admission rate in the US was 1.8 per 1,000 births.[1] Our CCOB program was launched in 2024 to standardize our approach to medically complex obstetric patents. Patients with the COOB designation receive specialized nursing care, telemetry monitoring, and multidisciplinary rounding led by the obstetric anesthesia team on L&D. We previously evaluated characteristics of CCOB patients with chronic comorbidities (planned), and acute diagnoses (unplanned), and found unplanned cases were more likely to become critically ill.[2] Certain circumstances prompted transfer to an ICU. In this study, we characterized factors associated with ICU transfer and evaluated outcomes of CCOB patients admitted to an ICU vs those receiving all their critical care in our CCOB unit on L&D, hypothesizing that outcomes would be similar.

Methods

The CCOB designation was added to our electronic medical record, EPIC, in May 2024, allowing all patients meeting criteria to be reviewed. Characteristics and outcomes between CCOB patients transferred to an ICU and those cared for only in the CCOB unit on L&D were reviewed. Maternal outcomes included a vasoactive infusion requirement, quantitative blood loss, hemorrhage, blood product transfusion, hospital length of stay and CCOB unit length of stay.

Results

There were 165 CCOB cases between May 2024 to July 2025: 147 (89%) remained on L&D, and 18 (11%) were admitted to an ICU either directly or from the CCOB unit (Table 1). Maternal demographics did not differ between groups. Patients admitted to an ICU were either transferred to the cardiac ICU (n=2; 11%) surgical ICU (n=7, 39%), medical ICU (n= 6; 33%), or neuro-ICU (n=4; 22%). Patients transferred to an ICU were more likely to have been unplanned CCOB, to have been delivered at an earlier gestational age, and to have received general anesthesia for delivery, compared with patients not transferred. Patients transferred to an ICU were more likely to have sepsis or infection, respiratory

indications, or neurological indications, but not cardiac indications. Eight patients were admitted to an ICU directly from the emergency department, an operating room, or an outside hospital. Maternal and neonatal outcomes (including NICU admission) and hospital length of stay were not statically different between the groups.

Discussion

There were no significant differences in outcomes between CCOB patients transferred to the ICU at any time point and those who were not, though confounding by indication was possible. Some patients were admitted to an ICU before receiving CCOB care. Patients transferred to an ICU were more likely to be unplanned CCOB and had a septic, respiratory or neurological CCOB indication. Future work should focus critical care resources and specialized teams to care for acutely ill patients on L&D. This care system can serve as a model for other institutions.

References:

1. NCHS Data Brief, no 485, 2023
2. SOAP Annual Meeting 2025; Abstract: 2045267

Critical Care Obstetrics (CCOB) Program Year One- Risk Stratification and Outcomes for Patients who Received Care on Labor and Delivery (L&D) and Those Transferred to an Intensive Care Unit (ICU).pdf

SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 06

VOICE-ICU: Voices of Obstetric Intensive Care Experiences - Informing Care and Unit Design: A Scoping Review

Presenting Author: Kyeisha K. Laurence, BS

Presenting Author's Institution: Harvard Medical Student/Harvard Kennedy School - Cambridge, Massachusetts

Co-Authors: Sebastian M. Seifert, MD - Brigham and Women's Hospital/Mass General Brigham

Abstract :

Understanding obstetric (OB) patients' experiences in the intensive care unit (ICU) is essential to improving care and outcomes. Research in non-OB ICU patients has described complex, long-term psychological sequelae,[1] but may not capture the unique needs of patients who often face separation from their newborns and balance physical and psychological healing with intensive newborn care.[2] Although severe maternal morbidity (SMM) is increasingly linked to adverse maternal mental health outcomes,[3] few studies offer strategies to enhance maternal experiences during ICU admissions. To our knowledge, no systematic review has focused on OB patients' experiences in the ICU. We hypothesize that the literature will identify distinct OB-specific experiential domains, including unique psychological, maternal role disruption, and support person needs, that are inadequately addressed by existing care models and unit design.

We conducted a systematic review in accordance with PRISMA-ScR methodology of studies examining the experiences of OB patients admitted to the ICU or requiring critical care due to SMM. A search of MEDLINE, Cochrane, Embase, ClinicalTrials.gov identified English-language, peer-reviewed studies from 2000 to 2025. Search terms targeted three domains: population (OB patients), setting (ICU/critical care), and experiences (patient experience, perceptions, psychological outcomes). Case reports, studies with < 5 participants, and narrative or perspective pieces were excluded. Covidence software was used for study selection.

The search identified 4686 studies; 95 duplicates were removed; title and abstract screening excluded 4533. 50 full-texts were reviewed and 16 met inclusion criteria. All studies used qualitative methods, including surveys and interviews following ICU admission or the occurrence of SMM requiring critical care. Five themes emerged: emotional well-being and psychological impact; new motherhood; communication and provider interactions; transition from ICU; and partner experiences.

This review defines core experiential domains that should inform OB ICU care models, quality metrics, and unit design. Across studies, ICU admissions were described as shocking, distressing and disempowering. Many studies emphasize involving partner perspectives—an underrepresented yet crucial group for a developing family-centered model of OB critical care. Consistently cited areas for improvement included newborn bonding, breastfeeding support, mental health assessment and resources, clear and consistent communication, and follow-up with critical care teams. Overall, the literature on OB ICU patient experiences remains sparse, particularly in the US, with a notable absence of

patients with limited English proficiency. Robust qualitative and quantitative data are needed to address this crucial gap in the care of OB patients experiencing critical illness.

References:

1. Crit Care Med 2015;43:1121

2. Midwifery 2014;30:158

3. Obstet Gynecol Clin North Am 2020;47:453

VOICE-ICU SOAP Abstract Figure.pdf

SAT - RA - BS 3 - BR 3 - Patient Voices 2 – 07

A New Interdisciplinary Patient Support Tool to reduce psychological trauma amongst women undergoing urgent or emergency cesarean sections: Results from a Modified Delphi study

Presenting Author: Pamela Angle, MD FRCPC MSc (oxon)

Presenting Author's Institution: Obstetrical Anesthesia Research Unit, Sunnybrook Research Institute, Sunnybrook Health Sciences Centre, University of Toronto - Toronto, Ontario

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Christine Kurtz Landy, MScN, PhD - York University
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Abstract :

Introduction
Urgent/emergent (UE) cesarean sections (CS) are an independent predictor for the development of childbirth-related post-traumatic stress disorder [1]; high-quality supportive clinical care may help to prevent or reduce this risk [2]. This Modified Delphi study developed a new Interdisciplinary Patient Support Tool to guide the supportive care women receive from their interdisciplinary health care providers *immediately before, during, and immediately after* UE CS.

Methods
Following Research Ethics Board approval, a Modified Delphi study design of two sequential patient panels was conducted. Two independent panels of women, representing the breadth/depth of live UE CS experiences, were recruited $\leq$72 hours delivery. Each panel completed a single round of item ratings. Actionable intervention candidate items (n=33) were developed from the literature, our previous Phase 1 qualitative study on UE CS stressors, and interdisciplinary UE CS experts. Participants in each panel (1) rated each item's importance on a 7-point Likert Scale (1=*not at all important*, 7=*extremely important*), (2) ranked their relative importance, and (3) provided comments. Items were revised for wording/clarity between panels one and two. Consensus was defined as $\geq$70% of participants rating an item of moderate importance or higher and an interquartile range of $\leq$2. Items that reached consensus in both panels were included in the Interdisciplinary Patient Support Tool. Items reaching consensus in only one panel were considered optional or context-specific for inclusion.

Results
Thirty women were recruited for the first panel in round one and 34 for the second panel in round two. Across both panels, the mean age of women was 33.6, with about two-thirds being primiparous (71.9%) and most delivering by urgent CS (78.1%). Of the initial 33 actionable intervention candidate items, the

panel reached consensus for *n*=29 items after round one and refined them to *n*=27 after round two. The final 27 actionable intervention items selected based on consensus ratings in round two reflected the themes of anticipatory guidance (88-100%), continuous support (94-97%), preservation of the birth experience (85-91%), and support person involvement (91-94%).

Discussion

This Modified Delphi study identified 27 actionable intervention items that will be included in the new Interdisciplinary Patient Support Tool, reflecting the priorities immediately relevant to women undergoing UE CS from interdisciplinary health care providers. Future work will pilot test the Tool and its components for their feasibility/acceptability, as well as their impact on women's psychological trauma after UE CS.

References:

1. BMC Psychol 2025;13:26.

2. American Society of Anesthesiologists. 2024.

Table 1. Participant Baseline Characteristics (*n*=64)

Characteristic	% (*n*) or Mean (SD)
Age in years	33.6 (4.2)
Parity	Primiparous 71.9% (46/64) Multiparous 28.1% (18/64)
Caesarean section type	Urgent 78.1% (50/64) Emergency 21.9% (14/64)
Gestational age (weeks)	
Term (≥37)	71.9% (46/64)
Moderate-late preterm (≥32 to <37)	12.5% (8/64)
Very preterm (≥28 to <32)	6.3% (4/64)
Extremely preterm (≥24 to <28)	9.4% (6/64)
Single gestation	95.3% (61/64)
Psychiatric disorder history	31.3% (20/64)
Labored prior to caesarean section	85.9% (55/64)
Received labor pain relief	68.8% (44/64)
Received labor epidural pain relief	67.2% (43/64)
Prior caesarean section history	10.9% (7/64)
Trial of labor after caesarean section	1.6% (1/64)
Reason for caesarean section	
Fetal heart rate concerns	39.1% (25/64)
Non-progressive labor/fetal malposition/cord prolapse	37.5% (24/64)
Fetal concerns (IUGR)	9.4% (6/64)
Maternal concerns	7.8% (5/64)
Placental abruption/hemorrhage/uterine rupture	4.7% (3/64)
Preeclampsia/HELLP syndrome	1.6% (1/64)

SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 01

Perioperative Efficiency for Cesarean Delivery Differs by Care Model: A Comparison of Community and Academic Hospitals

Presenting Author: Sherry Wu, BA

Presenting Author's Institution: Brigham and Woman's Hospital - Rochester, New York

Co-Authors: Lucy Niu, BS - Brigham and Woman's Hospital
Audrey Yu - Brigham and Woman's Hospital
Menggang Yu, PhD - Brigham and Woman's Hospital
Qianqian Zhao, MS - Brigham and Woman's Hospital
Ivy Zhou, BSN, BS - Brigham and Women's Hospital, Harvard Medical School

Abstract :

Background

Wide variation exists in perioperative efficiency across healthcare systems, yet the impact of hospital care models on cesarean delivery workflow remains poorly characterized. We sought to compare perioperative efficiency between a community hospital and two academic medical centers.

Methods

We conducted a retrospective multicenter study of cesarean deliveries from January 2019 through April 2025 at three hospitals: one community hospital and two academic centers. Outcomes included hospital length of stay (LOS) and five perioperative intervals: anesthesia start-to-incision, incision-to-procedure end (surgical time), procedure end-to-out of room, out of room-to-anesthesia stop, and anesthesia stop-to-discharge (recovery). Multivariable negative binomial regression was used to estimate adjusted means, controlling for ASA class, COVID period, and surgery type.

Results

Among the 33,562 cesarean deliveries included, hospital site was a strong predictor of all perioperative timing outcomes (all $p< 0.0001$). Adjusted LOS was shortest at the community hospital (6463 min; 4.49 d; 95% CI 6012–6948), compared with academic center A (6832 min; 4.74 d; 95% CI 6356–7344) and academic center B (7387 min; 5.13 d; 95% CI 6876–7938). The community hospital also demonstrated shorter anesthesia start-to-incision times (60 min; 95% CI 53–68) compared with academic center B (74 min; 95% CI 66–84) and academic center A (89 min; 95% CI 79–101), shorter surgical duration (56 min; 95% CI 53–59) compared with academic center B (64 min; 95% CI 61–68) and academic center A (75 min; 95% CI 71–79), faster procedure end-to-out of room (13 min; 95% CI 12–14) compared with academic center B (18 min; 95% CI 17–20) and academic center A (19 min; 95% CI 17–21), and faster out of room-to-anesthesia stop (6 min; 95% CI 5–7) compared with academic center B (12 min; 95% CI 10–13) and academic center A (13 min; 95% CI 11–15). Recovery time also differed significantly among hospitals ($p< 0.0001$), with academic center A shortest (5405 min; 3.75 d; 95% CI 5163–5658), followed

by the community hospital (5461 min; 3.79 d; 95% CI 5216–5717) and academic center B (5791 min; 4.02 d; 95% CI 5534–6061), though these differences were modest in magnitude and likely of limited practical significance.

Conclusions

After adjustment for case mix, COVID period, and ASA class, the community hospital demonstrated consistently greater perioperative efficiency for cesarean delivery compared with the academic centers, including shorter operative and perioperative transition times and the shortest overall hospital length of stay. These differences likely reflect system-level workflow and care model factors rather than patient complexity alone and suggest that operational practices at community hospitals may offer actionable strategies to improve efficiency and throughput at academic centers.

References:

SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 02

Dynamic Machine Learning Model for Prediction of Unplanned Intrapartum Cesarean Delivery Risk in Patients with Neuraxial Labor Analgesia

Presenting Author: Nancy H. Greenspon, MD

Presenting Author's Institution: McGaw Medical Center of Northwestern University - Chicago, Illinois

Co-Authors: Ian N. Gaston, MD - Northwestern University Feinberg School of Medicine

Abstract :

Introduction

Emergency Cesarean deliveries pose serious maternal risks, including infection, hemorrhage, and organ injury.[1] Predicting the risk of intrapartum Cesarean delivery (CD) can improve clinical management and potentially decrease the incidence of emergent procedures. Unlike traditional predictive models limited to static baseline characteristics, machine learning (ML) enables the analysis of dynamic labor variables such as cervical dilation and fetal heart tracing classification.[2,3] We previously established a link between peri-neuraxial analgesia non-reassuring fetal heart tones (NRFHT) and increased incidence of CD. This correlation encouraged the development of a novel ML model that improves upon existing methods by incorporating data specifically around the time of anesthetic management.

Methods

We conducted a retrospective cohort study at a Level IV maternal care center, analyzing 57,958 patients who underwent a vaginal trial of labor with neuraxial analgesia. A total of 153 variables, comprising both static characteristics and dynamic labor metrics, were utilized to train a gradient boosting ML model for the prediction of intrapartum Cesarean delivery. Model performance was assessed using the area under the receiver operating characteristic curve (AUC-ROC).

Results

At the time of abstract submission, the gradient boosting ML model demonstrated a classification accuracy of 0.878 with an AUC-ROC of 0.859 and specificity of 0.981. The model consisted of 44 variables, including, but not limited to, the following peri-neuraxial analgesia variables: time from admission to neuraxial analgesia; cervical dilation at time of placement and change in dilation peri-placement; oxytocin dose at time of placement; peri-neuraxial NRFHT; hemodynamic baselines and changes; FHR baseline and changes; other medication utilization; and the presence of chorioamnionitis.

Discussion

Current ML models for the prediction of unplanned intrapartum Cesarean delivery are limited by their exclusion of anesthetic data and uncertainty regarding the optimal timing for data collection.[2,3] Our model addresses these gaps by integrating a comprehensive range of clinical parameters, including dynamic changes that may occur around the time of neuraxial placement. If validated, this framework could serve as the foundation for a clinical decision support tool that enhances patient counseling and empowers

obstetric anesthesiologists to shift from reactive management to proactive planning for patients at high risk of Cesarean delivery.

References:

1. Lancet. 2019;393(10184):1973-1982.

2. Int J Gynecol Obstet. 2025;171:775-783.

3. Am J Obstet Gynecol. 2020;233:437.e1-15.

SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 03

Comparing the Effects of Sitting Duration and Lateral Positioning on Hemodynamics and Neonatal Outcomes During Spinal Anaesthesia for Elective Caesarean Section

Presenting Author: Raghvendra Singh, MBBS, MD

Presenting Author's Institution: Department of Anaesthesiology & Critical Care UPUMS Saifai Etawah - Etawah, Uttar Pradesh

Co-Authors: Manoj Kumar, MBBS, MD - Department of Anaesthesiology & Critical Care UPUMS Saifai Etawah

Abstract :

Background: Spinal anaesthesia is commonly used for caesarean sections, and patient positioning during administration may affect haemodynamic stability. This study evaluated the effects of different sitting durations and lateral positioning on maternal haemodynamics and neonatal outcomes.

Methods: One hundred thirty-five women undergoing elective caesarean section under spinal anaesthesia were randomized into three groups (n = 45): Group S1 (sitting 1 minute), Group S2 (sitting 2 minutes), and Group L (lateral position). Haemodynamic variables, vasopressor use, sensory and motor block, APGAR scores, patient satisfaction, and complications were recorded.

Results: Mean arterial pressure decreased significantly in Groups S1 and S2 compared with Group L ($p < 0.05$). Group L showed greater haemodynamic stability and required less vasopressor. Time to highest sensory block was shorter in Group L (4.20 ± 1.31 min) than in Groups S1 and S2 ($p < 0.05$). APGAR scores at 1 and 5 minutes and patient satisfaction were significantly higher in Group L, with fewer complications. Sensory and motor block levels were similar across groups.

Conclusion: Lateral positioning during spinal anaesthesia provides better haemodynamic stability, reduced vasopressor requirement, higher patient satisfaction, and improved neonatal outcomes compared with sitting positions in elective caesarean section.

References:

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SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 04

The effect of prophylactic low-dose norepinephrine infusion on perioperative hypothermia during cesarean section: a retrospective cohort study

Presenting Author: Rimu Suzuki, RN, MSN

Presenting Author's Institution: St. Luke's International Hospital - Chuo, Tokyo

Co-Authors: Mana Takizawa, MD - St. Luke's International Hospital

Abstract :

Perioperative hypothermia remains a frequent complication during cesarean section under spinal anesthesia, with reported incidences of 30% or higher. One of the primary mechanisms for perioperative hypothermia is heat redistribution, where body core heat is transferred to the periphery by vasodilation due to induction of anesthesia. Vasopressors are commonly administered during cesarean section to treat maternal hypotension via peripheral vasoconstriction. Prophylactic infusion of vasopressors may therefore attenuate peripheral vasodilation and help reduce redistributive hypothermia. Previous studies have shown that infusions of phenylephrine or ephedrine may reduce perioperative hypothermia during cesarean section. Low-dose norepinephrine infusion has shown superior efficacy in preventing hypotension and may also be effective in preventing perioperative hypothermia.

We conducted a retrospective cohort study comparing patients undergoing elective cesarean section under spinal anesthesia for 1 year and 4 months before and after May 1, 2024, when our institution adopted prophylactic low-dose norepinephrine infusion as standard practice. Prior to this date, only phenylephrine or ephedrine boluses were given as needed. Forced-air warming at 43ºC as standard practice remained unchanged throughout the study period, along with intraoperative monitoring of maternal core temperature by non-invasive zero-heat-flux thermometer. We investigated whether the switch to prophylactic low-dose norepinephrine infusion had a protective effect against maternal hypothermia compared to historical controls.

A total of 511 patients met inclusion criteria: 278 in the norepinephrine (NE) group, and 233 historical controls (HC). The incidence of intraoperative maternal hypothermia (core temperature < 36.0ºC) was 6.3% lower in the NE group, but not significantly (17.7% NE vs 24.0% HC, p=0.08). Similarly, incidence of shivering was lower but not significantly (2.1% NE vs 3.4% HC, p=0.43). However, mean minimum core temperature was significantly higher in the NE group (36.4ºC NE vs 36.3ºC HC, p=0.01). There was no difference in mean systolic blood pressure at any point.

Prophylactic low-dose norepinephrine infusion modestly reduced maternal hypothermia during cesarean section compared with historical controls. While the effect size was small, these results suggest norepinephrine may contribute as part of a multimodal strategy for perioperative temperature management. The overall incidence of maternal hypothermia remains high, and further work is needed to address this common complication.

References: Acta Anaesthesiol Scand 2024;68:247-253

SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 05

Feasibility of Maintaining Maternal Systolic Blood Pressure ≥90% Baseline During Elective Cesarean Delivery Under Spinal Anesthesia and Association with Neonatal Outcomes: A Retrospective Cohort Study

Presenting Author: Anna Wilkinson, MBChB, BMSc, FRCA

Presenting Author's Institution: University of British Columbia - Vancouver, British Columbia

Co-Authors: Elise Hindle, MBChB, BSc (Med Sci), FRCA, FRCPC, RAF (retired) - BC Women's Hospital, University of British Columbia
Kaitlin Nelson, BSc, MSc - Women's Health Research Institute, BC Women's Hospital, University of British Columbia

Abstract :

Spinal anesthesia for elective cesarean delivery (CD) is frequently complicated by maternal hypotension from sympathectomy, with potential impairment of uteroplacental perfusion. Current guidance recommends tight systolic blood pressure (SBP) control, targeting SBP ≥90% of an accurate pre-spinal baseline and avoiding decreases to < 80% of baseline[1,2]. A recent UK multicentre audit reported SBP ≥90% of baseline in only 9.1% of cases despite routine vasopressor use[3]. Feasibility of maintaining SBP within 10% of baseline in routine practice remains uncertain. This retrospective cohort study quantified adherence to SBP targets and examined associations between SBP and neonatal outcomes.

Consecutive ASA II–III patients undergoing elective term (≥37 weeks) CD under spinal or combined spinal–epidural anesthesia were included. Exclusions were conversion to general anesthesia, multiple gestation, fetal abnormality, significant maternal cardiac disease/arrhythmia or dysautonomia, hypertensive disorders of pregnancy, major hemorrhage, or incomplete hemodynamic data. The primary outcome was guideline adherence, defined as all SBP values from spinal injection to delivery ≥90% of baseline (baseline defined a priori as documented preoperative SBP). Secondary outcomes were hypotension severity (SBP 80– < 90% and < 80% of baseline), episode frequency/duration (min), and vasopressor use. Neonatal outcomes included Apgar, arterial gases (pH, base excess), fetal acidemia (pH < 7.20) and unanticipated neonatal unit admission.

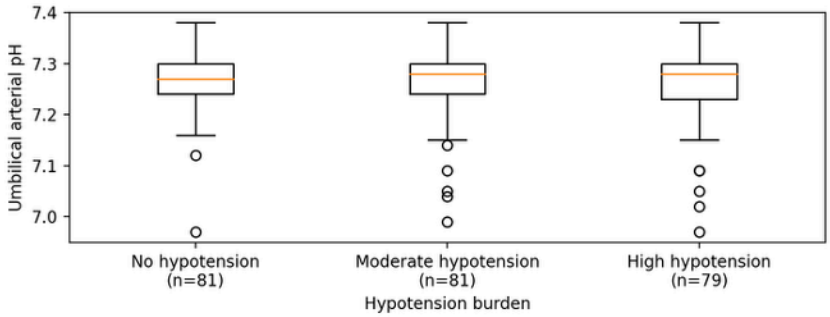
Of 270 eligible cases, 1 lacked baseline SBP; 269 were analyzed. Guideline adherence was achieved in 103/269 (38.3%; 95%CI 32.7–44.2). Hypotension (any SBP < 90% of baseline) occurred in 166/269 (61.7%), including SBP 80–< 90% in 149/269 (55.4%) and SBP < 80% in 84/269 (31.2%). Median proportion of SBP measurements ≥90% was 90.3% (IQR 68.2–100.0). Among hypotension cases (n=166), mean (SD) time spent with SBP < 90%, 80–< 90%, and < 80% of baseline was 5.5 (5.0), 4.1 (4.6), and 1.3 (2.1) min, respectively. Neonatal outcomes were similar between hypotension and no-hypotension groups (umbilical arterial pH 7.27 [7.24–7.30] vs 7.28 [7.24–7.30], p=0.666; base excess 3.00 [1.00–4.00] vs 3.00 [2.00–4.00] p=0.665; 1min Apgar 9 [8–9] vs 9 [9–9] p=0.155; 5min Apgar 9 [9–9] vs 9 [9–9] p=0.597; and unanticipated NICU admission were similar). Vasopressor infusion use was recorded in 97.4% of cases.

Maintaining SBP ≥90% baseline prior to delivery during elective CD was difficult to achieve despite prophylactic vasopressor use and may not reflect clinically meaningful hemodynamic compromise. Similar neonatal outcomes despite SBP deviations may suggest that the hemodynamic exposure most relevant to fetal well-being may be the cumulative burden of hypotension rather than isolated transient deviations.

References:

1. NICE Caesarean birth.www.nice.org.uk
2. IJOA 2021;45:130–2
3. IJOA 2025;62:104352

Figure 1. Neonatal umbilical pH and intraoperative hypotension burden.



Hypotension burden categories were defined using tertiles of the percentage of observed intraoperative Systolic Blood Pressure (SBP) readings <90% of baseline from time of spinal to time of neonate delivery. No hypotension = 0% events; Moderate hypotension = >0% to 22.2% events; High hypotension = >22.2% events.

SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 06

The Pannus Retention System and Hypotension during Cesarean Section; an Observational Study

Presenting Author: Ashir Bansal, MD

Presenting Author's Institution: St. Joseph's University Medical Center - Union City, New Jersey

Co-Authors: Mohammed Elassa, DO - St. Joseph's University Medical Center
Zac Lazev, DO - St. Joseph's University Medical Center

Abstract : Introduction: Pannus retraction/retention can be utilized during cesarean section to move excess abdominal tissue in order to improve surgical access and visualization, usually in high BMI patients when a low transverse surgical incision is planned. While this can be accomplished with conventional tape, more sophisticated systems are commercially available providing more effective and secure retraction. The PRS Pannus Retention System (TZ Medical) consists of 4 adhesive pads serving as anchor points - 2 on the abdomen and 2 under the table, with 2 adjustable connector straps between them to retract the pannus(see fig)(1). Because this practice pulls up and tightens the abdominal contents, aortocaval compression might be affected, exacerbating supine hypotension. We studied the immediate effects of the PRS on blood pressure prior to cesarean section.

Methods: We observed systolic blood pressure patterns in 17 patients scheduled for elective cesarean section in whom the PRS was utilized. Average BMI was 42.6 (range 29.7- 56). All patients had spinal anesthesia (hyperbaric bupivacaine 1.8 ml, fentanyl 15 mcg, morphine 150 mcg) resulting in an anesthetic level between T4-6 and were started on a phenylephrine infusion of 50-70 mcg/minute. Once the final anesthetic level was established and following urinary catheterization, when 2 consecutive systolic BP readings were stable and within 10% of each other, the surgeon was allowed to apply the PRS system. BP was then checked at 1 and 3 minutes after application to determine the immediate effects on systolic BP compared with SBP immediately prior to application.

Results: In 15 patients (88%) SBP dropped after application (avg. 16.2 mmHg; range 2–34 mmHg) at either 1 or 3 minutes. Four patients (23%) had a 20% or greater drop, and 2 others had a reduction >15%. In 5 patients (29%) SBP dropped below 100mmHg. Two patients had no drop or a slight increase. All significant drops in BP were easily managed with boluses of phenylephrine or infusion rate adjustments. We saw no association between greater BMI and severity of decrease in SBP.

Conclusion: The PRS system can be safely used during cesarean section provided the anesthesiologist is aware of the potential for significant BP drops and the need for adjustment to vasopressor therapy. Retraction straps should not be tightened in a patient with hypotension or borderline blood pressure until stabilized to an acceptable range.

References: 1. https://www.tzmedical.com/products/labor-and-delivery/prs-041.

SAT - RA - BS 3 - BR 3 - Cesarean Delivery and Other Surgery – 07

Association of patient and clinical characteristics with successful vaginal birth after cesarean delivery: a single-center retrospective study

Presenting Author: Hannah Berland, MD

Presenting Author's Institution: Baylor Scott & White Medical Center-Temple - Temple, Texas

Co-Authors: Isabella Hardej, BS - Baylor College of Medicine
Hope Scherger, BS - Baylor College of Medicine
Diana Villazana-Kretzer, DO - Baylor Scott & White Medical Center-Temple

Abstract :

Objective

Our primary aim was to determine which maternal characteristics were associated with successful vaginal birth after cesarean delivery (VBAC) in a single-center cohort.

Study Design

Patients who had live-born deliveries at our hospital from January 1, 2023 to December 31, 2023 were included in the study. Patients who attempted VBAC and had complete body mass index (BMI) data were included in the final analysis. A bivariate analysis was performed between patients who had successful and unsuccessful VBAC. A multivariate logistic regression designed to predict successful VBAC was performed with variables of interest.

Results

There were 2969 deliveries during the study period. 491 patients had a history of prior CD and 140 patients attempted VBAC. One patient was excluded from the final analysis due to missing BMI data. 107 (77%) patients who attempted VBAC had a vaginal delivery. Patients who had a successful VBAC were taller, had a lower BMI, higher parity, and were less likely to have had a medically indicated induction of labor. Complete data for the cohorts are presented in *Table 1*. A multivariate logistic regression designed to predict successful VBAC found that a five-unit increase in BMI (aOR 0.72; 95% CI 0.54-0.96; p=0.02) was independently associated with successful VBAC. Parity (aOR 1.54; 95% CI 0.96-2.46; p=0.08), failed induction of labor for prior CD (aOR 0.31 95% CI 0.07-1.43; p=0.13), fetal heart rate abnormalities for prior CD (aOR 0.54; 95% CI 0.21-1.39; p=0.20), medically indicated induction of labor (aOR 0.45; 95% CI 0.19-1.08; p=0.07) and provision of labor epidural analgesia (aOR 0.33; 95% CI 0.04-2.74; p=0.31) were not independently associated with successful VBAC. The c-statistic for this multivariate model was 0.76.

Conclusion

A five-unit increase in BMI was associated with a 28% reduction in the chance of successful VBAC. Race was not associated with successful VBAC in our bivariate analysis and this variable was not included in our multivariate logistic regression. Patients who had unsuccessful VBAC had a higher rate of labor epidural analgesia that was not statistically significant. Additionally, labor epidural analgesia was not independently associated with successful VBAC. Our c-statistic of 0.76 for our multivariate logistic

regression indicates good predictability. These findings may assist in counseling and clinical decision-making for patients considering VBAC at our hospital.

References:

Table 1. VBAC.pdf

Program Material
Sunday, May 3, 2026

Breakout Session #4 – 8:00am – 9:30am

Room 1 (McGill) - Oral Research Presentations (Breakout Rooms)

Case Reports (Breakout Rooms)
Room 2A (Ste-Helene) – OB Emergencies
Room 2B (Ste-Helene) – Neurovascular Challenges
Room 3A (Beaver Hall) – Elevated ICP
Room 3B (Beaver Hall) – Arrhythmias, AICDs, and Pacemakers

Research Abstracts (Breakout Rooms)
Room 1 (Palais) – Labor Analgesia Challenges and Tips
Room 2 (Viger) – Cesarean Delivery Quality
Room 3 (Ramezay) – Preeclampsia

SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 01

Development and Evaluation of a Low-Cost 3D-Printed Scoliosis Neuraxial Training Model

Presenting Author: Man Kuan Lei, MD

Presenting Author's Institution: UCSF Anesthesia - San Francisco, California

Co-Authors: Pedram Aleshi, MD - UCSF Anesthesia
Alexander Butwick, MBBS, FRCA, MS - University of California San Francisco
Scott Drapeau - UCSF
Lauren Nguyen - UCSF
Peter Yeh, MD - UCSF Anesthesia

Abstract :

Background
Neuraxial procedures are more challenging in patients with scoliosis. Currently, there are no commercially available scoliosis trainers, and published models are one-off research prototypes. We built an affordable, adaptable 3D-printed scoliosis trainer to support deformity-specific neuraxial education and evaluated it with anesthesia providers using the validated NASA Simulation Task Load Index (SIM-TLX) assessment tool.

Methods
We developed a lumbar scoliosis insert with a replaceable silicone “skin” that fits in the Genesis epidural–spinal base (Fig 1a). Using open-source files and software (Blender), low-cost 3D printing materials (PLA, PVA), and silicone, the trainer can be reproduced for ~$40. Faculty, fellows, and residents performed a simulated placement. The primary outcome was task workload measured by the 9-dimension SIM-TLX survey, adapted from the NASA Task Load Index and is widely used in healthcare simulation research. Secondary outcomes included time-to-LOR (loss-of-resistance), number of skin punctures, level changes, redirections, and fidelity ratings.

Results
25 participants completed the task; 48% (12/25) were attendings/fellows, 52% (13/25) were residents. SIM-TLX results showed that mental demand, frustration, complexity ratings clustered in moderate range (~10); physical/temporal demand, situational stress, distraction, perceptual strain task control were lower (~5) (Fig 1b). This pattern indicates that users experienced thinking/time pressure and problem-solving as the dominant burdens, with minimal bodily strain or environmental distraction. Performance showed moderate difficulty: median time-to-LOR was ~6m, 1–3 skin punctures, about half of participants attempting >1 level, most required ≤10 needle redirections. Time-to-LOR differed by seniority—speed and consistency generally improved with experience, with wider spread among residents. Fidelity ratings were favorable— “Good/Excellent” spinous-process palpation ~83%, skin palpation ~67%, and overall appropriateness for epidural training ~88%.

Conclusions
A reusable scoliosis adaptor for a widely used neuraxial trainer enables moderate cognitive workload and

good perceived educational value. These findings show that low-cost 3D-printed neuraxial phantoms can match or exceed commercial fidelity and that scoliosis models enhance training in anatomically challenging spines. Next steps include exploring more cost-efficient, realistic,
and ultrasound-capable materials, and multi-site studies linking simulator metrics to clinical performance.

References: 1. 3D Print Med 2025. doi:10.1186/s41205-025-00266-x
2. PloS one 2018. doi: 10.1371/journal.pone.0191664
3. Virtual Reality 2020. doi: 10.1007/s10055-019-00422-9

Figure 1a.

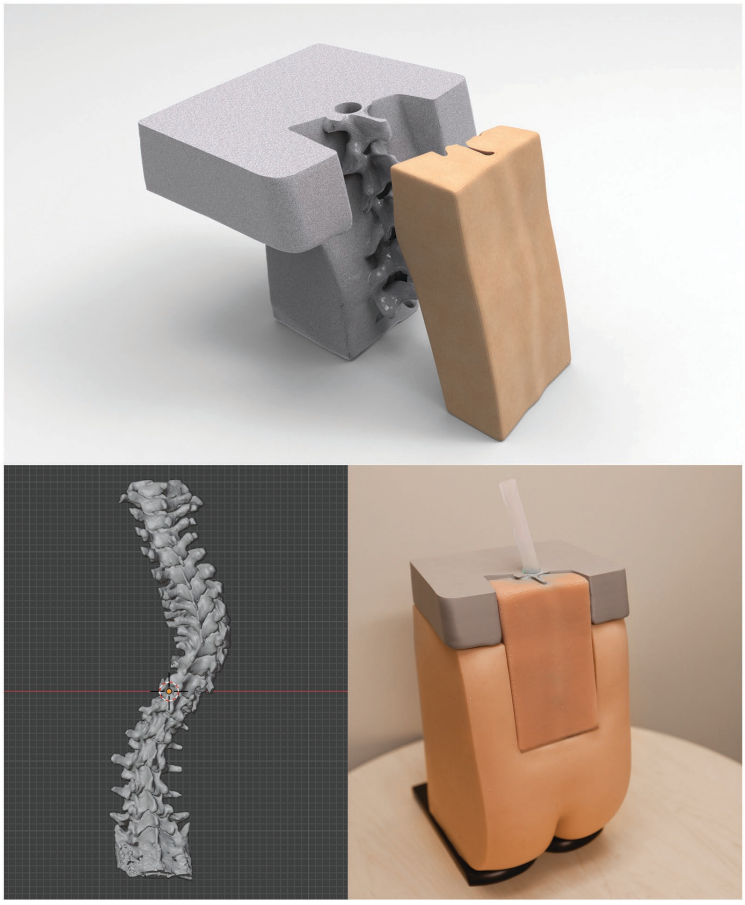


Figure 1b.

SIM-TLX subscale N=25	Median (IQR)	Min–Max	% ≥10 (n/N)
Mental demand	10 (3.5–12.5)	0–20	64% (16/25)
Physical demand	5 (1.5–9.5)	0–15	24% (6/25)
Temporal demand	5 (0.5–11)	0–16	44% (11/25)
Frustration	7 (3–14.5)	0–20	44% (11/25)
Task complexity	10 (4–15)	0–17	60% (15/25)
Situational stress	6 (1–11)	0–18	40% (10/25)
Distraction	5 (0.5–10.5)	0–20	28% (7/25)
Perceptual strain	5 (1.5–9.5)	0–16	24% (6/25)
Task control difficulty	6 (2–10)	0–15	36% (9/25)

SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 02

Development of an EMR-Embedded Obstetric Anesthesia Quality Dashboard

Presenting Author: Christine P. McKenzie, MD

Presenting Author's Institution: University of North Carolina - Chapel Hill, North Carolina

Co-Authors: Kathleen A. Smith, MD, FASA - The University of North Carolina at Chapel Hill

Abstract :

Introduction: The Society for Obstetric Anesthesia and Perinatology (SOAP) Center of Excellence (COE) program emphasizes systematic measurement of clinical processes and outcomes to promote safe, equitable, and high-quality obstetric anesthesia care. However, many institutions lack real-time, clinically meaningful reporting tools that align with COE and ASA quality metrics. We aimed to develop an EPIC based obstetric anesthesia quality dashboard using routinely captured electronic medical record (EMR) data to support continuous quality improvement (QI), transparency, and operational decision-making.

Methods: The project started with a submission ticket requesting support to create a method to collect key OB anesthesia QI metrics. The initial request outlined key quality metrics including descriptive statistics (delivery volumes, procedure types, neuraxial techniques, and operative obstetric cases) and performance metrics were selected based on SOAP COE, ASA, and MPOG (epidural utilization, neuraxial failure, epidural reassessment compliance, post-cesarean opioid use, unintentional dural puncture, post-dural puncture headache, epidural blood patch, and general anesthesia for cesarean delivery). Numerator and denominator definitions were standardized, and several measures were configured as notable events requiring case review. Location and CPT-based filters were applied to improve obstetric specificity. However, after meeting directly with an analyst defined criteria using CPT codes, populations reports, and record documentation details the reporting request was further refined. The analysts designed a dashboard using EPIC SlicerDicer and reporting workbench tools.

Results: The dashboard successfully automated monthly reporting of obstetric anesthesia volumes and key performance indicators without manual chart abstraction. Metrics aligned with institutional QI priorities and SOAP COE requirements were viewable by month, provider group, and delivery mode. The system enabled identification of trends in epidural reassessment compliance, neuraxial failure, opioid exposure, and general anesthesia use. Integration with notable event workflows facilitated targeted case review and provider feedback.

Discussion: An EPIC embedded obstetric anesthesia quality dashboard is feasible and provides scalable, real-time access to clinically relevant metrics aligned with national quality standards. This approach supports continuous monitoring, targeted interventions, and preparation for SOAP COE participation. Future work will focus on linking dashboard outputs to structured QI initiatives and evaluating the impact on patient-centered outcomes and safety events. EMR-based dashboards represent a sustainable strategy to advance data-driven obstetric anesthesia quality programs.

SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 03

Escape Room for Inter-professional Complex Obstetric Care

Presenting Author: Felicia Rustandy, MD

Presenting Author's Institution: KK Women's and Children's Hospital - Singapore, Not Applicable

Co-Authors: Jason Ju In Chan, MBBS - KK Women's and Children's Hospital
Jia Ying Chong, MBBS - KK Women's and Children's Hospital
Malkit Kaur, BSN, PGDHE - KK Women's and Children's Hospital
Jill Cheng Sim Lee, MBChB, MSc (Clinical Education), MRCOG, MRCP, FAMS - KK Women's and Children's Hospital
Zanariah Yahaya, MBBS - KK Women's and Children's Hospital

Abstract :

Escape rooms provide an innovative gamified approach with learner-focused activities. Teams cooperatively discover clues, solve puzzles and complete tasks to progress through the challenge to achieve a specific goal in a fixed time. Educational escape rooms align learning objectives to the activities. Active learning experiences can foster teamwork, group communications and problem solving skills.

Complex obstetric cases are not uncommon in KK Women's and Children's Hospital (KKH). Currently, there are a lot of training of professionals in silos and no interprofessional education (IPE) programme specific for obstetric patients in the Operating Theatre (OT). During emergencies, healthcare professionals are stressed when working as a team, thus it is needed to simulate the conditions of interprofessional collaborative practice (IPC).

Our study aims to strengthen interprofessional cohesion, communication skills leading to shared decision making, and foster wellness and a positive culture in learning within healthcare professionals.

We designed our IPE escape room to align with postpartum hemorrhage (PPH) management in the OT. The game had 6 stages of puzzles to be solved in parallel enclosed rooms within 45 mins. Knowledge from the different healthcare professionals were needed to the puzzles; thus making teamwork essential.

We conducted a total of 5 sessions (10 teams). Each team consisted of 1-2 surgeons, 1 scrub nurse, 1 anesthesia nurse and 1 anesthetist. At each session, two teams competed to be the first to solve all the puzzles and escaped the room.

Participants completed the Interprofessional Education Collaborative (IPEC) version 3 self-assessment tool before and immediately after the event and results were compared. 16 statements in 2 domains of interprofessional interaction and values were rated on a Likert scale from strongly disagree to strongly agree.

Our study had 44 participants consisting of 10 anaesthesia nurses, 10 scrub nurses, 14 obstetricians and 10 anaesthetists. 36 completed both pre and post survey; 94% agreed that the activity was enjoyable, 92% believed this activity fosters their well-being, 89% felt this activity strengthened their relationship

among the team, 84% stated their communication skills have improved with other professionals, and 91% agreed that this activity was a positive experience in promoting patient safety in an inter-professional setting.

A paired T-test conducted showed a statistically significant improvement for both domains of interprofessional values and interactions between the pre-workshop and post-workshop.

Escape room offers an engaging, learner-centred approach to medical education which promotes critical thinking, teamwork and participation. It is a low-cost, high-impact resource for a variety of learners and is a valuable supplement to traditional simulation that increases participation in a non-stressful environment.

References:

SOAP poster 2026.pdf

SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 04

A Novel Ultrasound-Compatible Lumbar Simulation Jacket: Impact on Ultrasound and Palpation Skills Among Anesthesiology Residents

Presenting Author: Katherine Chan, MD

Presenting Author's Institution: Harvard Medical School - boston, Massachusetts

Co-Authors: Noor A. Raheel, MD, MPH - Brigham and Women's Hospital

Abstract :

Background

For maximum proficiency and safety performing neuraxial techniques in pregnant patients, surface landmark palpation and ultrasound skills are vital.[1] These skills are challenging to acquire due to large cohorts of new learners, limited patient availability, and clinical time pressures.[2] Skills workshops typically involve non-pregnant models with low body mass indices. Such models may underrepresent the technical challenges encountered in pregnancy, including increased tissue depth and altered surface landmarks. We hypothesize that a simulation tool reflecting these challenges may enhance early skill acquisition.

Methods

After IRB approval, residents participated in a prospective observational quasi-randomized study during their obstetric anesthesia rotation. Residents were assigned every other month to either a training cohort which received a rapid-cycle deliberate practice session using a simulation jacket or a control cohort which received standard clinical training alone.

A wearable, ultrasound-compatible simulation jacket composed of ballistic gelatin melded to a hospital gown was designed to mimic increased lumbar subcutaneous tissue (Figure). The jacket allowed residents to train in a more realistic environment, and with higher discretion.

Residents completed confidence self-assessments for neuraxial ultrasound and epidural palpation using a 1–10 Likert scale on rotation days 1, 15, and 30. At the end of day 1, both cohorts were administered a self-assessment; the training cohort then attended a 1-hour ultrasound and palpation session with the simulation jacket and immediate post-session assessment. The primary outcome was change in self-perceived skill over time. Responses were collected anonymously and analyzed at the group level.

Results

Training cohort residents reported immediate increased self-perceived skill, most notably in neuraxial ultrasound (Figure). Compared to controls, the training cohort showed more rapid early improvement maintained throughout the rotation. By the end of the month, both cohorts improved; however, the training cohort reported competence earlier across all domains. This effect was observed across experience levels, with the greatest improvement among residents with minimal prior experience. All training cohort

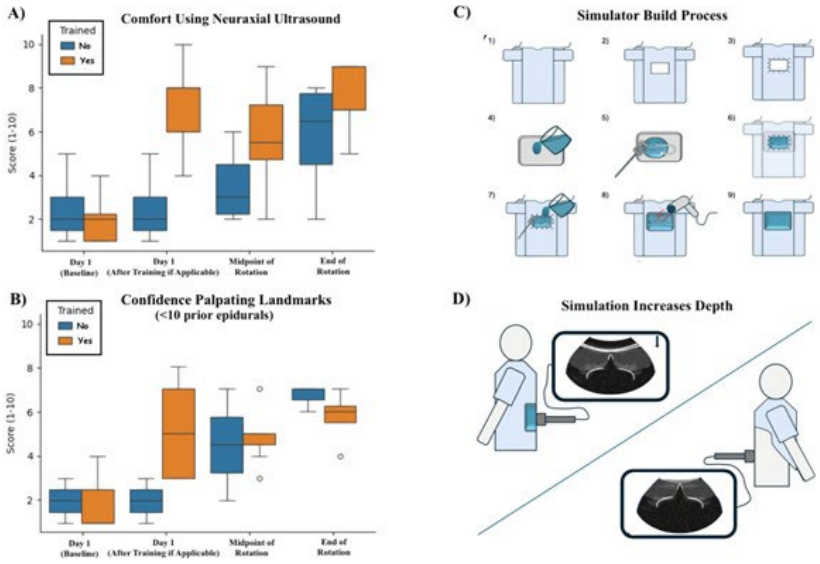
residents reported improved comfort with ultrasound and recommended the simulator for future learners. Perceived usefulness of the model increased with additional clinical exposure.

Discussion

Use of a wearable ultrasound-compatible simulation jacket for rapid-cycle deliberate practice was associated with accelerated improvement in resident self-perceived neuraxial anesthesia skills. This low-cost, peer-to-peer simulation approach may enhance early skill acquisition and confidence prior to performing techniques in laboring parturients. Impact of this tool on neuraxial outcomes warrants further study.

References:

1. Nielsen MS et al Br J Anaesth 2025
2. Provenzano SM et al Adv Med Educ Pract 2025



SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 05

Between Promise and Practice: Provider Challenges in Adopting AI for Clinical Workflows

Presenting Author: Sadaf Tayafeh, MSc

Presenting Author's Institution: NOMA AI - Pittsburgh, Pennsylvania

Co-Authors: Homa Ahmadzia, MD - INOVA
Gilles Clermont, MD, MSc - NOMA AI, Inc.
Salim Malakouti, PhD - NOMA AI, Inc.
Julian Mandragon, BSc - NOMA AI, Inc.
Patrick Schneider, MD - The Ohio State University

Abstract :

Background

Maternal hemorrhage remains a leading cause of preventable maternal morbidity and mortality, with persistent challenges in early risk recognition, protocol adherence, and cognitive burden on labor and delivery teams[1]. In this study, we aimed to evaluate clinicians' perception of usability and clinical usefulness of NOMA AI's HemoRisk tool. Hemorisk is an AI-powered, EHR-integrated clinician-facing decision-support interface designed to provide continuous, integrated hemorrhage risk assessment.

Methods

A mixed-methods usability study was conducted among 15 clinicians from two academic healthcare systems. Participants represented obstetricians, certified nurse midwives, labor and delivery nurses, anesthesiologists, and perinatologists with a wide range of clinical experience. Participants were presented with the HemoRisk user interface across two case scenarios. Participants completed a structured survey incorporating System Usability Scale (SUS)-style items, in addition to Likert-scale questions assessing clinical value and workflow impact, and open-ended qualitative feedback regarding usability, accuracy, and mental workload.

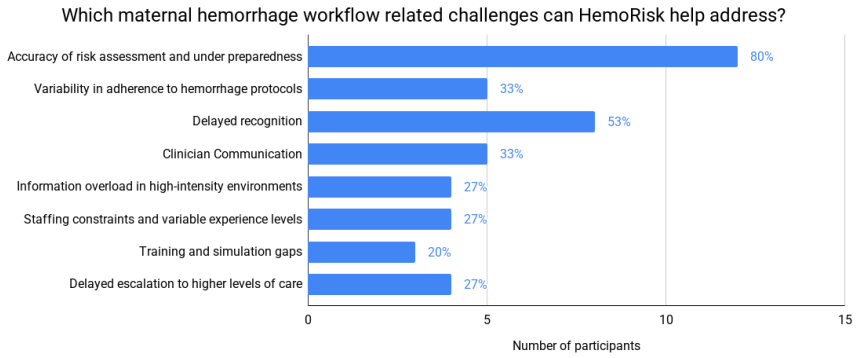
Results

Participants reported high perceived usability and clinical value of the HemoRisk interface. Most respondents indicated that HemoRisk would improve existing workflows (73%), reduce cognitive burden during labor and delivery (73%), and enhance protocol adherence (60%). A majority believed the tool could improve the accuracy of hemorrhage risk assessment compared with current methods, though some expressed uncertainty pending validation against existing scoring approaches. Additionally, participants express that HemoRisk can help improve other clinical workflow challenges, including those related to adherence (Figure). Qualitative feedback highlighted strengths, including centralized visualization of patient data, longitudinal risk trending, improved communication across care teams, and earlier recognition of escalation needs. Respondents emphasized that HemoRisk supported, but did not replace, clinical judgment. Adoption of complementary wearable biosensor technology was viewed favorably by many clinicians, particularly if wireless and minimally intrusive.

Conclusions

Across diverse clinical roles and care settings, clinicians perceived the HemoRisk interface for displaying risk of maternal hemorrhage as usable, workflow-enhancing, and potentially impactful for improving preparedness and early response to maternal hemorrhage. Acknowledging the cultural skepticism surrounding the integration of AI into clinical workflows, these findings offer insights into these barriers. Additionally, they support the clinical acceptability and further prospective evaluation of HemoRisk's clinical effectiveness.

References: 1. ANZJOG 60.2 (2020): 212-217.



SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 06

Implementation of a Virtual Reality Neuraxial Masterclass In Medical Education For Trainees

Presenting Author: Catharine Keim, MD

Presenting Author's Institution: New York Presbyterian - Weill Cornell Medicine - Hoboken, New Jersey

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Abstract :

Neuraxial procedures are advanced skills that can be challenging for trainees to master and require deep anatomic and spatial understanding. Traditional teaching (e.g. lectures, cadaver labs, manikins) have significant limitations, prompting investigations into virtual reality (VR) as an educational tool[1]. The objective of this project was to evaluate whether an instructor-led, multi-user VR masterclass on neuraxial anatomy and procedures improves knowledge and confidence in trainees within an anesthesiology residency program.

A masterclass curriculum was developed using a software program specialized for spatial medical imaging designed to be used in VR environments[2]. Six, five- to 10-minute lessons were recorded by an instructor covering topics including spinal anatomy, exploration of the epidural space, and different approaches for neuraxial placement using three-dimensional (3D) anatomic models. Along with audio, the recorded lessons included the instructor's hand gestures, annotations, and 3D drawings in real time. The final product was an immersive environment in which viewers could follow the instructor-led lesson or manipulate models independently. The masterclass was uploaded onto a VR headset which was readily available to trainees throughout the day while on their obstetric anesthesia rotation. Trainees were asked to complete an identical written test both pre- and post-completion of the masterclass as well as a reaction survey. The primary outcome was improvement in anatomical knowledge and procedural technique assessed by comparison of identical pre- and post-intervention written tests. The secondary outcome was learner satisfaction and perceived educational value as well as expert assessment of the training module assessed by post-intervention reaction surveys completed by both trainees and attending anesthesiologists. The reaction survey consisted of Likert-scale items and open-ended questions on ease of use, realism, understanding, confidence, and likelihood of recommendation. Data from 27 trainees showed a mean (standard deviation (SD)) pre-test score of 53% (14%) and mean (SD) post-test score of 77% (17%) with an average absolute gain of 24% ($p < 0.0001$). 89% of participants had improved scores on knowledge assessment with consistent benefits seen across trainee level. Reaction surveys demonstrated overwhelmingly positive perceptions, high usability, excellent visual clarity, and enhanced subjective anatomical and procedural understanding.

Overall, implementation of our VR masterclass showed both objective and subjective improvement in anatomic and procedural knowledge. Future directions include assessing knowledge retention and skill

transfer to clinical practice; assessing efficacy, cost-effectiveness and efficiency of VR curricula; and future incorporation of haptic technology for hands-on simulation with tactile feedback.

References:

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2. BJA 2025;134.6:1797–1800

SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 07

Visualizing Intrathecal Drug Spread With a 3D-Printed Spine Model: Effects of Trendelenburg and Pre-Supine Sitting Duration

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Abstract :

Background

For patients undergoing spinal anesthesia for cesarean delivery, changes in patient positioning after spinal block placement, including Trendelenburg or delayed supine positioning, may influence the upper level of dermatomal block. Prior work suggests a head-down tilt of at least 15° may overcome lumbar lordosis.[1] We hypothesized that greater head-down tilt increases cephalad spread and that longer upright sitting before supine positioning reduces cephalad spread; primary outcomes were maximal spread level and dye intensity differences.

Methods

A transparent 3D-printed spinal subarachnoid model was filled with a saline–glucose solution to approximate cerebrospinal fluid density (Figure 1a). A 2 mL methylene blue solution in 8.25% dextrose was injected at L3–L4 in the upright position. For Trendelenburg experiments, the model was positioned at incremental head-down tilts immediately following injection to assess maximal cephalad spread, with triplicates performed at 0, 5, 10,1 5, 20 degrees Trendelenburg tilt.
In our secondary analysis of delayed supine positioning, the model remained upright for 0, 1, 3, or 5 minutes before being placed supine. We compared the dye intensity at the cephalad leading edge to the initial dye intensity at the time of injection, expressed as a relative percentage. Video data were analyzed using custom Python scripts. Dye spread was segmented using GrabCut and color thresholding, quantified along the spinal canal with predefined reference and tracking regions, and normalized for lighting variation as a percentage of maximal signal

Results

Cephalad spread increased with Trendelenburg tilt. Mean maximal spread increased from 31.0 ± 0.0 cm at 5° (T6–T7) to 33.3 ± 0.6 cm at 10° (T5–T6), 40.0 ± 0.0 cm at 15° (T3–T4), and 50.0 ± 0.0 cm at 20° (C4) (Figure 1b). Spread rose rapidly in the first 20 to 30 seconds and then plateaued, with minimal separation between 0° and 5° (Figure 1b). A 10° tilt produced modest increases, whereas 15° showed a

stepwise rise and 20° spanned the spinal column (Figure 1b). Longer upright sitting before supine positioning reduced absolute spread intensity (Figure 1c), while terminal cephalad spread remained similar across durations, plateauing at approximately 31 cm (T6–T7) (not shown).

Discussion

This transparent 3D-printed spinal model makes intrathecal spread directly visible and quantifiable from a purely mechanical perspective—isolating CSF–dye dynamics without physiologic confounders. In this model, Trendelenburg ≥15° markedly increases cephalad spread, while delayed supine positioning primarily reduces leading-edge intensity. This reproducible platform can be used to systematically test positioning, timing, baricity/volume, and anatomic variants to better understand—and ultimately improve—the predictability of spinal anesthesia.

References:

1. Br J Anaesth. 2007;98:524-530.

Figure 1 3-D for SOAP 1:28.pdf

SUN - ORP - BS 4 - BR 1 - Oral Research Presentations – 08

Development of a Virtual Reality Educational Module Using a Scoliosis Patient-Specific Three-Dimensional Model

Presenting Author: Catharine Keim, MD

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Abstract : Scoliosis is commonly encountered in the obstetric population and can make neuraxial anesthesia challenging, especially for trainees. Scoliosis is not just lateral curvature of the spine, but also rotation of the vertebral bodies[1]. Understanding this three-dimensional (3D) distortion is paramount to planning a safe and effective approach to the epidural space, however teaching this concept to trainees using conventional two-dimensional (2D) modalities is difficult and reductive. The role for virtual reality (VR) and 3D models in education and procedural planning within obstetric anesthesiology is an emerging field[2]. In this process abstract, we describe how we developed a patient-specific 3D model of scoliosis and used it to create an immersive educational module in VR for trainees at our institution.
A patient with severe scoliosis provided informed consent for use of imaging data. High-resolution computed tomography images were imported in Digital Imaging and Communications in Medicine (DICOM) format into Medical Holodeck's Medical Imaging XR software. All information was de-identified and uploaded on HIPAA compliant cloud servers. Within the software, Hounsfield unit adjustment set ranges for subsequent thresholding and filtering. AI-driven segmentation was run using the TotalSegmentator tool to isolate spinal anatomy. Bone structures were colorized using gradient-based lookup tables to emphasize anatomical clarity. Once refined, the model was loaded into a VR environment on a Meta Quest 3 headset. Plain 2D radiographs of a normal and scoliotic spine were also loaded into the environment. Using the Recorded Extended Reality spatial capture toolset, we recorded a spatial lecture inside the VR environment. Spine anatomy and vertebral rotation is explored in 2D noting distortion of spinal landmarks (e.g. spinous processes, pedicles) between plain and scoliotic radiographs while highlighting the limitations in this view. Moving to the 3D model, the anatomy is contextualized in space using real-time hand gestures, ray casting, and 3D annotations. Vertebral rotation is explored by manipulating the model into axial cross-sections. 3D drawing is used to demonstrate needle trajectory and path during epidural placement using a traditional approach versus alternative approaches. The lesson recording captured voice, hand motion, model manipulation, and spatial references in real-time. The final product is a reusable, spatially anchored learning experience viewable on any compatible VR headset. Trainees will be able to enter the environment, observe the instructor's spatial references, or explore the model independently. Next steps include development of objective evaluation tools to measure educational effectiveness and user feedback. Further evaluation is needed to assess

educational outcomes, scalability, and integration into clinical training workflows.

References: 1. BJA Education 2024;24(10):361-3702.
2. Int J Obstet Anesth 2024;57:103959

Development of a Virtual Reality Educational Module Using a Scoliosis Patient-Specific Three-Dimensional Model.pdf

SUN - CR - BS 4 - BR 2A - OB Emergencies – 01

Spontaneous Coronary Artery Dissection in the Third Trimester

Presenting Author: Shobana Bharadwaj, MBBS

Presenting Author's Institution: University of Maryland - Baltimore, Maryland

Co-Authors: Allison Lankford, MD - University of Maryland School of Medicine
Christopher R. Parrino, MD, MD - University of Maryland Medical Center

Introduction: Pregnancy-associated spontaneous coronary artery dissection (P-SCAD) is rare, with an estimated incidence of 1.81 per 100,000 pregnancies and is an underrecognized cause of 15-43% of pregnancy-associated myocardial infarctions (MI)[1, 2]. Most cases occur in the postpartum period, and those that do occur in pregnancy are most often seen in the third trimester. We report a case of P-SCAD presenting during the third trimester and subsequent cesarean delivery.

Case One: A 41-year-old G5P1031 at 38w3d presented with mid-sternal chest pain radiating to the back and was found to have a markedly elevated high-sensitivity troponin concerning for non-ST segment elevation MI. Echocardiogram revealed normal biventricular function without regional wall motion abnormalities. She underwent left heart catheterization which demonstrated focal Type 1 SCAD of OM2 (Figure). Aspirin and a cangrelor infusion were initiated while awaiting delivery. A multidisciplinary team recommended cesarean delivery under general anesthesia to reduce the myocardial demand associated with active labor and to minimize the interruption in antiplatelet therapy necessary for safe provision of a neuraxial anesthetic. Cesarean delivery was scheduled for three days later. Cangrelor was paused for 2 hours before surgery. A pre-induction arterial catheter was placed, and general anesthesia was induced without incident. A healthy neonate was delivered. Quantitative blood loss was 1,115 mL, and 1 unit of blood was transfused. Postoperatively, the patient was transitioned to clopidogrel and was discharged home

Case Two:

Discussion: Vaginal delivery with a passive second stage or cesarean delivery are recommended in patients with P-SCAD to avoid increased myocardial oxygen demand associated with Valsalva and active labor[3]. SCAD is most frequently associated with fibromuscular dysplasia or connective tissue disorders, neither of which were diagnosed in our patient. Coronary angiography is the gold standard for diagnosis and can be achieved with low levels of fetal radiation exposure[3]. Patients with P-SCAD are at high risk of recurrent MI in future pregnancies. SCAD is unpredictable, so those who become pregnant again require early attention from a multidisciplinary team including specialists in cardiology, maternal fetal medicine, and anesthesiology[2].

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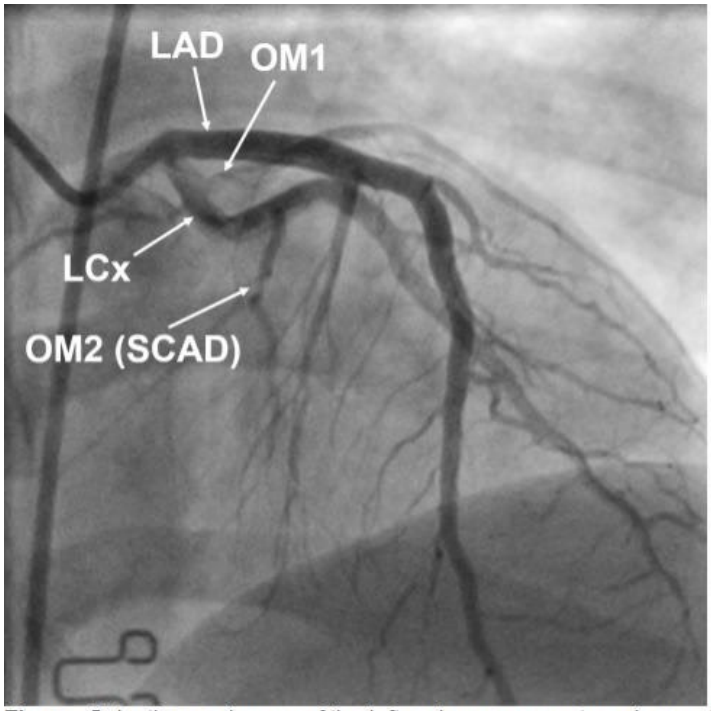


Figure. Selective angiogram of the left main coronary artery demonstrating luminal irregularity of OM2, concerning for Type 1 SCAD. Abbreviations: LAD, left anterior descending; OM, obtuse marginal; LCx, left circumflex; SCAD, spontaneous coronary artery dissection.

SUN - CR - BS 4 - BR 2A - OB Emergencies – 02

Preeclampsia and Spontaneous Coronary Artery Dissection: A Rare Cause of Postpartum Myocardial Infarction

Presenting Author: Fatemeh Ashtari, MD

Presenting Author's Institution: Cleveland Clinic - Beachwood, Ohio

Co-Authors: Cholene Espinoza, MD - Cleveland Clinic
Manal Hassan, MD - Cleveland Clinic

Introduction: Pregnancy-associated spontaneous coronary artery dissection (P-SCAD) is a spontaneous separation of the coronary artery wall occurring during pregnancy or the postpartum period, caused by intramural hematoma or intimal disruption rather than atherosclerosis or trauma. It is the most common cause of myocardial infarction in pregnant and postpartum women, accounting for 14.5% to 43% of pregnancy-associated myocardial infarctions (1). The majority of cases occur postpartum, most commonly within the first week after delivery (1). Patients with P-SCAD tend to have more severe clinical presentations than those with non–pregnancy-associated SCAD (1).

Case One: A 42-year-old G1P0 otherwise healthy woman with an IVF-conceived pregnancy presented 6 days postpartum after developing sudden chest pain, syncope, and seizure-like activity requiring chest compressions prior to EMS arrival. Her postpartum course was notable for severe preeclampsia with a peak creatinine of 1.66 mg/dL and marked peripheral edema (4+). On presentation to the ED, she reported chest pain and shortness of breath. EKG demonstrated ST-segment elevations in the inferior and lateral leads. CTA showed no evidence of pulmonary embolism or aortic dissection, while bedside POCUS demonstrated regional wall-motion abnormalities and LVSD with an estimated EF of 40%. Given rising troponin levels (748 ng/L) and persistent chest pain, the patient underwent emergent coronary angiography, which demonstrated 90% occlusion of the LAD and complete occlusion of the LCX. An IABP was placed due to cardiogenic shock with an elevated LVEDP of 40 mmHg and evidence of end-organ hypoperfusion, including a lactate level of 4.4 mmol/L. Based on the angiographic findings and absence of coronary calcification, P-SCAD was considered the most likely diagnosis, and she subsequently underwent urgent multivessel CABG the following day. Intraoperative TEE revealed biventricular systolic dysfunction with moderate functional mitral and tricuspid regurgitation. She was discharged home on postoperative day 8 with plans to follow up with obstetric cardiology and SCAD specialists.

Case Two:

Discussion: This patient had multiple recognized risk factors for pregnancy-associated spontaneous coronary artery dissection (P-SCAD), including preeclampsia and in vitro fertilization (IVF). Preeclampsia is present in approximately 11% of P-SCAD cases compared with 3.4% in the general population, while a history of fertility treatment is reported in 28% versus 12%, respectively (2). Additional independent risk

factors include multiparity and advanced maternal age (2). This case highlights the importance of maintaining a high index of suspicion for P-SCAD in any pregnant or postpartum woman—particularly those with recognized risk factors—who presents with symptoms suggestive of acute coronary syndrome.

References: 1.Hayes SN, et al. Spontaneous Coronary Artery Dissection. JACC. 2020. 2.Tweet MS, et al. Spontaneous Coronary Artery Dissection Associated with Pregnancy. JACC. 2017.

SUN - CR - BS 4 - BR 2A - OB Emergencies – 03

Anesthetic Management of Scheduled Cesarean Delivery in a Patient With Pregnancy-Associated Spontaneous Coronary Artery Dissection

Presenting Author: Stefan Rodriguez, MD

Presenting Author's Institution: Beth Israel Deaconess Medical Center / Harvard Medical School - Boston, Massachusetts

Co-Authors: Yunping Li, MD - Beth Israel Deaconess Medical Center / Harvard Medical School

Introduction: Pregnancy-associated spontaneous coronary artery dissection (P-SCAD) is a rare but life-threatening condition and the leading cause of pregnancy-associated myocardial infarction. Although most cases occur postpartum, antepartum presentations pose unique challenges for delivery planning and anesthetic management (1). We describe the multidisciplinary perioperative management of a scheduled cesarean delivery in a patient with third-trimester P-SCAD.

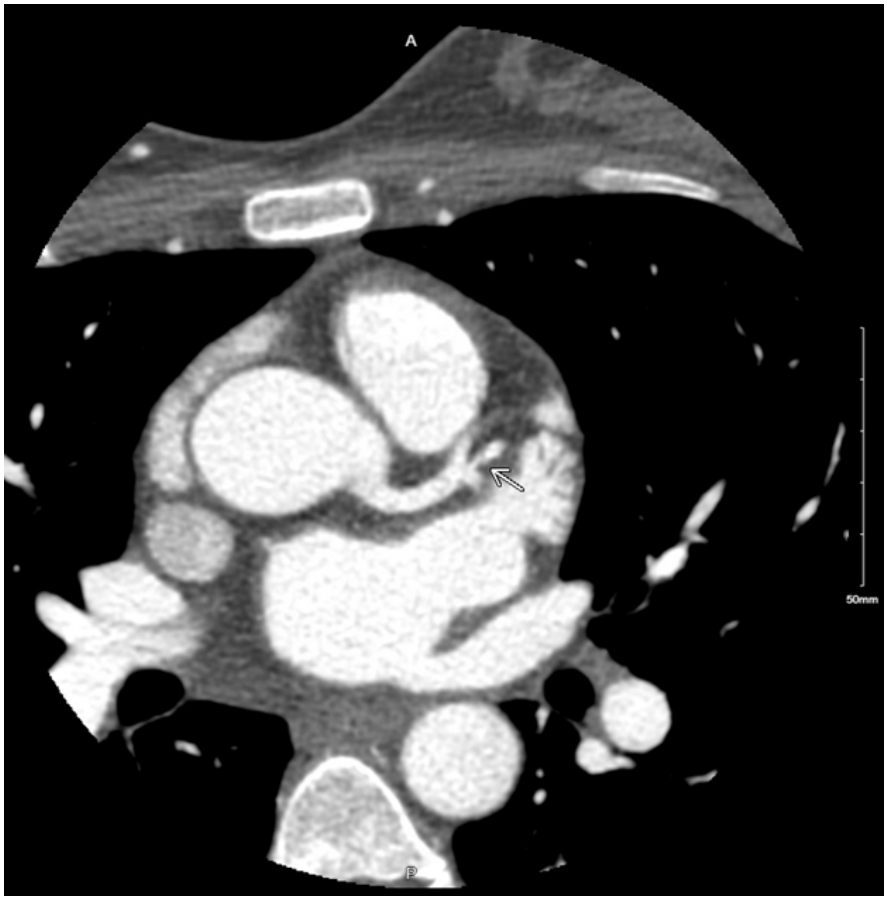
Case One: A 30-year-old G4P0 woman at 36+2 weeks gestation presented with acute chest pain radiating to the jaw and elevated blood pressure. ECG showed inferior T-wave inversions, and troponin peaked at 651 ng/L. TTE showed preserved biventricular function (EF 59%). Coronary CT angiography revealed a focal proximal left circumflex artery dissection without atherosclerosis, consistent with SCAD. She has a past medical history significant for hypertension (previously on labetalol, held during this pregnancy). She was managed conservatively and discharged on labetalol. Following multidisciplinary discussion with cardiology, nursing, MFM, and anesthesia, scheduled cesarean delivery at 39 weeks was planned to avoid hemodynamic stress from labor. Invasive arterial blood pressure monitoring and two large-bore IVs were placed preoperatively. Given recent SCAD, a dural puncture epidural technique with slow incremental dosing was chosen to minimize abrupt sympathectomy. Test-dose was omitted. 5ml of 0.5% bupivacaine with 10mcg dexmedetomidine was administered. Three minutes later, an additional 5ml of .5% bupivacaine was given. Once patient achieved a sensory level to pinprick at T12, 3ml of a solution with 20 mL of 2% lidocaine, 0.1 mL epinephrine 1:1000, and 2 mL of 8.4% sodium bicarbonate was given. 12 ml was given in divided dose prior to incision (3ml every 3 min until a T4 level was reached). Phenylephrine and esmolol were used to maintain baseline BP and HR respectively. The case was otherwise uncomplicated. Postoperatively, the patient was monitored with arterial line surveillance for 24 hours. She was discharged on beta-blockade with cardiology follow-up.

Case Two:

Discussion: P-SCAD is associated with higher rates of multivessel disease, cardiogenic shock, and maternal morbidity compared with non-pregnancy-associated SCAD (2). Although vaginal delivery is generally preferred in cardiac disease, cesarean delivery may be appropriate for patients with recent acute coronary events to allow controlled hemodynamics. Anesthetic goals include avoidance of tachycardia, preservation of coronary perfusion pressure, and prevention of hypotension. Slow titration

neuraxial techniques with invasive monitoring are well suited for these patients (3). This case highlights successful anesthetic management of cesarean delivery following recent P-SCAD using a carefully titrated DPE and arterial line. Multidisciplinary planning was critical to optimize outcomes in this rare but high-risk condition.

References: 1. pmid 32819471 2. pmid 29472380 3. pmid 36780370



SUN - CR - BS 4 - BR 2A - OB Emergencies – 04

Cesarean Delivery in a Patient with History of Unprovoked Spontaneous Coronary Artery Dissection

Presenting Author: Fallon Babcock, MD

Presenting Author's Institution: Ochsner Clinic Foundation - Jefferson, Louisiana

Introduction: Spontaneous coronary artery dissection (SCAD) is a leading cause of ACS in young females, with known risk factors being the pregnant and postpartum state. The pathophysiology of SCAD is defined by obstruction of coronary artery blood flow caused by an intimal tear1. Predispositions include exposure to estrogen and progesterone, hyperdynamic cardiac activity, and prolonged Valsalva maneuvers1.We present a case of planned cesarean delivery (CD) in a patient with prior history of unprovoked SCAD, with additional risk factors such as exposure to estrogen hormonal therapy during IVF.

Case One: A 33yo F G1P0 with PMH of anxiety, IVF pregnancy and hyperthyroidism presented for primary CD for breech presentation. The patient had a history of SCAD where she presented with left chest and shoulder pain, ST depressions and T wave inversions on EKG, and elevated cardiac biomarkers. Coronary angiography demonstrated SCAD with significant left main involvement. She was managed conservatively with ASA, Metoprolol, and Imdur with reassuring repeat CT coronary imaging. ASA and Metoprolol were continued in pregnancy for prevention of recurrence. Neuraxial anesthetic was successfully achieved using a slowly dosed, combined spinal-epidural with 1mL intrathecal hyperbaric bupivacaine, fentanyl 10mcg, and preservative-free morphine 100mcg + 10mL epidural 2% lidocaine with bicarbonate. Hemodynamics were maintained using fluid resuscitation and phenylephrine infusion. The patient underwent uneventful delivery of a vigorous infant. Post-operative recovery while inpatient was uncomplicated. POD 7 she was re-admitted for hypertension which was managed with amlodipine and close obstetric follow-up.

Case Two:

Discussion: SCAD is a well-documented cause of ACS in the young female population, especially in the peripartum period. Like most patients presenting with SCAD, our patient lacked cardiovascular risk factors. Importantly, this patient was at further increased risk of SCAD recurrence given diagnosis of anxiety and exposure to hormonal therapy through IVF. Despite increased risk and unknown status of the presence of underlying vasculopathy, she was able to undergo uneventful delivery without cardiac complication or SCAD recurrence. This was in part due to preventative medical therapy during pregnancy as well as controlled cesarean delivery.

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al. Subsequent Pregnancy in a Patient With Spontaneous Coronary Artery Dissection. Journal of Clinical Gynecology and Obstetrics, North America, 4, apr. 2015. 3. Tweet, M et al. Pregnancy After Spontaneous Coronary Artery Dissection: Counseling Patients Who Intend Future Pregnancy. JACC Adv. 2023 Dec, 2 (10)

SUN - CR - BS 4 - BR 2A - OB Emergencies – 05

Intraoperative Discovery of Massive Hemoperitoneum from Subcapsular Liver Hematoma in a Patient with Preeclampsia and Intrauterine Fetal Demise

Presenting Author: Abhinav Prasad, MD

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Co-Authors: Laura Cohen, DO - Umass Memorial Medical Center
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Introduction: Subcapsular liver hematoma is a rare but life-threatening complication of preeclampsia with severe features and HELLP syndrome. The incidence is approximately 1:67,000 in preeclampsia births or 1:2,000 in HELLP syndrome births. Hepatic involvement results from fibrin deposition within hepatic sinusoids, causing sinusoidal obstruction and ischemia that can progress to subcapsular hematomas, parenchymal hemorrhage, and hepatic rupture. When rupture occurs, maternal mortality reaches 8% and perinatal mortality 44%.

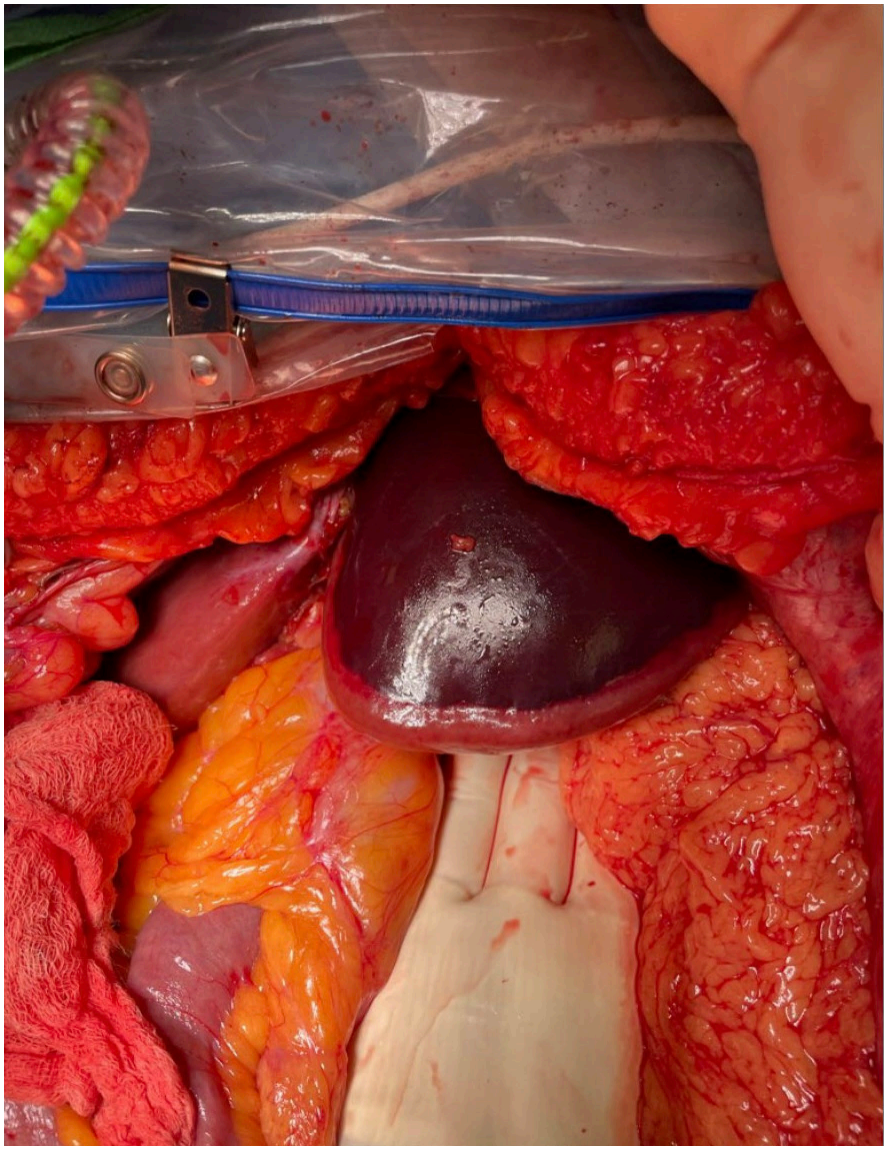
Case One: A 39-year-old primigravid nonbinary patient at 36 weeks 5 days gestation presented with 8 hours of dizziness and diffuse, severe abdominal pain without vaginal bleeding or fluid leakage. Initial examination revealed tachycardia, hypertension (140/90 mmHg), pallor, and a profoundly tender abdomen with guarding. Labs were significant for profound transaminitis, acute kidney injury, anemia, and leukocytosis. Bedside ultrasound confirmed intrauterine fetal demise. Intrabdominal free fluid was not noted on the initial ultrasound exam, however other findings were concerning for acute blood loss secondary to placental abruption or possible uterine rupture. Cesarean delivery under spinal anesthesia with bilateral salpingectomy was planned. Upon Pfannenstiel incision, two liters of hemoperitoneum was immediately encountered, prompting massive transfusion protocol activation. After hysterotomy, fetal delivery, and uterine closure, bleeding appeared non-gynecologic in origin from the upper abdomen. General surgery was emergently consulted. Following conversion to general anesthesia with endotracheal intubation, a vertical midline incision revealed multiple ruptured subcapsular liver hematomas. The bleeding was surgically stabilized, and the patient was transferred to a trauma center for further definitive operative management.

Case Two:

Discussion: This case highlights critical learning points for obstetric anesthesiologists. First, severe abdominal pain with hemodynamic instability in late pregnancy should prompt consideration of hepatic complications, even without classic HELLP laboratory findings initially. Second, multidisciplinary coordination is essential. Early general surgery consultation and readiness to convert from neuraxial to general anesthesia are paramount when intraoperative findings suggest non-obstetric hemorrhage. Third, massive transfusion protocols must be activated immediately upon discovery of hemoperitoneum.

Anesthesiologists must be prepared for rapid escalation and prolonged resuscitation in these rare but life-threatening emergencies.

References: 1. Hepatology 2021; 73(1):p 318-365 2. Lancet 2025; 405(10477):498-513



SUN - CR - BS 4 - BR 2A - OB Emergencies – 06

New-onset Peripartum Cardiomyopathy with Focal Pulmonary Edema Masked as Pneumonia Leads to Acute Decompensation in Labor Necessitating Urgent Cesarean Delivery

Presenting Author: Payton Marshall, MD, PhD

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Introduction: Peripartum cardiomyopathy (PPCM) is new-onset heart failure in late pregnancy or early postpartum, without identifiable etiology or prior structural heart disease, and with echocardiographic evidence of left ventricular systolic dysfunction.1 Early diagnosis and prompt treatment remains a challenge.2 While delivery is the definitive treatment, goal-directed medical therapy (GDMT) following delivery often leads to recovery of systolic function. However, the disease carries the potential for long term cardiac risk. Although the mechanism is unclear, inflammatory dysregulation is thought to impair angiogenesis and myocardial function.3 PPCM can be fatal, requiring rapid multidisciplinary diagnosis and management.3 Here we present a case of PPCM leading to acute cardiac decompensation that was initially interpreted as atypical pneumonia.

Case One: A 39 year old G4P2 with hypertension, gestational diabetes, and asthma presented at 37 weeks gestation with mild dyspnea on exertion. CT of the chest demonstrated right-sided ground glass opacities concerning for atypical pneumonia and she was started on antibiotics (Figure 1). Echocardiography revealed new global hypokinesis, a left ventricular ejection fraction (LVEF) of 31%, and moderate mitral regurgitation (MR), consistent with PPCM. Given mild symptoms and hemodynamic stability, induction of labor with neuraxial anesthesia was planned. The patient became acutely unstable with epidural initiation, requiring vasoactive support and diuresis for declining SpO2 and progressive pulmonary edema on bedside ultrasound. Due to intolerance of labor, she underwent cesarean delivery in the general OR with cardiac and obstetric anesthesia support. Intraoperatively, vasoactive support was escalated with epinephrine and dobutamine, and delivery was otherwise uncomplicated. Vasoactive agents were rapidly weaned and diuresis was continued postpartum in the ICU with clinical improvement. Repeat echocardiogram showed LVEF of 29% with severe MR and flow reversal noted in the right pulmonary vein. Postpartum care included initiation of GDMT, and treatment for euglycemic DKA. She was discharged on maximally tolerated GDMT with a LifeVest and Ziopatch for high ectopy burden.

Case Two:

Discussion: Although rare, PPCM requires prompt multidisciplinary teams to diagnose, treat, and ensure safe delivery. This case was notable for initial radiographic findings suggestive of pneumonia rather than cardiogenic pulmonary edema. Neuraxial anesthesia likely unmasked rapidly progressing hemodynamic instability. Acute worsening of her MR may have resulted in flow reversal in her right sided pulmonary veins and resultant right sided focal pulmonary opacities on imaging. Delivery resulted in rapid discontinuation of vasoactive support and tolerance of GDMT initiation.

References: 1. Trends Cardiovasc Med. 2019;23(3):164-173 2. Medicine (Baltimore). 2018;97(31);e11516 3. Curr Heart Fail Rep.2018;15(5);297-306

Figure_New-onset Peripartum Cardiomyopathy with Focal Pulmonary Edema Masked as Pneumonia Leads to Acute Decompensation in Labor Necessitating Urgent Cesarean Delivery.pdf

SUN - CR - BS 4 - BR 2A - OB Emergencies – 07

Intraoperative Decompensation with Placenta Percreta Requiring Aortic Compression and Emergent Conversion to General Anesthesia: A Case Report

Presenting Author: Anna T. Pham

Presenting Author's Institution: University of Texas Medical Branch - Prairie View, Texas

Co-Authors: Amit K. Aggarwal, DO - University of Texas Medical Branch
Ryan Griffin, MD - University of Texas Medical Branch
John Harman, MD - University of Texas Medical Branch

Introduction: Placenta accreta spectrum is a serious obstetric complication where the placenta adheres to or invades the uterine wall, preventing its normal separation after delivery. The incidence of placenta accreta ranges from 0.79 to 3.11 per 1000 births for individuals with prior cesarean section.[1] Placenta percreta, the most severe form of placenta accreta spectrum, involves complete invasion through the uterine myometrium and possible extension into surrounding organs such as the bladder or bowel. All forms of placental invasion into or past the myometrium have a life-threatening risk of peripartum hemorrhage and maternal mortality, with an average blood loss between 2000 to 5000 mL.[2]

Case One: A 33-year-old G4P2103 with suspected placenta accreta presented at 34 weeks for cesarean section and hysterectomy. Past medical history was significant for multiparity, previous cesarean delivery, and myomectomy. A combined spinal-epidural was placed. Following an uncomplicated delivery, a ruptured placenta percreta was found without evidence of invasion into the bladder. Patient acutely decompensated secondary to hemorrhage, with an estimated blood loss of 1500 mL. Manual aortic compression was performed by the obstetrics team for approximately 13 minutes until the uterine arteries were secured. Patient received 2 units of packed RBCs and 1 unit of FFP and was rapidly converted to general anesthesia for the hysterectomy. Due to preoperative preparations such as arterial line placement, cell saver setup, Belmont rapid infuser, and availability of blood products, the remainder of the procedure was well tolerated. Patient was extubated, remained hemodynamically stable throughout the postoperative period, and was discharged successfully on postoperative day 4.

Case Two:

Discussion: Peripartum hemorrhage following cesarean delivery, particularly in the setting of placenta accreta spectrum, remains a leading cause of maternal mortality.[3] In this case, despite a lower-than-average estimated blood loss, the patient experienced acute decompensation requiring emergent interventions. This demonstrates the importance of thorough preoperative planning and multidisciplinary coordination to mitigate the risks associated with placenta accreta spectrum. Furthermore, this case presents a way anesthetic management can be optimized when accreta is suspected or diagnosed preoperatively.

References: 1. Int J Gynecol Obstet 2018; 140:265-273 2. Am J Obstet Gynecol 2010; 203:430-439 3. Curr Opin Anaesthesiol 2011; 24:274–281

Fig. 1. Upon laparotomy, placenta was found to have completely invaded the uterine wall, with tense and bulging vessels in the midline of the uterus. Additional tortuous vessels extended inferiorly toward the bladder.

SUN - CR - BS 4 - BR 2A - OB Emergencies – 08

Seizure is the Great Masquerader in the Peripartum Period

Presenting Author: Patricia Rusli, MD

Presenting Author's Institution: The Ohio State University Wexner Medical Center - Columbus, Ohio

Co-Authors: Becky G. Mirsky, MD - The Ohio State University Wexner Medical Center

Introduction: Approximately 1.1 million women of childbearing age have epilepsy in the United States. Most women will continue their previous level of seizure control, although 15–30% may experience an increase in seizures. Differential diagnosis in the parturient should include structural and metabolic causes, including intracranial hemorrhage, cerebral venous sinus thrombosis, ischemic stroke, eclampsia, infection, and local anesthetic systemic toxicity. This is important because women with epilepsy were found to have a four-fold significantly higher risk of death.

Case One: A 34-year-old G3P2002 female at 39 weeks and 3 days gestation with a history of idiopathic epilepsy managed with levetiracetam presented for scheduled repeat cesarean delivery. Preoperatively, the patient was evaluated in an epilepsy clinic, where her antiepileptic regimen was optimized, and recommendations were made to avoid medications associated with increased seizure risk, including phenylephrine and diphenhydramine. The perioperative anesthetic plan included spinal anesthesia with norepinephrine selected for vasopressor support. Following uneventful neuraxial anesthesia placement and initiation of surgery, the patient developed sudden unresponsiveness and tonic–clonic convulsions immediately after delivery of the neonate, accompanied by rapid oxygen desaturation to 80%. Given ongoing seizure activity and respiratory compromise, general anesthesia was induced, and the airway was secured via endotracheal tube. Midazolam and magnesium sulfate were administered, resulting in seizure cessation and hemodynamic stabilization. The remainder of the procedure was uncomplicated, and she was extubated at its conclusion. Further investigation revealed that she had taken a reduced dose of levetiracetam on the morning of surgery and experienced significant sleep deprivation the night prior.

Case Two:

Discussion: This case underscores the importance of comprehensive perioperative planning for parturients with seizure disorders, vigilance for intraoperative seizure activity, and prompt differentiation from eclampsia. In this case, laboratory evaluation for preeclampsia, including liver function tests, urinalysis, and platelet count, was within normal limits, making eclampsia unlikely. This case also highlights the impact of medication adherence and sleep deprivation on seizure threshold, as well as the importance of thorough preoperative evaluation by the anesthesiologist. Fortunately, taking into account key anesthetic considerations in the management of acute seizures during cesarean delivery and rapid reactivity to intraoperative complications can result in favorable outcomes.

References: 1. Patel Ther ADV Neurol Disord 2016; 9(2):118-29 2. Beach Int Rev Neurobol 2008; 83:259-71 3. Razaz JAMA Neurol 2024; 81(9):985-995

SUN - CR - BS 4 - BR 2A - OB Emergencies – 09

Suspected Amniotic Fluid Embolism During Vaginal Delivery of Dichorionic Diamniotic Twins Under Epidural Anesthesia

Presenting Author: Storm Alexander, BA

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Introduction: Amniotic fluid embolism (AFE), also termed anaphylactoid syndrome of pregnancy, is a rare but potentially fatal obstetric emergency characterized by sudden cardiovascular collapse, respiratory compromise, and coagulopathy. AFE typically presents during labor or immediately postpartum with acute hypotension, hypoxia, and altered mental status, often leading to maternal and fetal distress if not rapidly recognized and managed.

Case One: A 30-year-old gravida with dichorionic diamniotic (DiDi) twins underwent an attempted vaginal delivery in the operating room under epidural anesthesia. After delivery of twin A, the obstetrician noticed Twin B to be in breech position so attempt was made at an internal version. At this time, the patient developed sudden bradycardia and hypotension accompanied by altered mental status, suspicious for an amniotic fluid embolism (AFE) in the absence of alternative explanations such as anesthetic toxicity, pulmonary embolism, or hemorrhage. Immediate management focused on supportive care. The anesthesia team administered intravenous atropine to address profound bradycardia, ondansetron and ketorolac as part of a proposed AFE resuscitation protocol, and epinephrine to support blood pressure and cardiac output. Endotracheal intubation was performed for airway protection and oxygenation. Twin B was delivered emergently at this time via emergent cesarean section under general anesthesia. With aggressive hemodynamic support, the patient’s vital signs stabilized, and she was transferred intubated to the intensive care unit (ICU). Over the following 24 hours, she was weaned from ventilatory support and successfully extubated. Both neonates and the mother recovered without immediate neurologic sequelae.

Case Two:

Discussion: AFE remains a diagnosis of exclusion due to its unpredictable presentation and lack of definitive diagnostic testing. Physicians rely on clinical criteria including abrupt onset of hypotension, hypoxia, and often accompanying coagulopathy in the context of labor or delivery. The pathophysiology involves a cascade of inflammatory mediators in response to amniotic fluid components entering the maternal circulation. Rapid recognition, immediate resuscitation, and multidisciplinary coordination are critical to managing AFEs. Though traditional treatment is largely supportive, several reports describe the

use of a combination of atropine, ondansetron, and ketorolac (“A-OK” protocol) in suspected AFE to mitigate autonomic dysregulation and inflammatory pathways. This case highlights the importance of rapid multidisciplinary response and tailored hemodynamic support in the successful management of suspected AFE. While survival has improved with modern critical care and obstetric anesthetic practices, AFE continues to pose significant maternal risk.

References: Am J Obstet Gynecol 2016;215:408 Am J Obstet Gynecol 2016;215:B16 Obstet Gynecol 2019;133:337 Ochsner J 2022;22:253 Medicine (Baltimore) 2025;104:e45462

SUN - CR - BS 4 - BR 2A - OB Emergencies – 10

Cesarean Section for Parturients with Ascending Aortic Aneurysm: Two Case Reports with Anesthetic Recommendations

Presenting Author: Amy Yan, MD

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Co-Authors: Tiffany Angelo, DO - Stony Brook University Hospital
Michelle Delemos, MD - Ston Brook Medical University Hospital

Introduction: Parturients with aortic aneurysm present unique concerns, however there are limited case reports and recommendations available. Elective cesarean delivery is often indicated due to risks of aneurysm rupture or dissection with valsalva during vaginal delivery. We present two case reports of patients with ascending aortic aneurysm undergoing general anesthesia for cesarean section.

Case One: 32yo G1P0 with Marfan's Syndrome and aortic root dilatation, stable at 43mm during pregnancy. She was on 25mg metoprolol daily with adequate HR and BP control. Multidisciplinary meetings determined delivery via elective cesarean section at 37 weeks with general anesthesia. Neuraxial was deferred due to severe scoliosis and concern for dural ectasias. Pre-induction arterial line was placed with boluses of dexmedetomidine for anxiolysis and esmolol for tachycardia. RSI was performed with propofol and rocuronium with delivery in 3 minutes followed by oxytocin, carboprost and tranexamic acid. Estimated blood loss was 1 L. Hemodynamics were managed with phenylephrine, nicardipine and labetalol. She was extubated in the OR and brought to PACU, after which she was transferred to cardiac step down. On POD1 she was downgraded to postpartum and discharged on POD4.

Case Two: 39yo G1P0 with chronic hypertension and congenital bicuspid aortic valve with aortic root dilation, stable at 44mm during pregnancy. She was on 75mg metoprolol daily and was up-titrated in the 3rd trimester to 100mg daily for BP control. Multidisciplinary meetings determined delivery via elective cesarean section at 37 weeks. She was cleared for neuraxial but opted for general anesthesia due to anxiety. Pre-induction arterial line was placed followed by boluses labetalol and nicardipine for BP control. RSI was performed with fentanyl, propofol and rocuronium with delivery in 6 minutes followed by oxytocin. Estimated blood loss was 500mL. She was extubated in the OR and brought to PACU, after which she was transferred to cardiac step down. On POD1 she was downgraded to postpartum and discharged on POD5.

Discussion: There is limited literature on parturients with ascending aortic aneurysm. A multidisciplinary approach is critical to plan for safe delivery and postpartum recovery. Hemodynamic changes of pregnancy include increased HR and decreased peripheral vascular resistance which may worsen aortic dilation. Elective cesarean delivery is indicated in all patients with aortic diameter over 45mm and should be considered when aortic diameter is 40-45mm. Neuraxial or general anesthesia can be used. Choice of

neuraxial technique should plan for a slow load to avoid precipitous drops in BP and reflex tachycardia. With general anesthesia, attention should be taken to avoid hypertension and tachycardia during laryngoscopy and intubation. With both anesthetics, close hemodynamic management is necessary to avoid devastating complications from aortic aneurysms.

References: 1. Curr Opin Cardiol. 2016;31(6):611-617. 2. Circulation. 2023;147(11):e657-e673.

SUN - CR - BS 4 - BR 2A - OB Emergencies – 11

Anesthetic Management for Emergent Cesarean Delivery in the Setting of Acute Infective Endocarditis and a Right Atrial Mass

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Introduction: Infective endocarditis (IE) during pregnancy is uncommon but associated with significant maternal and fetal risk, especially when complicated by intracardiac masses, sepsis, and right heart strain. Effective management necessitates prompt multidisciplinary collaboration to optimize maternal hemodynamics, determine optimal timing of delivery, manage anticoagulation, and formulate an anesthetic plan, including consideration of extracorporeal membrane oxygenation (ECMO) support.

Case One: A 35-year-old G2P0101 at 32 weeks' gestation with hyperemesis gravidarum requiring total parenteral nutrition presented with Serratia marcescens and Streptococcus oralis bacteremia and a 2.3-cm mobile right atrial (RA) mass. Her medical history was notable for tricuspid valve endocarditis during a previous pregnancy. Therapeutic anticoagulation with heparin was initiated. Within 24 hours of antibiotic de-escalation, the patient developed sepsis with laboratory evidence of clinical deterioration. Repeat echocardiography revealed interval enlargement of the right atrial mass, which was attached to an indwelling catheter. Due to worsening maternal status and a category II fetal heart rate tracing, maternal–fetal medicine recommended emergent cesarean delivery. Heparin was discontinued immediately, and cardiothoracic surgery was present in the operating room on standby for potential ECMO cannulation and initiation. Intraoperative transesophageal echocardiography (TEE) was utilized to continuously monitor the right atrial mass throughout the procedure. Cesarean delivery under general anesthesia was completed safely within one hour, after which the patient was transferred intubated to the intensive care unit. Due to the elevated risk of postoperative hemorrhage after cesarean delivery and the anticipated requirement for high-dose intraoperative heparin, AngioVAC thrombectomy of the right atrial mass was deferred for five days. The procedure was subsequently performed without complications, and the patient recovered fully.

Case Two:

Discussion: This case underscores the essential role of a multidisciplinary approach involving obstetric anesthesiology, maternal–fetal medicine, cardiothoracic surgery, and critical care in managing pregnant patients with acute infective endocarditis and intracardiac masses. Intraoperative TEE enabled real-time

assessment of the right atrial mass, supporting safe anesthetic and surgical management. Rapid interdisciplinary coordination facilitated emergent delivery and subsequent definitive thrombectomy, resulting in favorable maternal outcomes.

References: 1.J Antimicrob Chemother 2022; 77(10):2701-2705 2. J Clin Med 2025; 14 (12):4262.

IE_RA.pdf

SUN - CR - BS 4 - BR 2A - OB Emergencies – 12

ECLAMPTIC SEIZURE AT THE TIME OF NEURAXIAL ANESTHESIA FOR SCHEDULED CESAREAN DELIVERY

Presenting Author: Niharika Gupta, MD

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Co-Authors: Anthony Dinkel, MD - McGaw Medical Center of Northwestern University
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Introduction: Acute neurologic changes during cesarean delivery represent a time-sensitive obstetric emergency.(1) The differential diagnosis includes high or total spinal anesthesia, local anesthetic systemic toxicity (LAST), stroke and eclampsia.(1) Eclampsia must be excluded given its strong association with fetal and maternal morbidity.(1) We present a case of a suspected eclamptic seizure occurring at the time of spinal anesthesia for scheduled cesarean delivery.

Case One: A healthy, 40-year-old G2P1 presented for scheduled repeat cesarean delivery for twin gestations in breech/vertex presentation. Antepartum and admission blood pressures were normal but blood pressure in the OR was found to be 206/132. After discussion with OB, pressure was determined to be anxiety related. Spinal anesthesia was administered with the expectation that vasodilation from the sympathectomy would address the blood pressure. Although improved, blood pressure remained elevated 182/77. Approximately three minutes after placing the patient in the supine position, with left lateral tilt, the patient became unresponsive and posturing was noted. Vital signs at the time were significant for a drop in maternal blood pressure to 65/31 mmHg with fetal heart rate decelerations. Midazolam and a magnesium were administered for presumed eclampsia. The patient became responsive enough to establish a surgical block and the obstetric team performed emergent delivery under spinal anesthesia. The patient continued to be lethargic for 15 minutes after regaining consciousness. Postoperative lab studies demonstrated an increased white blood cell count with normal platelet count, coagulation studies, hepatic function panel, and urine protein-to-creatinine ratio. Neurologic examination in the post anesthesia care unit eventually returned to baseline. Computed Tomography (CT) revealed no evidence of cerebral hemorrhage, infarction, mass or obstructive thrombus. The patient was then managed in the intensive care unit (ICU) for tight blood pressure control and a continuous magnesium infusion. Their ICU course was notable for sustained, severe hypertension that lasted up to 24 hours following delivery.

Case Two:

Discussion: This case underscores the importance of maintaining vigilance for eclampsia in any pregnant or postpartum patient presenting with acute neurologic symptoms as it may present abruptly without warning signs and symptoms.(3) Approximately 20-38% of patients do not demonstrate classic signs of hypertension or proteinuria before their first seizure.(3) Anesthesia providers must rapidly

coordinate emergent delivery when indicated.(2) Neuraxial anesthesia remains the preferred management for delivery in eclamptic patients compared to general anesthesia.(2) Awareness of the non-linear progression of eclampsia is critical to timely intervention and optimization of maternal and neonatal outcomes.(3)

References: 1. Lancet. Neurology. 2013;12(2):175-185 2. Journal Clinical Anes. 2011; 23(3): 202-206. 3. Obstet & Gynecol 2020;135(6):237-260.

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 01

FUNCTIONAL NEUROLOGIC DISORDER MIMICKING STROKE IN THE IMMEDIATE POSTPARTUM PERIOD

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Nancy H. Greenspon, MD - McGaw Medical Center of Northwestern University

Introduction: Acute neurologic changes in the immediate postpartum period represent a time-sensitive obstetric emergency with potentially devastating maternal outcomes.(1) Patients with hypertensive disorders of pregnancy are at an increased risk of cerebrovascular events, underscoring the need for rapid recognition and escalation of care.(1) For patients with altered neurologic status, the differential diagnosis includes stroke, eclampsia, seizure, adverse medication effects, metabolic derangements, and, rarely, functional neurologic disorders.(2) We present a case of profound neurologic depression and global akinesia following a traumatic, operative vaginal delivery.

Case One: A 24-year-old G1P0 with a pregnancy course notable for preeclampsia without severe features presented in active labor. Her labor course was complicated by a prolonged second stage, and she, ultimately, required a forceps-assisted vaginal delivery for maternal exhaustion. Immediately postpartum, she developed uterine atony requiring treatment with carboprost, methylergonovine, and misoprostol. Additionally, she required repair of a fourth-degree perineal laceration, throughout which she experienced significant pain despite multiple epidural boluses of 3% chloroprocaine and intravenous hydromorphone. One hour after delivery, the patient was found with her eyes open but unresponsive to verbal commands, sternal rub, or painful stimuli. Though experiencing aphonia, she intermittently appeared to communicate through blinking. Vitals at the time were notable for SBPs >160mmHg and a magnesium infusion was initiated. Due to concern for acute cerebrovascular pathology, a stroke code was activated. Emergent CT and MRI of the brain revealed no evidence of intracranial hemorrhage, ischemic stroke, or posterior reversible encephalopathy syndrome (PRES). Soon thereafter, the patient began to spontaneously regain minimal movement in all extremities and follow commands. By the following day, she had returned to her neurologic baseline. Additional evaluations including video electroencephalogram (vEEG) were unremarkable. Following a multidisciplinary assessment, she was diagnosed with an acute functional neurologic episode following a traumatic delivery.

Case Two:

Discussion: This case highlights the critical role of obstetric anesthesiologists in the early recognition of acute postpartum neurologic changes. Functional neurologic episodes have a wide array of symptoms including seizures, motor weakness, movement disorders, amnesia, and visual symptoms.(2) In preeclamptic patients with sudden neurological changes, imaging, labs, and potentially EEG should be

pursued to exclude PRES, eclampsia, and stroke.(3) Awareness of the acute stress response in the postpartum period may inform clinicians against further unnecessary and even harmful interventions.(2)

References: 1. Crit Care Clin. 2016;32(1):43-59. 2. Harv Rev Psychiatry. 2025;33(6):328-332. 3. BJPsych Bulletin. 2025;49(6):401-411.

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 02

Vascular malformations near the spine highlight the importance of outpatient pre-delivery planning in a high-risk obstetric anesthesia clinic

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Co-Authors: Leah Vetter, MD - Stanford Medicine, Department of Anesthesia, Perioperative, and Pain Medicine

Introduction: Anesthesiologists are leaders in patient safety. Outpatient high-risk obstetric (OB) anesthesia clinic is a crucial resource for optimizing and counseling patients with complex medical conditions ahead of delivery (1). Vascular malformations present a wide spectrum of disease severity in pregnancy and typically warrant dedicated brain and spine MRI imaging to facilitate safe delivery planning (2-5). We present the case of a patient who was admitted for induction of labor with known diffuse vascular malformations and no prior OB anesthesia consultation.

Case One: A 33-year-old G1P0 was admitted for elective induction at 39w0d. Her antenatal issues included diffuse congenital vascular malformations (VMs) of her palm, axilla, upper back, lumbar paraspinal muscles, buttock, thigh, and vulva. Genetic testing showed somatic mosaicism in the TEK gene, and she was counseled that this chronic condition can evolve over time but was otherwise benign. One year prior to pregnancy the patient had undergone a pelvic MRI which demonstrated: “numerous lesions throughout pelvic, paraspinal, bilateral gluteal musculatures and subcutaneous soft tissue, some with slow flow feeding vessels and pooling of blood into the lesion” (Figure 1). Her additional past medical history was significant for: asthma, GERD, iron deficiency anemia, normal coagulation parameters, and a BMI of 27 kg/m2. The patient was primarily Mandarin speaking. The OB anesthesia team first learned of these VMs upon chart review, after the patient was in labor and experiencing painful contractions. The neuroradiologist on call confirmed that the prior pelvic MRI demonstrated large and bilateral paraspinal VMs at L4/5, with a prominent vessel crossing midline. The pelvic MRI field of view terminated at the top of the L4 vertebral body. A dedicated spine MRI was not feasible with the patient in labor. Without imaging to fully evaluate the lumbar spine, we could not determine the safety of neuraxial placement. We counseled the patient on the increased risk of neuraxial procedures. She considered cesarean delivery under general anesthesia, but the lack of updated imaging of her pelvic VMs also posed significant surgical risk. After discussing alternatives, the patient opted to start with nitrous oxide and later transitioned to a remifentanil PCA with pain scores improving from 9/10 down to 4-5/10 prior to successful vaginal delivery.

Case Two:

Discussion: Our OB anesthesia team evaluates high risk patients in a weekly outpatient telehealth clinic,

typically in the second trimester. Our patient would have significantly benefited from pre-delivery imaging, risk stratification, and shared decision making. Instead, she was left with minimal time to consider her options for safe pain relief. Feedback was provided to the patient's primary OB provider.

References: 1. IJOA. 2007;16(4):311-313. 2. Can J Anesth. 2015;62:901–906 3. Can J Anesth. 2009;56:374–384 4. IJOA. 2009;18(2):176-181 5. JA Clin Rep. 2021;7:19

Figure 1.pdf

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 03

Management of Delivery in a Parturient with Vascular Ehlers Danlos Syndrome

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Introduction: Vascular Ehlers Danlos syndrome (vEDS) is an autosomal dominant condition characterized by a collagen chain mutation resulting in increased risk for uterine rupture during pregnancy and vascular dissection. (1) Existing emergency guidelines for vEDS recommend avoidance of neuraxial anesthesia and invasive vascular monitoring in patients with vEDS syndrome due to the concerns for increased risks of epidural hematoma, postdural puncture headache, and vascular injury. (2) There is one published case report describing neuraxial anesthesia for cesarean delivery in a patient with vEDS, in which combined-spinal epidural anesthesia was performed with both arterial and central venous access obtained out of caution. (3) However, data guiding anesthetic management for obstetric patients with vEDS is limited.

Case One: A 38-year-old G1P0 female with past medical history of vEDS, paroxysmal SVT status post ablation, orthostatic hypotension, Raynaud's syndrome, migraines, and seizure disorder presented at 37w1d for elective caesarean section. Preoperative evaluation included a CTA showing no aortic dilation and TTE showing normal heart function with mild mitral regurgitation. During preoperative anesthesia consultation, general anesthesia was recommended over neuraxial anesthesia. The patient strongly preferred neuraxial anesthesia and demonstrated understanding of the associated risks. She underwent uncomplicated spinal anesthesia for caesarean section without invasive monitoring. The intraoperative and immediate postoperative courses were uneventful, and she was discharged on post-operative day three. Several weeks postpartum, her course was complicated by preeclampsia with pulmonary edema, heart failure with moderate-severe mitral regurgitation, left lower extremity DVT, and multiple pulmonary emboli.

Case Two:

Discussion: This case demonstrates successful neuraxial anesthesia for cesarean delivery in a patient with vEDS without perioperative or neurologic complications. This report suggests that neuraxial anesthesia may be feasible in carefully selected patients with vEDS following multidisciplinary evaluation and informed shared decision-making. This case further highlights the importance of incorporating patient preference into anesthetic planning when evidence is limited and existing guidelines are based largely on expert opinion. Further data is needed to better characterize the true risks of neuraxial techniques in this population.

References: 1. BJOG: An Int J of Obstet & Gynaecol 131.12 (2024): 1620-1629 2. Orphanet UK 2009 3. Case Rep in Anesthesiol 2018.1 (2018): 1924725

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 04

Against All Odds: Successful Pregnancy in a Patient with Autotransplanted Kidneys and Spinal Arteriovenous Malformation: a case report.

Presenting Author: Alison Williams

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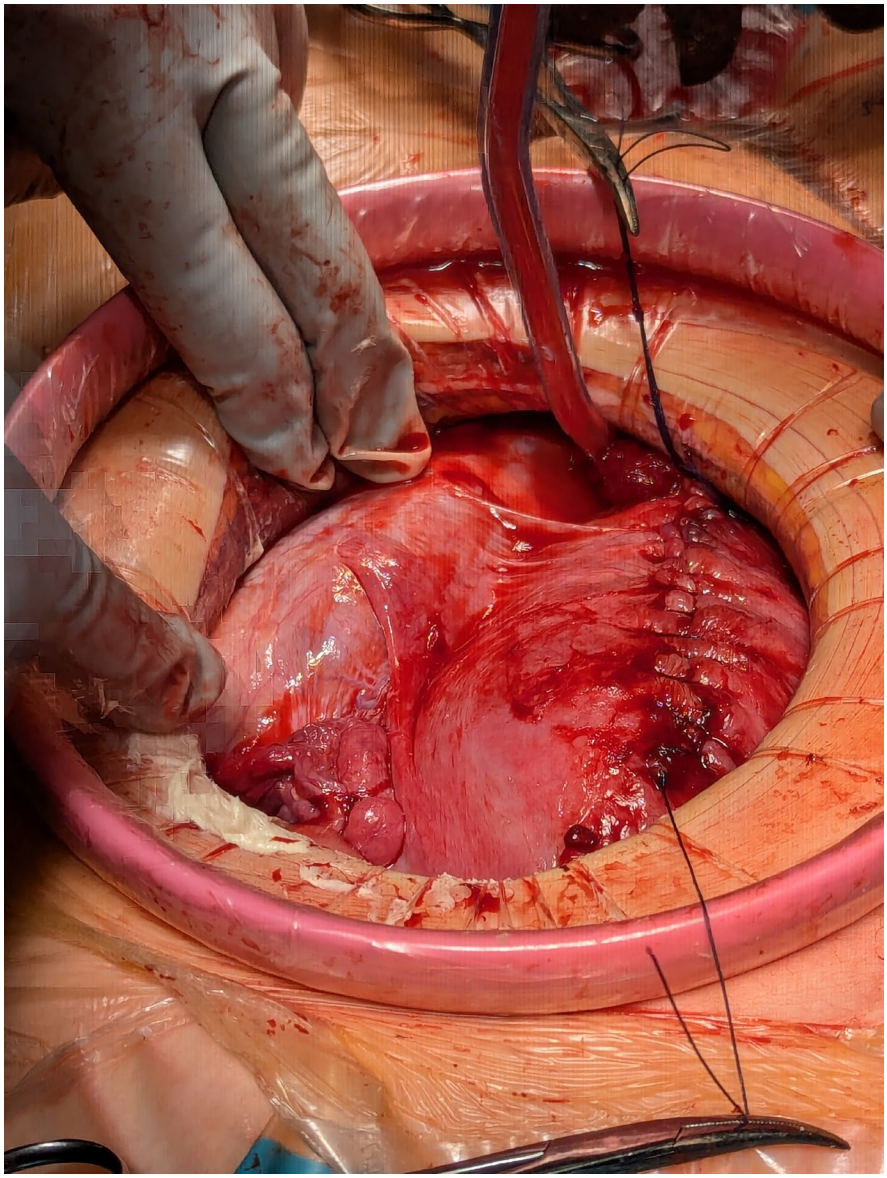
Introduction: Spinal arteriovenous malformations (AVMs) in pregnancy are exceptionally rare. Physiological changes may precipitate neurological deterioration through venous congestion or AVM enlargement from hormone changes.[1] Combined with autotransplanted kidneys, this adds unique challenges regarding positioning, organ perfusion, and delivery planning.

Case One: : A 30-year-old woman, G2P0, presented at 17 weeks gestation with progressive thoracic back pain and rapid myelopathy affecting gait and sensation below the umbilicus. Her history included thoracic scoliosis (Cobb angle 30°), childhood hypertension from renal artery stenosis ultimately requiring bilateral auto transplantation of native kidneys into iliac fossae and low BMI. A CT revealed extensive intrathecal AVM from T1/T2 to conus, with intramedullary lipomas at T3, T7, T11, and cord enhancement suggesting venous congestion at T5-T6. Following five-hours of angiogram, she underwent extensive prone surgery with C7-L2 exposure, T1-T11 laminectomy, and AVM excision. She recovered with persistent spastic gait but independent mobilisation. At 38 weeks, declining creatinine thought to be from gravid uterine compression of her pelvic kidneys prompted caesarean delivery. Prior spinal surgery precluded neuraxial anaesthesia; general anaesthesia with arterial line monitoring was planned. MRI assessment at 34 weeks identified superficially located kidneys at risk of injury from traditional pfannensteil surgical approach. A transplant surgery opinion recommended midline subumbilical laparotomy, and a classical uterine incision was chosen by senior obstetricians as the patient did not plan to have more children and this would avoid the kidney adherent to the lower segment.

Case Two:

Discussion: Spinal AVMs are rare and the impact of pregnancy haemodynamics remain poorly understood; cerebral AVM data suggest concerns around rupture risk, but spinal data is limited.[1] Prone positioning with transplanted organs and pregnancy requires team planning for optimal graft and fetal perfusion. Auto and allograft transplanted kidneys pose gestational monitoring requirements of renal function and create delivery challenges. The altered anatomy necessitates thorough imaging, multidisciplinary planning, and modified approaches.[2]

References: 1. Neurosurg Rev 2024;47:332 2. Aust N Z J Obstet Gynaecol 2022;62:332



SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 05

Use of lumbar ultrasound in neuraxial anesthesia for a pregnant patient with Klippel–Trenaunay syndrome: a case report

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Co-Authors: Benjamin Watson - Universidad del Desarrollo
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Introduction: Klippel–Trenaunay syndrome (KTS) is a rare congenital disorder characterized by cutaneous hemangiomas, venous malformations, and tissue hypertrophy. It is often associated with neuraxial anomalies and scoliosis, complicating anesthesia (1, 2). Pregnancy exacerbates these malformations, increasing bleeding and thrombotic risks. MRI in conjunction with lumbar ultrasound has emerged as a strategy that aids in the identification of anatomical structures, improves success rates, enhances patient satisfaction, and reduces the risk of complications (3). There are no previous Chilean reports on this association, and the combined use of MRI and lumbar ultrasound in obstetric patients with KTS has been sparingly documented internationally

Case One: We present a 40-year-old pregnant patient (37+5 weeks) with KTS and mild scoliosis. Her history included a prior complicated delivery involving intravascular epidural catheter placement. Given this history, lumbar MRI was performed, revealing anterior epidural space occupancy from L4 to S1 and venous prominence, while identifying the L2–L3 space as lesion-free. A pre-procedural lumbar ultrasound confirmed the patency of L2–L3 and provided depth measurements. Combined spinal-epidural (CSE) anesthesia was successfully performed at this level without vascular or neurological complications. Epidural PCEA was programmed achieving satisfactory analgesia.

Case Two:

Discussion: Neuraxial ultrasound has established itself as a valuable tool for increasing the safety and efficacy of anesthesia in patients with complex anatomy or high vascular risk, such as those with KTS. This syndrome can be associated with vascular malformations within the neuraxis, increasing the risk of complications. In this context, planning based on imaging studies is essential. MRI allows for the mapping of lesions and the selection of segments free of involvement, while lumbar ultrasound complements this information at the point of care, facilitating the identification of anatomical structures, depth estimation, and needle trajectory planning. The literature demonstrates that ultrasound improves vertebral level localization, increases the first-attempt success rate, and reduces failed attempts; this is particularly relevant in obstetrics, where the anatomical changes of pregnancy make the palpation of bony landmarks difficult In this case, the combination of MRI and lumbar US allowed for the selection of a safe interspace

and the optimization of the technique, minimizing risks and complications. Although it is not a substitute for MRI in ruling out intradural malformations, ultrasound provides practical advantages and additional safety at the time of puncture. Its systematic application in patients with KTS or other neuraxial vascular malformations could improve clinical outcomes, and this case contributes evidence to a field that is sparingly documented, especially at the national level

References: 1. Cureus 2020;12:e8023 2. Braz J Anesthesiol 2018;68:641 3. Curr Pain Headache Rep 2020;24:59

Figura 1. RNM columna lumbar tomada a las 25 semanas de gestación. **Flecha:** El espacio epidural de la columna lumbar y en menor grado dorsal caudal, se observa una ocupación por contenido de señal intermedia T1 e hiperintenso T2/STIR con algunos vacío de señal en su interior, muestra mayor espesor en el espacio epidural anterior desde L4 a S1 donde rodea el saco tecal; se extiende también hacia los canales foraminales.

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 06

Epidural Labor Analgesia in a Parturient With Neurofibromatosis Type 1

Presenting Author: Xinhao Liu, MD, PhD

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Introduction: Neurofibromatosis type 1 (NF1) is an autosomal dominant disorder characterized by café-au-lait macules, neurofibromas, and potential involvement of the central nervous system [1]. Neuraxial anesthesia in NF1 can raise concern for occult spinal tumors or neurofibromas that may complicate catheter placement or increase risk of neurologic injury [2].

Case One: A 25-year-old gravida 2 para 1001 at 37+0 weeks presented for induction of labor due to newly diagnosed gestational hypertension. Her medical history was notable for mild asthma without complications and NF1, manifesting as multiple café-au-lait macules on the trunk and extremities. She had undergone excision of a peripheral neurofibroma in 2019 and was followed by neurology, with no history of spinal involvement or neurological deficits. Given her NF1 diagnosis, the obstetric anesthesia team requested a neurology consultation prior to neuraxial placement. Neurology performed a bedside assessment and confirmed the absence of focal neurological symptoms or contraindications to epidural anesthesia. A combined spinal–epidural technique with dural puncture epidural (DPE) was performed at the lumbar level without complication. Labor analgesia was initiated with a solution of 0.0625% bupivacaine and fentanyl 2 mcg/mL using a CADD pump programmed for programmed intermittent epidural bolus (PIEB) and patient-controlled epidural analgesia (PCEA): 9 mL every 45 minutes with 5 mL patient-controlled boluses, 10-minute lockout. Prior to epidural placement, her pain was 9/10. Thirty minutes after placement, she reported complete pain relief but developed hypotension (85/50 mmHg) with dizziness. The infusion was paused, and she received 1 liter of lactated Ringer's solution. Her blood pressure normalized within one hour. The epidural infusion was then restarted in continuous mode at 6 mL/h. The remainder of her labor was uneventful, and she delivered vaginally four hours later without maternal or neonatal complications. Patient had been followed up in the next day and stated she has no difficulty ambulating or urinating.

Case Two:

Discussion: Although NF1 can involve the spine with neurofibromas or other lesions, routine pre-procedural MRI is not recommended in the absence of focal neurological symptoms. Our patient benefited from a neurology consultation, which provided reassurance that there were no contraindications to epidural placement. The transient hypotension observed following neuraxial block was likely related to sympathetic blockade rather than NF1-specific pathology, and it responded promptly to fluid resuscitation and adjustment of the infusion regimen. This case supports existing guidance that neuraxial analgesia can be safely offered to parturients with NF1 who lack focal neurological deficits. Close collaboration among obstetric, anesthesia, and neurology teams is essential to ensure safe management and to

individualize care.

References: 1. Nat Rev Dis Primers. 2017 Feb 23;3:17004.

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 07

Inflammatory Polyneuropathy Following Neuraxial Labor Analgesia in a Patient with Chiari I Malformation

Presenting Author: Katherine T. Fortson, MD

Presenting Author's Institution: Weill Cornell Medical College - Queens, New York

Introduction: A 36-year-old, G1P0 with history of unrepaired Chiari I malformation, glaucoma, anxiety and spontaneous pneumothorax presented for term induction. Intrapartum neurosurgical consultation cleared her for neuraxial analgesia. The patient received epidural analgesia placed by senior attending, with effective pain control and no apparent complications during a prolonged labor. Following NSVD and catheter removal, sensory and motor function did not recover, with the patient unable to ambulate with urinary retention. Motor deficit involved possible femoral nerve distribution, however deficits waxed and waned in imprecise distribution bilaterally. MR spine (with and without contrast) showed subtle enhancement of the cauda equina, but no evidence of hematoma or infection.

Case One: Differential included residual local anesthetic effect, Guillain Barre Syndrome (GBS), and inflammatory polyneuropathy. Pulse dose steroids were ineffective. She was discharged after one month with residual deficits. After outpatient IVIG and physical therapy (PT), she improved to baseline in three months. This case demonstrates a rare case of presumed inflammatory polyneuropathy causing significant functional limitations after prolonged labor course and epidural analgesia.

Case Two:

Discussion: The case highlights the importance of peripartum consultation, expert procedural administration1, and prompt follow up in patients with neurologic complications. This patient was concerned that Chiari type I was a contraindication for neuraxial analgesia. Anesthesia and neurosurgical consultation allayed fears, but she ultimately suffered an unrelated adverse outcome. Prompt imaging and neurology/neurosurgical consultation2,3, aggressive PT, and multidisciplinary communication were essential to helping the patient cope with both physical disability and psychological consequences. Diagnosis was also challenging, as the deficit did not follow a clear dermatomal pattern or pathognomonic presentation, nor was it clear whether neuraxial analgesia had contributed. Should this patient present in labor again, careful consideration of the appropriateness of neuraxial should be undertaken.

References: 1. Practice Guidelines for Obstetric Anesthesia: An Updated Report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. Anesthesiology. Feb 2016;124(2):270-300. doi:10.1097/ALN.0000000000000935 2. Neal JM, Barrington MJ, Brull R, et al. The Second ASRA Practice Advisory on Neurologic Complications Associated With Regional Anesthesia and Pain Medicine: Executive Summary 2015. Reg Anesth Pain Med. Sep-Oct 2015;40(5):401-30. doi:10.1097/AAP.0000000000000286 3. Yentis SM, Lucas DN,

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SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 08

When the Pressure Breaks: Pituitary Apoplexy in the Setting of Pre-Eclampsia

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Presenting Author's Institution: Stanford University School of Medicine - Menlo Park, California

Co-Authors: Fatine Karkri, MD - Stanford University School of Medicine

Introduction: Background: Pituitary apoplexy is a rare but potentially life-threatening event with an estimated prevalence in 1:10000 term pregnancies.1 We report a case of pituitary apoplexy in a patient with acute pre-eclampsia managed collaboratively by obstetrics, neurosurgery, endocrinology, ophthalmology, and anesthesia teams.

Case One: Case Presentation: A 40-year-old G2P1 at 30 weeks gestation with chronic hypertension presented with shortness of breath and elevated blood pressures after one week of medication non-adherence. She had previously taken oral labetalol 100mg BID. Blood pressures on admission were 162/104, 159/114, 155/111. She was diagnosed with superimposed pre-eclampsia without severe features with a urine protein creatinine ratio of 0.42 and admitted for blood pressure control. Perinatal ultrasound was unremarkable. She then developed sudden, intractable headache unresponsive to analgesics, accompanied by photophobia and worsening visual blurriness concerning for worsening preeclampsia. Her medical history was also notable for congenital blindness of the left eye, with her right eye being her only functional vision source. MRI brain revealed an enlarged pituitary gland with evidence of hemorrhage consistent with pituitary apoplexy. No optic disc edema or nerve compression was observed, and endocrine evaluation showed central hypothyroidism with possible adrenal insufficiency. The patient was managed with stress-dose corticosteroids and levothyroxine, with planned non-emergent transsphenoidal hematoma evacuation to preserve any remaining vision per patient request. Surgery proceeded uneventfully under general anesthesia with continuous intra-operative fetal monitoring. The obstetric team remained on standby in case of prolonged fetal heart-rate deceleration. Postoperatively, the patient experienced improvement in headaches and vision, with stable pituitary function on hydrocortisone replacement. She later underwent uneventful cesarean delivery under spinal anesthesia at 36+5 weeks for PPROM with appropriate stress-dose steroid coverage.

Case Two:

Discussion: Discussion: Elective surgical management was pursued per patient request to mitigate vision loss from worsening preeclampsia or extension of pituitary bleeding. Management for pituitary apoplexy remains largely conservative with glucocorticoid supplementation as mainstay treatment since surgical evacuation carries unknown risks during pregnancy.2 However, delayed intervention can lead to permanent vision loss and requires frequent reassessment as clinical deterioration can occur expeditiously. Conclusion: Surgical intervention proved successful for resolving worsening vision and headaches in this case. Timely imaging, endocrinologic assessment, and coordinated care across

specialties were critical for optimizing maternal and fetal outcomes.

References: References: 1. Rev Bras Ginecol Obstet. 2023 May;45(5):273-280. 2. J Clin Med. 2024 Apr 24;13(9):2508.

When the Pressure Breaks Pituitary Apoplexy in the Setting of Pre-Eclampsia .pdf

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 09

Blue Rubber Bleb Nevus Syndrome in Pregnancy: A Case Report

Presenting Author: Jeremy Latham, MD

Presenting Author's Institution: University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine - Lexington, Kentucky

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Bryce Marshall, MD - University of Kentucky Department of Anesthesiology Perioperative Critical Care and Pain Medicine,

Introduction: Blue rubber bleb nevus syndrome (BRBNS) is a rare, autosomal dominant condition causing venous malformations (VMs) both cutaneously and within visceral organs, most commonly the gastrointestinal (GI) tract.[1] These lesions have the potential for life-threatening hemorrhage. We present our unique approach to multidisciplinary perinatal anesthetic management of a parturient with BRBNS.

Case One: A 25 y/o G1P0 with a history of BRBNS significant for GI VMs requiring multiple bowel resections, partial gastrectomy, and transanal excision of numerous blebs presented for delivery planning at 31 weeks gestation. She was noted to have classic bluish rubbery cutaneous lesions on her arms, shoulder, legs, and lips. None were noted on tongue, palate, or posterior pharynx. Because of her significant GI burden and frequent bleeds, she had required over 200 lifetime blood transfusions and was maintained on weekly iron infusions for chronic anemia. The patient desired a vaginal delivery (VD) with neuraxial anesthesia (NA). Given the concern for genital tract lesions, a prior hysteroscopy and vaginoscopy were reviewed with no notable lesions. In consultation with maternal fetal medicine, it was deemed reasonable to proceed with VD. The rare but concerning risk of possible CNS VMs was also assessed. VMs can rapidly evolve during pregnancy and CNS VM rupture could result in seizures or subarachnoid hemorrhage.[2] Inadvertent puncture of a neuraxial VMs could result in epidural hematoma formation.[3] An MRI head, lumbar and thoracic spine was performed at 35 weeks and was normal with no neuraxial VMs identified. The patient was admitted at 38w6d for induction of labor due to newly diagnosed gestational hypertension. A labor epidural was placed uneventfully. A baby boy was delivered vaginally with 100mL QBL. Although the baby had no cutaneous lesions noted on exam, long-term follow-up was recommended.

Case Two:

Discussion: Management of parturients with BRBNS can be challenging and there is limited literature on their anesthetic management. VMs may be exacerbated by pregnancy which can lead to atypical and unexpected hemorrhage. These complications can occur during airway instrumentation, neuraxial placement [4] or during VD if there are genital VMs present.[5] Patients are also at risk for severe GI hemorrhage [6] as well as bleeding from abdominal wall lesions.[7] They often present with chronic iron

deficiency anemia and serial blood transfusions, putting them at risk for antibody formation and fetal isoimmunization. Given our patient's desire for neuraxial and VD, we pursued additional workup to assess risk for these complications. By using imaging, collaborative multi-disciplinary consultation and counseling prior to delivery, a safe neuraxial anesthesic was performed during this successful high-risk vaginal delivery.

References: 1. PMID: 25493043 2. PMID: 39355358 3. PMID: 26579613 4. PMID: 23762681 5. PMID: 17688627 6. PMID: 16052398 7. PMID: 27579096

SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 10

Balancing Maternal and Fetal Risk: Preterm Cesarean to Facilitate Neurosurgical Resection of a Giant Craniopharyngioma

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Presenting Author's Institution: Stanford - Palo Alto, California

Co-Authors: Pervez Sultan, MD - Stanford University School of Medicine

Introduction: While elective, nonobstetric surgeries may be delayed in pregnancy for a fetus to reach a later gestational age or occur post-delivery, neurosurgical intervention timing for symptomatic intracranial masses during pregnancy requires nuanced multidisciplinary decision-making for optimal maternal and fetal outcomes.1 We present the case of a patient with a giant suprasellar craniopharyngioma who underwent successful cesarean delivery (CD) prior to tumor resection.

Case One: A 31-year-old (G1P0) at 29 weeks gestation was transferred to neurosurgery for sudden darkening of vision in both eyes. In her second trimester, she had noted progressive fatigue, dry eyes, polydipsia, and memory loss. Her medical history included gestational diabetes and polycystic ovarian syndrome. Brain MRI showed a large multilobulated suprasellar mass (4.6 x 5.2 x 5.5 cm, Figure 1), concerning for craniopharyngioma with mass effect. Given the acute visual compromise and risk of permanent visual loss, an urgent multidisciplinary meeting was held with Obstetric Anesthesia, Maternal Fetal Medicine, Neurosurgery, Endocrinology, and Neonatal Intensive Care Unit (NICU) teams. Management options reviewed included: 1) high dose steroids and expectant management to term, 2) neurosurgical intervention with continuous fetal monitoring and possible emergent CD, or 3) planned preterm delivery followed by neurosurgery resection. Ultimately the team elected antenatal intravenous stress-dose steroids and a course of betamethasone, with CD under general anesthesia at 29+6 weeks, avoiding increased intracranial pressure. The decision to deliver prior to neurosurgery was due to anticipated surgical duration (8 hours) and surgical request for hypotension. A female neonate (1.423 kg) was delivered with 1 and 5 minute Apgar scores 4 and 7 and discharged from NICU at 7 weeks. Two days after CD, the patient underwent endoscopic craniopharyngioma resection and skull base reconstruction. Postoperatively, she had complete recovery of right visual loss and partial improvement of left visual loss. Adjuvant radiotherapy is planned for residual tumor along the optic chiasm within 6 months of initial surgery.

Case Two:

Discussion: This case highlights the importance of early symptom recognition in obstetric patients and multidisciplinary planning when urgent nonobstetric pathology threatens maternal and/or fetal outcomes. Bidirectional interactions between the hormonal changes of 1) pregnancy and 2) the craniopharyngioma further emphasize timely planning.2 Key considerations included timing of delivery versus immediate neurosurgery, perioperative steroid management given hypothalamic-pituitary axis involvement, fetal lung

maturation and NICU for a preterm infant, and staged neurosurgical and adjuvant radiotherapy to minimize permanent visual and endocrine morbidity. Teamwork and detailed perioperative care led to favorable maternal and neonatal outcomes.

References: 1. Am J Obstet Gynecol MFM. 2021;3(1):100256. 2. Eur J Endocrinol. 2010;162(3):453-475.

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SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 11

Through A Vascular Minefield - Cesarean Delivery Under Spinal Anesthesia

Presenting Author: Keerthana Jayabalan, MBBS, MD, DNB

Presenting Author's Institution: Junior Consultant, Apollo Hospitals Enterprises Limited - Namakkal, Tamil Nadu

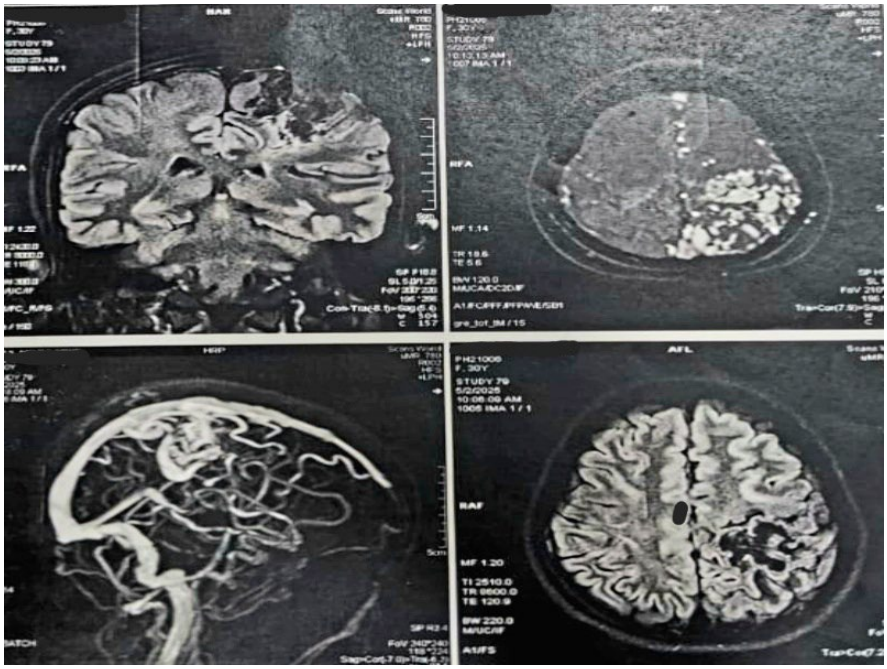
Introduction: Pregnancy-associated Cerebral AVMs pose formidable anaesthetic challenges, where haemodynamic instability can transform a stable lesion into a catastrophic haemorrhage. Anaesthetic management must therefore meticulously preserve cerebral perfusion, prevent hypertension and intracranial pressure elevation and be tailored to AVM stability while balancing maternal and fetal safety.

Case One: A 27-year-old parturient G2P1L1 with epilepsy and a known left frontoparietal arteriovenous malformation, scheduled for Elective Caesarean delivery at 37 weeks' gestation. She had seizures post previous LSCS and was diagnosed with Cerebral AVM. She was maintained on levetiracetam 500 mg twice daily without neurosurgical intervention. Later, She developed isolated Bell's palsy which resolved with physiotherapy.The current neurological assessment showed unruptured AVM with normal ICP; deemed safe to continue the present pregnancy. Standard monitoring was applied. To avoid haemodynamic surges associated with labour and general anaesthesia, Elective Caesarean section was performed under spinal anaesthesia using 12 mg hyperbaric bupivacaine with 25 µg fentanyl at L3–4. Systolic blood pressure was maintained between 110–125 mmHg. A healthy neonate was delivered (Apgar 9/9). The perioperative course and recovery were uneventful.

Case Two:

Discussion: Physiological changes of pregnancy, including increased blood volume and cardiac output, combined with haemodynamic surges during labour, laryngoscopy or surgical stimulation may increase transmural pressure across the AVM and precipitate bleeding. The mode of delivery and anaesthetic technique should therefore be individualised based on lesion stability, neurological status and obstetric factors. General anaesthesia carries the risk of sympathetic responses during airway manipulation whereas neuraxial anaesthesia avoids these responses. When performed with meticulous technique, spinal anaesthesia can provide continuous neurological assessment, stable haemodynamics and satisfactory surgical conditions. Avoidance of hypertensive uterotonics, continuation of antiepileptic therapy and close multidisciplinary coordination are essential.

References: 1.Robinson JL, Hall CS, Sedzimir CB. Subarachnoid hemorrhage in pregnancy. J Neurosurg. 1972;36(1):27–33 2.Stoodley MA, Macdonald RL, Weir BK. Pregnancy and intracranial vascular malformations. Neurosurg Clin N Am. 1998;9(3):549–556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SUN - CR - BS 4 - BR 2B - Neurovascular Challenges – 12

Pulmonary and Vertebral Arteriovenous Malformation in Pregnancy with Hereditary Hemorrhagic Telangiectasia: A Case Report

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Co-Authors: Sarah Shabot, MD, FASA - UTMB
Sara O. Syed - University of Texas Medical Branch Galveston

Introduction: Hereditary Hemorrhagic telangiectasia is an inherited vascular disorder characterized by fragile malformed vessels causing mucocutaneous, gastrointestinal, and visceral bleeding. Epistaxis is often the earliest manifestation, while arteriovenous malformations in the lungs, liver, brain, spine, or gastrointestinal tract typically present later as rupture leading to hemorrhage, stroke, seizures, epidural hematoma, or pulmonary hypertension [1]. Increased plasma volume and cardiac output during pregnancy may dilate these vessels and cause paradoxical embolism, cardiac decompensation, necessitating careful anesthetic planning to maintain hemodynamic stability and maternal–fetal safety.

Case One: A 29-year-old gravida 5 para 2 woman at 37 weeks' gestation presented for induction of labor due to decreased fetal movement. Her medical history was significant for ulcerative pancolitis with recurrent rectal bleeding requiring transfusions, chronic prednisone use, pulmonary arteriovenous malformation, hereditary hemorrhagic telangiectasia, chronic anemia, and mild asthma. She had no history of epistaxis, hemoptysis, or cutaneous telangiectasia. Chest Angiography at 29 weeks demonstrated a stable right lower lobe pulmonary arteriovenous malformation. Magnetic resonance imaging of brain and spine was done and revealed L3 L4 lumbar vertebral body hemangiomas. Echocardiography was normal. Given prior successful neuraxial analgesia and absence of hemangioma of spinal cord and meninges, labor epidural analgesia was planned after informed consent, including discussion of bleeding and epidural hematoma risk. Admission labs revealed microcytic anemia (hemoglobin 8.5 g/dL) with normal platelet count. An epidural catheter was placed uneventfully, and 0.2% Ropivacaine infusion at 10ml/hr provided effective analgesia without hemodynamic instability. She progressed to an uncomplicated vaginal delivery of a 3790 g infant with APGAR scores of 8 and 9. Estimated blood loss was 100 mL. The epidural catheter was removed postpartum without complication.

Case Two:

Discussion: Pregnancy in Hereditary Hemorrhagic Telangiectasia with pulmonary arteriovenous malformations requires multidisciplinary care, as physiologic hypervolemia and increased cardiac output may worsen right-to-left shunting and increase hemorrhage risk [2]. Even though chances of vertebral hemangioma rupture with central neuraxial block remains very low, the risk should be explained to the patient. Current guidelines do not mandate routine spinal imaging in asymptomatic patients, but recommend imaging to exclude cerebral and spinal hemangiomas before neuraxial procedures [3,4].

General anesthesia carries risks with pulmonary arteriovenous malformation due to possible hemodynamic stress and rupture, hypoxemia and paradoxical embolism [3]. This case demonstrates safe epidural analgesia following appropriate screening.

References: 1.Int J Womens Health 2017,9:373 2.Orphanet J Rare Dis 2020;15:5 3.Anaesth Rep 2023,11(1)e12227 4.Ann Intern Med 2020,173(12):989

SUN - CR - BS 4 - BR 3A - Elevated ICP – 01

Anesthetic Management of a Pregnant Patient with Elevated Intracranial Pressure

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Presenting Author's Institution: University of Nebraska Medical Center - Omaha, Nebraska

Introduction: Elevated intracranial pressure (ICP) during pregnancy is rare but associated with significant maternal and fetal risk. Physiologic changes of pregnancy, including increased blood volume, cardiac output, cerebral blood flow, and reduced plasma osmolality, may exacerbate intracranial hypertension, with risk particularly high during labor and delivery. Evidence guiding anesthetic management in this population is limited, and recommendations are largely extrapolated from neuroanesthesia literature. (1) Preservation of cerebral perfusion pressure and prevention of secondary brain injury are central anesthetic goals.

Case One: A 29-year-old G1P0 at 32 weeks gestation presented with subacute, progressively worsening headache. Medical history was notable for ankylosing spondylitis treated with adalimumab and a known thoracic mass of uncertain etiology that was being evaluated by neurosurgery and rheumatology. She experienced a seizure-like episode while undergoing advanced imaging, with acute altered mental status, a fixed non-reactive pupil, and papilledema, raising concern for critically elevated ICP. Lumbar puncture revealed an opening pressure of 50 cm H_2O without significant pleocytosis and with elevated protein and glucose. An external ventricular drain was placed with subsequent return to baseline neurologic status. Following extensive multidisciplinary discussion, a scheduled Cesarean delivery under general endotracheal anesthesia was performed (due to patient preference) at 34 weeks gestation. A pre-induction arterial line was placed. Rapid sequence induction was performed with rocuronium and total intravenous anesthesia was used for maintenance. The EVD remained open throughout the procedure, which the patient tolerated without complication. Neurocritical care staff was present intraoperatively and during post-anesthesia recovery. Postpartum management included a course of corticosteroids and ventriculoperitoneal shunt placement was performed on postoperative day 12 without complication. Currently, the patient remains neurologically stable on adalimumab and off corticosteroids for more than 6 months.

Case Two:

Discussion: Anesthetic management in patients with increased ICP is complex, rare, and current evidence on management is limited. Although neuraxial anesthesia is often preferred in obstetrics, elevated ICP, particularly in the setting of possible mass effect or impaired CSF dynamics, may increase the risk of cerebral herniation. General anesthesia may be required but necessitates meticulous control of hemodynamics and ventilation to minimize ICP fluctuations. (1) Individualized planning and multidisciplinary collaboration are essential, with maternal neurologic stability prioritized as the primary determinant of fetal outcome. (2)

References: 1. J Neurosurg Anesthesiol. 2025;37:150–155. 2. Int J Obstet Anesth. 2015;24:147–160.

SUN - CR - BS 4 - BR 3A - Elevated ICP – 02

Postpartum Reversible Cerebral Vasoconstriction Syndrome Concurrent with Pre-eclampsia After Cesarean Delivery: Balancing Conflicting Goals

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Presenting Author's Institution: University of British Columbia - Vancouver, British Columbia

Co-Authors: Helen Parker, Bm BS, BMedSci(Hons), FRCA, FRCPC - BC Women's Hospital, University of British Columbia

Introduction: Acute postpartum cerebrovascular syndromes are increasing with advanced maternal age and hypertensive disorders of pregnancy. Reversible cerebral vasoconstriction syndrome (RCVS) is an important cause of postpartum thunderclap headache with transient focal neurologic deficits, characterized by multifocal intracranial vasoconstriction with segmental arterial “beading” on angiographic imaging and risk of ischemic or hemorrhagic complications[1] [2]. RCVS must be rapidly distinguished from posterior reversible encephalopathy syndrome (PRES), which can present similarly but mandates prompt blood pressure (BP) reduction to limit vasogenic edema, whereas aggressive BP lowering during RCVS may compromise cerebral perfusion[1]. We report a postpartum case of RCVS that subsequently met criteria for pre-eclampsia, necessitating multidisciplinary management to balance cerebral perfusion against hypertensive emergency risk.

Case One: A 31-year-old G2P1 with an IVF pregnancy complicated by gestational hypertension (labetalol BID from 36 weeks) underwent cesarean delivery at 37+5 weeks. At ~24 hours postpartum, she developed sudden severe thunderclap headache followed by transient decreased level of consciousness and focal neurologic deficits (left-sided weakness with intermittent right facial droop/paraesthesia) with complete resolution within 1 hour. She remained normotensive. CTA ~90 min after symptom onset showed mild diffuse intracranial arterial “beading” consistent with RCVS, without hemorrhage or infarction. She continued to have recurrent thunderclap headaches with brief focal deficits; follow-up CTAs demonstrated dynamic vasospasm, including interval worsening with irregular narrowing of the posterior cerebral arteries and right ACA, followed by persistent findings with slight progression in ACA narrowing. On postpartum day 4, a markedly elevated protein-creatinine ratio confirmed pre-eclampsia. Labetalol was discontinued and, to treat RCVS and mitigate ischemic conversion, verapamil (40 mg TID) and low-dose aspirin were initiated with a permissive systolic BP target of 120-150 mmHg. Multimodal analgesia was used to control headache and minimize sympathetic BP surges. She was discharged on postpartum day 6 on verapamil with outpatient neurology follow-up.

Case Two:

Discussion: This case underscores the diagnostic and management implications of postpartum RCVS in the setting of hypertensive disease of pregnancy. Thunderclap headache with transient focal deficits and dynamic multifocal arterial narrowing on serial CTA supported the diagnosis and highlights the value of

early vascular imaging, as clinical symptoms may resolve despite ongoing vasospasm. The challenge was balancing competing hemodynamic goals; pre-eclampsia management prioritizes BP reduction to prevent end-organ injury and PRES, whereas excessive BP lowering during active RCVS may compromise cerebral perfusion in vasoconstricted territories.

References: 1. J Neurol 2023; 270:673 2. Int J Stroke 2023; 18:1151

SUN - CR - BS 4 - BR 3A - Elevated ICP – 03

Delivering Under Pressure: A Parturient with Intracranial Hemorrhage

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Presenting Author's Institution: Northwestern Memorial Hospital - Chicago, Illinois

Co-Authors: Samir Patel, MD - Northwestern Memorial Hospital

Introduction: Despite eclampsia being one of the most high-risk complications of pregnancy, there is little data on the parturient management of one of its most severe outcomes: acute intracranial hemorrhage (ICH). We present the management of a previously healthy 48yo G1P0 at 36w2d who was diagnosed with acute ICH and severely increased intracranial pressure (ICP), and required an emergent cesarean delivery.

Case One: The patient presented with vomiting and severe headache, then became unresponsive and started seizing. Seizures abated after repeated antiepileptics. Blood pressures during this time were severe-range and difficult to control despite treatment. A CT was positive for multicompartmental intracranial hemorrhages causing a 5mm midline shift, edema, and entrapment of the right lateral ventricle. Subsequent labs were consistent with DIC and evolving HELLP. After discussion with neurosurgery regarding ICP management strategies such as positioning, mannitol use, and hyperventilation, the patient was taken for an emergent cesarean. The patient was then admitted to the ICU for ICP monitoring and continued correction of her coagulopathy. Given ongoing concerns regarding ICP, she underwent an emergent hematoma evacuation and EVD placement. Post-operatively, the patient received supportive treatment for her DIC, HELLP, eclampsia, and hemorrhagic strokes c/b CSF flow obstruction. She was extubated on POD3, and discharged POD19 to an IRF.

Case Two:

Discussion: The cause of ICH during pregnancy can be multifactorial and range from cerebral aneurysms and trauma, to the stress of eclampsia competing with the goal of intracranial homeostasis.1 A recent study estimated the incidence of ICH as 7.18/100,000 pregnancies in the U.S. alone.2 However, because of the ethical considerations of such studies, a true guide on ICH, or even increased ICP management, of parturients, does not exist. First-line measures in non-pregnant patients with elevated ICP usually include hyperventilation, hypothermia, and the use of barbiturates or diuretics. However, given the changing physiology of pregnant patients and the possible ramifications to the fetus, the use of these methods to the degree used in non-pregnant patients is controversial and unstudied. Another critical decision point is determining the priority of delivery versus craniotomy in parturients who require neurosurgery. While several case studies suggest delivery as the initial goal for patients above 34 weeks gestation and neurosurgery for patients below 34 weeks, it is clear that a multidisciplinary discussion is consistently required.3 Given the above, it is vital that we continue to document similar cases and compare our current standards of care with our evidence of practice in order to create guidelines that can

lead us in weighing the risks and benefits of these competing interests.

References: 1.Godoy et al. Neurocrit Care (2022) 2.Meeks et al. JAMA Netw Open (2020) 3.Ji et al. Medicine(2023)

SUN - CR - BS 4 - BR 3A - Elevated ICP – 04

Anesthetic Management of Vaginal Delivery in a Pregnant Patient with Symptomatic Intracranial Meningioma

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Presenting Author's Institution: Renaissance School of Medicine, Stony Brook University - Old Westbury, New York

Co-Authors: Genevieve Monanian, n/a - Stony Brook University Hospital
Devon Patel - Stony Brook Medicine

Introduction: Intracranial meningiomas in pregnancy presents unique challenges for anesthetic management. Key considerations include the safety of neuraxial anesthesia, the safety of Valsalva during labor, and the optimal timing of delivery relative to surgical intervention. We present the anesthetic and obstetric management of a pregnant patient with a symptomatic intracranial meningioma who underwent vaginal delivery under epidural analgesia prior to postpartum tumor resection.

Case One: A 39-year-old G4P3003 at 34+6 weeks gestation presented with a several month history of left-sided vision loss described as painless loss of central vision that progressed to total left-sided vision loss. Magnetic resonance imaging (MRI) of the brain demonstrated an extra-axial mass centered along the central-to-left planum sphenoidal/tuberculum sellae region measuring approximately 2.2×1.9×1.3 cm. The lesion was consistent with a meningioma and caused compression with lateral displacement of the prechiasmatic left optic nerve and abutted the left ventral surface of the optic chiasm. No midline shift was appreciated. Neurologic symptoms were limited to progressive visual deficits. After multidisciplinary discussion among neurosurgery, maternal fetal medicine, and obstetric anesthesiology, the decision was made to proceed with induction of labor and delivery prior to neurosurgical intervention. Labor was induced at 35 weeks gestation, and the patient delivered vaginally under epidural analgesia. On postpartum day 5, the patient underwent left craniotomy for resection of the tuberculum sellae meningioma. Postoperative MRI demonstrated no evidence of residual tumor.

Case Two:

Discussion: This case highlights anesthetic, obstetric, and neurosurgical considerations in the management of a pregnant patient with a symptomatic intracranial meningioma, a tumor whose growth is significantly influenced by the hormones of pregnancy. In this patient, induction of labor with subsequent vaginal delivery under epidural analgesia was pursued prior to postpartum neurosurgical resection after thorough multidisciplinary discussion. Key points which led to the management plan for this patient were that her neurological deficits were both stable and focal in nature and that the intracranial lesion was characterized as having only localized mass effect with minimal risk of herniation in the event of inadvertent dural puncture during neuraxial anesthesia placement or with Valsalva during delivery. This case underscores the importance of individualized, imaging-based risk assessment and multidisciplinary

collaboration when considering neuraxial anesthesia and delivery planning in patients with intracranial pathology

References: 1. Cureus. 2025;17(11):e97564. doi:10.7759/cureus.97564 2. Anesthesiology. 2013;119(3):703-718. doi:10.1097/ALN.0b013e31829374c2 3. Surg Neurol Int. 2015;6:43. doi:10.4103/2152-7806.153845 4. BJA Educ. 2025;25(1):38-45. doi:10.1016/j.bjae.2024.09.003

SUN - CR - BS 4 - BR 3A - Elevated ICP – 05

When the Aqueduct Is Closed: Anesthetic Decision-Making for Cesarean Delivery in Non-Communicating Hydrocephalus

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Presenting Author's Institution: University of Toronto - Toronto, Ontario

Co-Authors: Ronald B. George, MD, FRCPC - Mount Sinai Hospital, University of Toronto
Fernanda SL Oliveira, MD - University of Toronto

Introduction: Neuraxial anesthesia is the preferred technique for cesarean delivery. However, its use in patients with obstructive hydrocephalus remains controversial. Aqueductal stenosis disrupts cerebrospinal fluid (CSF) flow between the third and fourth ventricles, raising concern for pressure gradients and neurological complications following dural puncture or epidural volume expansion. Identification of a continuous CSF pathway is therefore central to assessing neuraxial safety.

Case One: A 39-year-old gravida 3 para 1 at 39+6 weeks gestation with compensated triventricular hydrocephalus due to aqueductal stenosis presented for elective repeat cesarean delivery. The diagnosis had been incidentally identified on MRI during evaluation of unilateral ptosis and had remained radiographically and clinically stable for several years without CSF diversion. The patient had been clinically asymptomatic since the diagnosis was established. During her prior pregnancy, neuraxial anesthesia was avoided due to concern for intracranial pressure (ICP) shifts, and cesarean delivery was performed under general anesthesia with suboptimal postoperative pain control. Given the absence of interval disease progression and persistent uncertainty regarding neuraxial safety in a non-communicating CSF system, general anesthesia was again felt to be safest. To optimize postoperative analgesia and minimize opioid exposure, bilateral ultrasound-guided quadratus lumborum (QL) blocks were performed. The intraoperative course was uneventful. Postoperatively, pain control was satisfactory with multimodal analgesia, and no neurological complications were observed.

Case Two:

Discussion: In parturients with hydrocephalus, the presence or absence of a connected CSF pathway, —rather than ventricular size or clinical compensation alone, may be the critical determinant of neuraxial anesthetic safety. Aqueductal stenosis represents a non-communicating system in which neuraxial-induced CSF shifts could theoretically produce harmful intracranial pressure gradients. When CSF connectivity cannot be confirmed, general anesthesia combined with multimodal and regional analgesic techniques offers a prudent alternative. Careful neuroradiologic assessment of CSF pathways should be central to anesthetic decision-making.

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Reg Anesth Pain Med. 2015;40(6):762–768.

SUN - CR - BS 4 - BR 3A - Elevated ICP – 06

Mind Blowing Connections: A Case Report On The Management Of A Ruptured Arteriovenous Malformation During Pregnancy

Presenting Author: Andrea Monica L. Lee, MD, MBA

Presenting Author's Institution: Chinese General Hospital and Medical Center - Manila, National Capital Region

Introduction: Arteriovenous malformation (AVM) is a vascular abnormality composed of tangled blood vessels connecting arterial and venous circulation with no intervening capillary bed. This has a high risk of bleeding leading to massive neurological damage especially when found in the brain. The cause of this vascular lesion is unknown, with an estimated prevalence of less than 0.01% of the population and the incidence of hemorrhage is 0.5 per 100,000 population. Coexistence of a cerebral AVM and pregnancy is a complex situation requiring a multidisciplinary approach to address the dilemmas with regards to treatment, taking into consideration both fetus and the mother.

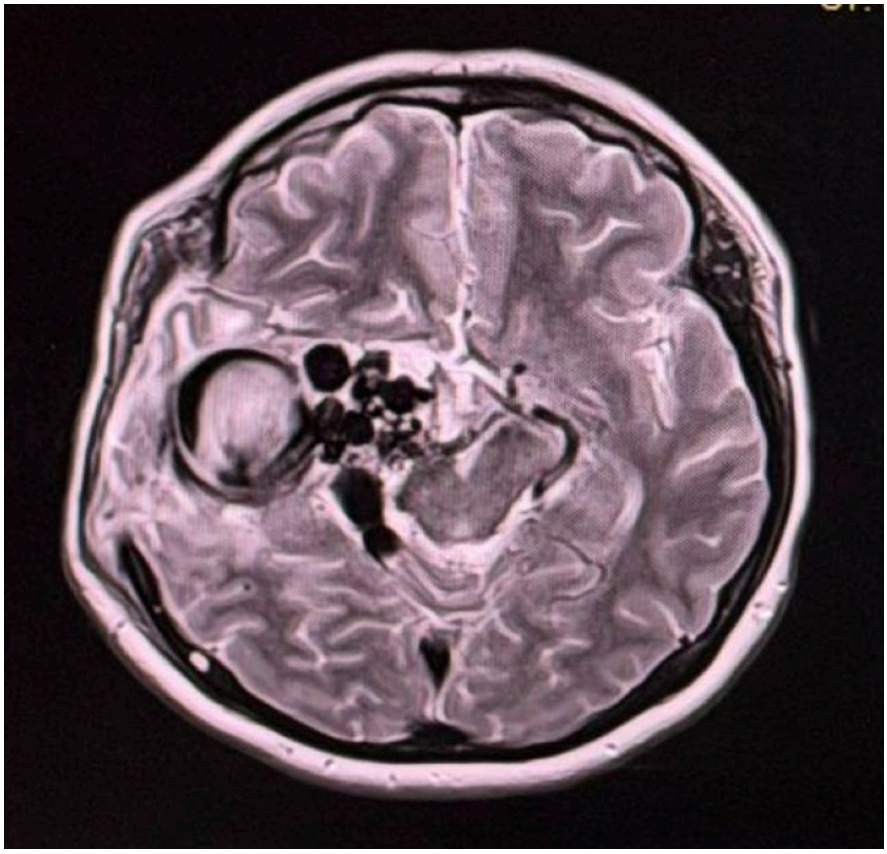
Case One: A 40 year old G2P1 woman presented at the ER at 27 weeks age of gestation (AOG) due to sudden onset left sided weakness. She had a four day history of headache, vomiting, and elevated blood pressure, and was seen drowsy with neurological symptoms. Work up done showed a large intraparenchymal hemorrhage secondary to a ruptured AVM. Emergency decompressive craniotomy was done in hopes to stabilize the patient and maintain pregnancy. The procedure and postoperative course was uneventful, and at 36 weeks and 6 days AOG, a cesarean section was performed under spinal anesthesia resulting in the delivery of a 2,330g infant with APGAR score 8, 9. The mother was then discharged and advised definitive management.

Case Two:

Discussion: Cerebral AVMs are rare, and cerebral hemorrhage in pregnancy mostly occurred between 20 weeks AOG and 6 weeks postpartum coinciding with maternal hemodynamic and hormonal changes. Cerebral hemorrhage during pregnancy is associated with a 28% maternal mortality and 14% fetal death rate. Currently, there are no guidelines available to support the ideal timing and kind of treatment for cerebral AVMs. However, in those presenting with neurosurgical emergencies such as in this case, urgent intervention is warranted regardless of gestational age and a multidisciplinary approach is recommended to provide the best possible outcome. In those presenting at >24 weeks AOG, cesarean delivery may be done followed by neurosurgery, or neurosurgery can be done to maintain pregnancy. Whatever the choice, anesthetic management needs to balance both maternal and fetal physiology. This includes (1) maintenance of cardiovascular stability in order to provide adequate cerebral perfusion pressure in the mother, and to avoid intrauterine fetal asphyxia, (2) maintaining $PaCO_2$ between 25 and 30mmHg to decrease ICP while taking into consideration the maternal respiratory alkalosis in pregnancy (3) judicious use of mannitol and fluids to prevent increased ICP as well as preventing fetal dehydration

and blood volume contraction, (4) careful choice of medications taking into consideration the needs of the mother and possible effects on the fetus, and (5) keeping in mind the physiologic changes in pregnancy that are at play.

References: Prabhakar (2017) Essentials of Neuroanesthesia World Neurosurgery, Volume 177, 2023, Pages 100-108



SUN - CR - BS 4 - BR 3A - Elevated ICP – 07

Increased ICP in the Parturient with Alport Syndrome

Presenting Author: Brannon Broussard, MD

Presenting Author's Institution: LSUHSC New Orleans - New Orleans, Louisiana

Co-Authors: Jakayla Harrell-Mohamed, MD - Touro

Introduction: Elevated Intracranial Pressure (ICP), pressure >20mmHg, is pathological in pregnancy. Anesthesia in parturients with intracranial pathology requires careful consideration as peripartum pathology, labor, neuraxial, and GETA can acutely increase ICP with cerebral perfusion maintenance, oxygenation, and cerebral herniation prevention as key management goals (1). Multidisciplinary planning is essential in identification of etiology and disease progression affecting anesthetic management and delivery mode. We present a case of symptomatic elevated ICP, Alport Syndrome, and development of superimposed Pre-eclampsia.

Case One: Our patient is a 27yo G7P2 at 30w1d with hx of c/s x 1, anemia, cHTN, Alport Syndrome, CKD3, and elevated ICP and papilladema (suspected idiopathic and empty sella syndrome) unrelieved by at least 2 LPs. Pt presented with worsening renal function (GFR 21 from 80 pre-pregnancy) for surgical optimization and BMZ for fetal lung maturity. Other symptoms were headaches and visual changes despite acetazolamide. On hospital day 1 pt developed superimposed Pre-E. Multidisciplinary discussion occurred between nephrology, MFM, OB anesthesia, neurology, cardiology, and NICU for delivery planning. Emergent HD deferred until post-delivery with decision to proceed with delivery after BMZ, 0.5 mg magnesium sulfate for fetal neuroprotection, 2U prbc transfusion for Hgb of 8, and 80mg IV furosemide. Given the history of persistently elevated ICP despite multiple lumbar punctures, neuraxial deemed contraindicated, and GETA for c/s determined on hospital day 3. A pre-op arterial line was placed along with two large bore PIVs prior to induction with propofol and rocuronium. BP management carefully done to balance organ perfusion; esmolol 10mg and labetalol 20mg given with goal SBP less than 160. A TAP block was done prior to extubation for pain control and smooth emergence. She was taken to ICU post-op. QBL was1290mL,1100 mL IVF given, and UOP was 80mL during the procedure and 180mL overnight. She was stepped down to the floor POD2 with euvolemia, resolved headache, and stable BP. Pt was discharged on POD5 requiring HD at 2mos post-op

Case Two:

Discussion: Among causes of elevated ICP in ambulatory patients, IIH is the most common with incidence of 22/100,000 (2); Typically, in patients with IIH dural puncture would be therapeutic which is inconsistent with our case findings necessitating use of GETA to reduce herniation risk. Pre-E contributes to ICP elevation and further complicated our management (1). GETA can be a safe option for patients who benefit from urgent delivery with hopes to definitively decrease ICP, though careful planning should be performed considering airway assessment profile, induction needs, maintenance of anesthesia, and

extubation (3)

References: 1. Warrick C, et al. Neuraxial anaesthesia for the parturient with intracranial pathology. 2025 2. Kilgore KP et al. Re-evaluating the Incidence of Idiopathic Intracranial Hypertension. 2017 3. Delaney AG. Clin Obstet Gynecol 1983

SUN - CR - BS 4 - BR 3A - Elevated ICP – 08

Posterior Reversible Encephalopathy Syndrome in the Setting of Preeclampsia, Substance Use, and Peripartum Cardiomyopathy Following Cesarean Delivery

Presenting Author: Reshu Chandra, MD Candidate

Presenting Author's Institution: UAB Heersink School of Medicine - Tuscaloosa, Alabama

Co-Authors: Xiao Lu Zhang, DO, PhD - University of Alabama at Birmingham

Introduction: Posterior reversible encephalopathy syndrome (PRES) is a rare neurologic condition characterized by headache, visual disturbances, seizures, and characteristic posterior white matter changes on neuroimaging. It is most commonly associated with hypertensive disorders of pregnancy and can result in serious neurologic complications. These patients present unique perioperative challenges related to blood pressure control, neurologic status, and cardiac reserve. Awareness and prompt recognition are critical to reduce morbidity, particularly in patients undergoing cesarean delivery with additional anesthetic and hemodynamic risk factors.

Case One: A 29-year-old woman, G1P1001, at 27 weeks' gestation with a history of substance use, hypertension, and hepatitis C presented with headache, elevated blood pressure, and visual disturbances. Urine drug screen was positive for amphetamines. Initial evaluation at an outside hospital raised concern for severe preeclampsia. On transfer, neurologic imaging after a code stroke demonstrated findings consistent with PRES on MRI, and ophthalmology ruled out intraocular causes. Blood pressure was labile, requiring multiple antihypertensives including clevidipine. During placement of an epidural for labor analgesia, she developed acute hypotension with subsequent fetal bradycardia unresponsive to treatment, prompting a stat cesarean delivery. She required multiple vasopressors intraoperatively and was admitted to the SICU for close hemodynamic monitoring. Postoperatively, neurological symptoms improved, but she was found to have peripartum cardiomyopathy with an ejection fraction of 30–35%.

Case Two:

Discussion: This case illustrates the complex interaction between PRES, substance use, preeclampsia, and peripartum cardiomyopathy in the perioperative period. PRES is a rare complication, often associated with preeclampsia/eclampsia in pregnancy, but literature describing anesthetic management in patients with concurrent cardiomyopathy and substance use is limited. Current guidelines emphasize early recognition, blood pressure control, and neurologic monitoring.1 However, reports on optimal anesthetic strategies and multidisciplinary coordination in such high-risk patients remain sparse. Our patient's acute hypotension during epidural placement and subsequent need for ICU-level care highlight the challenges of balancing maternal hemodynamics with fetal safety.2 This case underscores the importance of individualized anesthetic planning, early multidisciplinary involvement, and vigilant perioperative

monitoring in postpartum patients with overlapping neurologic and cardiac comorbidities.

References: 1. Lancet Neurol 2025;24:789–800 2. Cureus 2022;14:e23659

PRES.pdf

SUN - CR - BS 4 - BR 3A - Elevated ICP – 09

Neuraxial Anesthesia for Cesarean Delivery in a Parturient with New-Onset Seizure and Intracranial Meningioma

Presenting Author: Isabella E. Valente, MD

Presenting Author's Institution: UNC Hospitals - Chapel Hill, North Carolina

Co-Authors: Sonam Shah, BSPH - UNC School of Medicine

Introduction: New onset seizure during pregnancy is often attributed to a diagnosis of eclampsia; however, alternative etiologies must also be considered. Anesthetic planning for the parturient with intracranial pathology remains complex, ideally involving a multidisciplinary approach.

Case One: A 37-year-old G3P2002 woman at 34 weeks and 2 days gestation presented to the emergency department after a witnessed generalized seizure at home lasting approximately one minute. Her medical history was notable for preeclampsia in her first pregnancy. On presentation, she had severe-range blood pressure with systolic pressures in the 170s with mildly elevated liver function tests (less than twice the normal range). Eclampsia is the most common cause of new- onset seizures in pregnancy. The differential diagnosis includes other serious neurologic conditions; therefore, emergent imaging was completed with a computed tomography without contrast of the head revealed a 40-mm mass involving the left middle and anterior cranial fossae. Subsequent magnetic resonance imaging suggested that the lesion was consistent with a meningioma. Magnesium sulfate was initiated, and the patient was transferred to labor and delivery for obstetric management and delivery planning. She was not given any additional anti-seizure medications at admission. Considering her gestational age and history of one prior cesarean delivery (CD), the obstetricians and the patient together decided on a repeat cesarean delivery on the day of admission. Obstetric and anesthesia care planning involved collaboration among obstetric anesthesia, obstetrics, neurology, and neurosurgery. CT imaging indicated no midline shift, and there were no physical examination findings suggestive of elevated intracranial pressure; however, the MRI demonstrated concern for regional mass effect with parenchymal edema, raising concerns regarding the appropriate approach for her anesthetic plan. After shared decision-making with the patient and the consulting teams, a single-shot spinal anesthetic was selected. CD proceeded uneventfully without neurologic or anesthetic complications. Magnesium infusion was continued for 24 hours postoperatively, and the patient had an otherwise uncomplicated postoperative course and was discharged home on postoperative day four with outpatient neurosurgical follow-up to discuss definitive management of the intracranial mass. She was discharged on levetiracetam 750 mg BID for seizure prophylaxis in the setting of her newly diagnosed meningioma, and she has since had resection of the mass.

Case Two:

Discussion: The risk of brain herniation associated with dural puncture must be carefully weighed

against the potential for increased intracranial pressure related to general anesthesia. The ability to balance these risks and clearly discuss available options with the patient is an essential skill for the anesthesiologist

References: 1. Neuraxial Anesthesia in Parturients with Intracranial Pathology: A Comprehensive Review and Reassessment of Risk

SUN - CR - BS 4 - BR 3A - Elevated ICP – 10

POST-DURAL PUNCTURE HEADACHE COMPLICATED BY INTRACRANIAL HEMORRHAGE: CASE REPORT

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María Camila MAYA SALAZAR - Resident Clínica Universitaria Colombia
Laura V. Segura Bocanegra - Medical Doctor Clinica Universitaria Colombia

Introduction: Post-dural puncture headache (PDPH) is a recognized complication of neuraxial obstetric analgesia; however, in a rare subgroup it may precede major neurological events, including subdural hematoma (1). The initial presentation may resemble typical PDPH and later evolve into persistent, non-orthostatic headache and/or neurological deterioration (3). We report an unusual puerperal case of subdural and intraparenchymal hemorrhage, emphasizing the need to broaden the differential diagnosis when postpartum headache does not follow the expected course.

Case One: A 38-year-old woman, ASA II, G2P1V1, was admitted to our labor and delivery unit in active labor. Epidural analgesia was requested; an accidental dural puncture occurred with a Tuohy 18G needle. The needle was removed, and the technique was repeated at another interspace. She subsequently had an instrument-assisted delivery without complications. At 24 hours, follow-up revealed no evidence of PDPH, and she was discharged with recommendations. Two days later she re-presented with holocranial headache, predominantly occipital, rated VAS 8/10, with an orthostatic pattern and cervical radiation. Multimodal management was initiated; magnetic resonance imaging and venography were within normal limits. Seventy-two hours later, an epidural blood patch was performed with 20 ml of autologous blood, resulting in partial pain relief (VAS 3/10). Overnight she developed confusion. Non-contrast head CT revealed a left parietal intraparenchymal hematoma (34.5 × 35.1mm) with perilesional edema and a 9.5mm midline shift. Angio-MRI demonstrated a 22cc lesion, consistent with an acute hemorrhagic venous infarct, associated with an ipsilateral laminar subdural hematoma (8mm) and diffuse pachymeningeal enhancement. Neurological examination showed Glasgow 14/15, disorientation, fluent aphasia with paraphasias, and homonymous hemianopsia. She was transferred to the ICU for medical management and monitoring. Her clinical course remained stationary with digital agnosia and acalculia. Three days later follow-up CT demonstrated a stable parieto-occipital intraparenchymal hematoma and a left laminar subdural hematoma with slight reduction. Fourteen days after the event, the patient improved; she continued to exhibit retrograde amnesia and persistent acalculia, without impairment of other major executive functions, and was discharged.

Case Two:

Discussion: Subdural hematoma following labor epidural analgesia is rare. Available series suggest an increased risk when a dural puncture is recognized, and many patients report PDPH-like symptoms prior to diagnosis (3,4). This case highlights that deviations from the expected PDPH pattern—such as persistence, loss of orthostatic features, or new neurological signs—should prompt urgent reassessment and repeat neuroimaging in postpartum headache.

References: 1. Can J Anaesth 2025;72:1163 2. Br J Anaesth 2001;86:720 3. Pain Pract 2021;21:83 4. Reg Anesth Pain Med 2016;41:628 5. Anaesth Intensive Care 2001;29:51

Images Case report.pdf

SUN - CR - BS 4 - BR 3A - Elevated ICP – 11

Peri-Cesarean Seizure in a High-Risk Parturient: An Anesthesia Case Study

Presenting Author: Alice Coombs, MD

Presenting Author's Institution: VCU Health - Richmond, Virginia

Co-Authors: Benjamin Andre, MD - VCU Health
Luke Johnson - VCU Health

Introduction: Acute neurologic deterioration in the peri-cesarean period requires rapid differentiation among eclampsia, local anesthetic systemic toxicity (LAST), and posterior reversible encephalopathy syndrome (PRES). Though these conditions have overlapping features, there are unique features of each and it is imperative to recognize them as these conditions require distinct and time-sensitive interventions.

Case One: A 31-year-old G1P0 at 32w5d gestation underwent cesarean delivery for triplet gestation under neuraxial anesthesia for pre-eclampsia with severe features. Within minutes of delivery, the patient developed acute vision loss and was unable to track finger movement across her visual field. She then exhibited tonic–clonic seizure activity lasting 1 minute. She was normotensive prior to seizure onset; a radial arterial line was placed in the immediate postictal period showing systolic blood pressures in the high 140s. As 1 mg midazolam and 6 g magnesium were being administered, the seizure resolved spontaneously. Her preoperative magnesium infusion running at 2g/hr was continued intraoperatively. Airway support with oral airway and positive-pressure ventilation was provided. She experienced a prolonged postictal period with reactive but disconjugate pupils. Emergent non contrast head CT was considered to evaluate for intracranial pathology; however, the patient slowly became more alert near the end of the case–thus, this was deferred to allow neurology to evaluate. On neurology's exam, no focal deficits were present though lower-extremity exam was limited by neuraxial block. When the patient arrived back in her labor room from the OR, she was AOx4.

Case Two:

Discussion: Peri-cesarean seizure-like activity presents diagnostic challenges. Eclampsia was strongly considered given her pre-eclampsia with severe features; however, continued intraoperative magnesium therapy and prominent visual symptoms made this presentation atypical. Eclamptic seizures may be due to blood–brain barrier disruption; while magnesium reduces neuronal excitability via NMDA antagonism, breakthrough seizures may still occur. Visual disturbance is classically associated with PRES as it impacts the occipital lobes. This was also considered given transient hypertension and symptom profile, though confirmatory MRI was not pursued due to rapid clinical resolution. LAST was considered given neuraxial local anesthetic exposure but was deemed less likely due to dosing within recommended limits, absence of prodromal symptoms, lack of cardiovascular instability, and spontaneous seizure resolution without lipid therapy.

References: Gestational Hypertension and Preeclampsia: ACOG Practice Bulletin, Number 222. Obstet Gynecol. 2020;135(6):e237-e260. doi:10.1097/AOG.0000000000003891 American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics. ACOG Practice Bulletin No. 209: Obstetric Analgesia and Anesthesia. Obstet Gynecol. 2019;133(3):e208-e225. doi:10.1097/AOG.0000000000003132

SUN - CR - BS 4 - BR 3A - Elevated ICP – 12

Diagnostic Challenges of Postpartum Headache after Neuraxial Analgesia in a Parturient with a Reported History of Idiopathic Intracranial Hypertension

Presenting Author: Nicolas Ferry, MD

Presenting Author's Institution: Temple University Hospital - Gloucester City, Pennsylvania

Introduction: Background Postpartum headache is common and may reflect benign etiologies such as post–dural puncture headache (PDPH), but can also signal serious intracranial pathology. Patients with obesity, hypertensive disorders of pregnancy, or reported intracranial disease present diagnostic challenges in whom premature attribution to PDPH may delay recognition of life-threatening complications.

Case One: Case description We present a case of a 24-year-old gravida 3 para 2 woman with class III obesity, preeclampsia without severe features, and a reported history of idiopathic intracranial hypertension (IIH) who presented for induction of labor at 37+4 weeks. She experienced intermittent headaches antepartum despite acetazolamide therapy. Labor epidural analgesia was placed without recognized dural puncture. On postpartum day (PPD) 0, she developed a severe headache initially described as positional, radiating to the neck and occiput. Conservative management, including rest, intravenous fluids, acetaminophen, and caffeine, provided minimal relief. As headache characteristics evolved and concern for preeclampsia with severe features increased, magnesium sulfate was initiated postpartum but later discontinued when blood pressures and laboratory values remained stable. While conservative measures were trialed, the headache progressed and was no longer positional. On repeat anesthesia evaluation, the likelihood of PDPH was felt to be low, and an epidural blood patch was not offered. Given minimal relief and atypical features, the patient underwent neuroimaging, including non-contrast head CT, CT venography, and brain MRI with T2/FLAIR sequences. Imaging demonstrated an occipital intraparenchymal hemorrhage, cerebral venous sinus thrombosis (CVST) involving the left transverse sinus with nonocclusive right transverse sinus involvement, and parieto-occipital changes consistent with posterior reversible encephalopathy syndrome (PRES). On PPD2, she experienced a generalized tonic–clonic seizure and was started on anticonvulsant therapy and therapeutic anticoagulation. Her headache gradually improved, and she was discharged on PPD10 with outpatient neurology follow-up.

Case Two:

Discussion: Discussion Postpartum headache requires a broad differential diagnosis, particularly after neuraxial analgesia. Although PDPH is common, lack of improvement or evolving features should prompt early imaging to evaluate for CVST, PRES, reversible cerebral vasoconstriction syndrome, or intracranial hemorrhage. This case highlights the diagnostic complexity introduced by reported preexisting intracranial disease and overlapping postpartum neurologic syndromes. Early multidisciplinary involvement and

reassessment of initial diagnostic assumptions are critical to timely diagnosis and optimized maternal outcomes.

References: n/a

PP Headache Figure 1.pdf

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 01

Anesthetic Management of Cesarean Delivery in a Parturient with Congenital Long QT Syndrome and an Implantable Cardioverter-Defibrillator

Presenting Author: Nicolas Ferry, MD

Presenting Author's Institution: Temple University Hospital - Gloucester City, Pennsylvania

Introduction: Background: Congenital long QT syndrome (LQTS) is a rare cardiac channelopathy associated with malignant ventricular arrhythmias and sudden cardiac death. Pregnancy and delivery increase arrhythmic risk due to sympathetic surges, electrolyte shifts, and exposure to QT-prolonging anesthetic medications. Early obstetric anesthesia involvement is critical to reduce these risks and develop a safe, individualized plan.

Case One: Case Description: We present the case of a 42-year-old G3P1 with congenital LQTS and a history of ventricular fibrillation cardiac arrest requiring ICD implantation. She was referred for obstetric anesthesia consultation at 30 weeks gestation to establish a delivery plan. Although prescribed beta-blocker therapy, she reported intermittent adherence due to poor tolerance. During consultation, she expressed concerns about pain management, which were incorporated into the plan. A recent ECG showed a QTc of 434 ms. Given a prior history of cesarean delivery (CD), the patient elected for repeat CD. Preoperative preparation included electrolyte optimization and ICD interrogation with magnet placement to disable tachyarrhythmia therapies. Neuraxial anesthesia was recommended to minimize sympathetic stimulation, with avoidance of epinephrine additives. Intraoperative planning emphasized avoidance of QT-prolonging medications such as ondansetron and ephedrine (using phenylephrine instead), continuous ECG monitoring, and readiness for arrhythmia management. The patient is currently 37w3d pregnant and the outcome will be discussed if the case is chosen for presentation.

Case Two:

Discussion: Discussion: This case demonstrates the value of antepartum anesthesia consultation in patients with LQTS, allowing key anesthetic decisions to be made before the physiologic stress of delivery. In the setting of limited beta-blocker adherence, minimizing sympathetic stimulation is particularly important. Avoidance of epinephrine in neuraxial medications, careful selection of vasoactive and antiemetic agents, and vigilant monitoring are key considerations. Proactive antepartum planning and tailored neuraxial approaches may reduce arrhythmic risk and improve safety in parturients with LQTS and ICDs, in whom perioperative sympathetic surges and device management add additional complexity, while respecting patient autonomy in pain management decisions.

References: n/a

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 02

WOLF-PARKINSON-WHITE SYNDROME AND A SCHEDULED CESAREAN DELIVERY IN A PREGNANT PATIENT

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Presenting Author's Institution: Maimonides Medical Center - brooklyn, New York

Introduction: WPW syndrome is a congenital abnormality with accessory conduction pathways that bypass AV node and cause symptomatic, life threatening arrythmias. General prevalence is 1 to 3 per 1000 [1]. ECG shows a short PR interval, prolonged QRS with an initial slurring upstroke (delta wave) and sinus rhythm. Symptoms include tachycardia with palpitations, pre-syncope, syncope and in severe cases even a cardiac arrest.

Case One: Our patient is a 35 year old female with WPW syndrome, diagnosed during childhood, presented for a scheduled CS at 39 weeks. During this pregnancy patient had mild exertional dyspnea and fatigue with moderate to severe activities. Echocardiogram showed EF of 55% with stage 1 diastolic dysfunction, mild left ventricular hypertrophy and mild mitral regurgitation. Cardiologist recommended antihypertensive therapy and low salt diet. Her last tachycardic episode was 4 months ago and resolved spontaneously. On the day of surgery , we consulted inpatient cardiology team and prepared as follows: If patient were to develop a narrow complex SVT, treat with adenosine 6 mg followed by 12mg. If no response, verapamil or metoprolol 5 mg IV push can be used. For wide complex tachycardia, procainamide loading dose of 20 to 50 mg/minute to a maximum dose being 1.5 g. Procainamide was also the first line for A-fib with wide complexes. Any hemodynamic compromise, plan was to use synchronized cardioversion under sedation. Pre-operatively, patient was prehydrated and standard ASA monitors applied in the OR. Vital Signs: BP 117/86, HR 86, SpO2 99%. Spinal anesthesia was performed with hyperbaric bupivacaine 1.1 ml with 15mcg fentanyl and 0.1mg preservative free morphine. Patient was started on phenylephrine infusion at 0.2mcg/kg/min. Patient had an uneventful cesarean section followed by uneventful postop recovery. Eventual plan as per cardiology was for the patient to follow up with EP upon discharge.

Case Two:

Discussion: Cardiac arrhythmias occur at greater frequency during pregnancy. Pregnancy predisposes asymptomatic patients with pre-excitation to tachyarrhythmias. Triggering factors are high plasma catecholamine concentrations, increased adrenergic receptor sensitivity and high EDV. Factors to avoid intra-op are pain, anxiety and hypovolemia. Neuraxial anesthesia is a safer choice- it reduces the sympathetic activity, provides adequate pain control including excellent post-op analgesia. Fluid preload and left uterine tilt to avoid aorto-caval compression is advised. Phenylephrine infusion is used to treat hypotension. It increases vagal tone by stimulating baroreceptor reflexes and therefore reduces the incidence of SVTs.

References: 1) NIH: WPW syndrome Lovely Chhabra;Amandeep Goyal;Micheal D Benham 2) Tan HL, Lie KI. Tachyarrhythmias during pregnancy and lactation. Eur Heart J. 2001; 22: 458-464. 3) Robins K, Lyons G. SVT in pregnancy. Br J Anaesth. 2004; 92: 140-143. 4) Bengali R, Wellens HJ, Jiang Y. Peri-op management of the WPW syndrome. J Cardiothorac Vasc Anesth. 2014; 28: 1375-1386.

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 03

Balancing Risk and Benefit: Dexmedetomidine for a pregnant patient with refractory tachyarrhythmia.

Presenting Author: REDA HAFIANE

Presenting Author's Institution: University Of Ottawa - OTTAWA, Ontario

Co-Authors: ELIO BELFIORE - University Of Ottawa
MARTA BERRIO - University Of Ottawa

Introduction: Refractory tachyarrhythmias present significant challenges during pregnancy and delivery. Anesthetic management requires careful consideration of maintaining hemodynamic stability and preventing arrhythmias. The following case demonstrates the successful use of dexmedetomidine in the management of a parturient with severe tachyarrhythmia and reduced left ventricle ejection fraction (LVEF).

Case One: After obtaining consent, we present the case of a 33 yo parturient with genetically confirmed hypertrophic cardiomyopathy and a history of recurrent flutter and atrial fibrillation despite multiple ablations. At 26 weeks gestation, she presented with tachyarrhythmia refractory to bisoprolol and diltiazem requiring a 9 day admission to Cardiac ICU (CICU). She was stabilized with propranolol, digoxin and tinzaparin. Echocardiography at the time revealed global hypokinesia with a progressive deterioration in LVEF: from 48% to 43% in one month. She also had mild right ventricular dysfunction without significant valvular disease. Given the overall worsening of her cardiac status, a multidisciplinary conference was organized including cardiology, obstetrics, neonatology and anesthesiology: a cesarean section was planned for 36 weeks. At 35 weeks + 4 days, the surgery was performed under combined spinal epidural with comprehensive monitoring including 5 lead ECG, arterial line and defibrillator pads. Her initial heart rate was 150 bpm with blood pressure at 124/75 mmHg. We administered an infusion of Dexmedetomidine at 0.2 mcg/kg/h throughout the procedure. Spinal anesthesia consisted of 3.25 mg hyperbaric bupivacaine with 15 mcg fentanyl and 100 mcg morphine. Epidural lidocaine 2% with epinephrine was administered incrementally. The patient’s Heart Rate decreased to 110 bpm, with mild hypotension managed by norepinephrine infusion at 4 mcg/min. Estimated blood loss was 500 mL and we used 50 mcg Carbetocin. The patient remained stable and was able to bond with her newborn, who received Apgar 9/9. The postoperative course was uneventful with discharge on day 5. Follow-up showed an improved LVEF to 49%.

Case Two:

Discussion: Dexmedetomidine was felt to be a particularly useful drug in our case. A selective alpha 2 agonist, it caused sympatholysis reducing the parturient’s tachycardia and with its anxiolytic properties without respiratory depression, it helped maintain full cooperation during neuraxial placement while reducing catecholamine surge (1). The arrhythmia protective effects (2) played a key role given her

refractory tachyarrhythmia history, and unlike previous sedatives, dexmedetomidine permitted an early bonding between the mother and her newborn without causing any hemodynamic disruption. The combination of regional anesthesia with dexmedetomidine prevented the risks related to general anesthesia while providing optimal conditions for safe delivery. A multidisciplinary approach to such cases remains crucial.

References: 1) Int J Obstet Anesth 2025;62:104345. 2) PLoS One 2018;13:e0193303.

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 04

Neuraxial Anesthesia for Cesarean Delivery in a Patient with Brugada Syndrome: A Case Report and Systematic Review

Presenting Author: Andrew Woodman, MD, PhD

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Co-Authors: Marla Kiess, MD, FRCPC - Division of Cardiology, University of British Columbia
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Introduction: Brugada syndrome is an inherited cardiac sodium-channel disorder associated with malignant ventricular arrhythmias and sudden cardiac death.1 Neuraxial anesthetic choice for cesarean delivery is challenging because bupivacaine, commonly used for spinal anesthesia, has been implicated as potentially arrhythmogenic and is listed as a drug to avoid on brugadadrugs.org, although supporting evidence is sparse and largely extrapolated from non-obstetric case reports. We describe the use of a lidocaine-based CSE technique for cesarean delivery in a patient with Brugada syndrome and present a systematic review of neuraxial anesthesia and reported outcomes in obstetric patients diagnosed with Brugada syndrome. Written consent for publication was obtained from the patient.

Case One: A 22-year-old G2P1 with a BMI 53.3, gestational hypertension, type 2 diabetes mellitus, and a confirmed SCN5A variant consistent with Brugada syndrome presented for elective repeat cesarean delivery. Her prior cesarean delivery had been performed under spinal bupivacaine before her diagnosis; which was later established during investigation of neonatal seizures. The patient expressed a strong preference for neuraxial anesthesia. After discussion with electrophysiology, bupivacaine was avoided because of potential arrhythmic risk. A CSE technique was selected. Spinal anesthesia consisted of 1.5 mL of 2% plain lidocaine with fentanyl 15 mcg and morphine 100 mcg. For maintenance, she received a total of 15 mL epidural 2% lidocaine with 1:200,000 epinephrine. A brief episode of intraoperative supraventricular tachycardia occurred following spinal injection and resolved with IV labetalol and midazolam. The remainder of the procedure and postpartum course were uneventful. A systematic literature search identified reports describing neuraxial technique in obstetric patients. Neuraxial technique, agent, dose, and route were extracted. Complications were categorized as hypotension, ECG changes, or arrhythmia.

Case Two:

Discussion: This report describes a successful lidocaine-based CSE technique for cesarean delivery in an obstetric patient with Brugada syndrome. Although spinal bupivacaine has been used successfully in this patient and in other reported cases, the available literature is insufficient to definitively support or refute recommendations to avoid bupivacaine. While published obstetric case reports (27 women, 38 deliveries, table 1) have not described adverse arrhythmic outcomes, this may reflect publication bias.

The arrhythmic risk associated with small intrathecal doses remains poorly defined and larger studies are required. Dose, duration of exposure, and patient phenotype likely influence arrhythmic risk, as events have been reported primarily with prolonged epidural bupivacaine infusions, higher cumulative doses, and in older male patients.

References: 1. Cheung et al. Can J Cardiol. 2021

Final Brugada Abstract AC.pdf

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 05

Peripartum Anesthetic Management of a Patient with Pacemaker-Induced Cardiomyopathy

Presenting Author: Simran Patel, MD, MPH

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Co-Authors: Xinhao Liu, MD, PhD - Montefiore Medical Center

Introduction: Pacemaker induced cardiomyopathy (PICM) is defined by an ejection fraction (EF) < 50% or a >10% decrease following pacemaker implantation, affecting approximately 12% of recipients. PICM results from electrical and mechanical dyssynchrony caused by right ventricular (RV) pacing which bypasses the native conduction system, leading to abnormal activation and adverse left ventricular (LV) remodeling. Patients have 2 to 3-fold increased risk of death or heart failure hospitalization, highest within the first six months of pacemaker implantation but persists long-term. Women with preexisting cardiomyopathy face elevated risks during pregnancy, particularly with EF < 45%, and recovery is often limited. Persistent LV dysfunction postpartum increases risk in subsequent pregnancies with approximately 16% mortality (1-3).

Case One: A 23-year-old G2P1001 at 38+5 weeks gestation presented for induction due to decreased fetal movement. She had congenital complete heart block (Mobitz type I) managed with a dual-chamber pacemaker (implanted 2017, re-implanted 2023) and was pacemaker-dependent. Echocardiography showed mildly reduced EF (45%) with paradoxical septal motion consistent with RV pacing. Vaginal delivery was planned with low anticipated cardiac risk. Continuous telemetry, IV access, intake/output monitoring, and defibrillation pads were in place. A magnet was available for potential pacemaker reprogramming but not applied. Labor analgesia was provided via dural puncture epidural (DPE) (0.0625% bupivacaine with fentanyl 2 mcg/mL), with a 10 mL 0.25% bupivacaine bolus for breakthrough pain. No pacemaker interference, arrhythmias, or hemodynamic instability occurred. Vaginal delivery occurred six hours after epidural top-up. Postpartum recovery and maternal-neonatal outcomes were unremarkable.

Case Two:

Discussion: This case illustrates peripartum management in patients with PICM. Unlike dilated or peripartum cardiomyopathy, PICM arises from RV pacing in device-dependent patients, creating a paradox: the pacemaker causing cardiomyopathy cannot be discontinued. DPE provides rapid, effective analgesia with improved sacral coverage while minimizing sympathetic blockade—key for patients with reduced EF. Prophylactic temporary pacing was unnecessary in this hemodynamically stable patient. With vaginal delivery and no electrocautery, electromagnetic interference risk was low and magnet availability without routine use was appropriate (4-5). Through multidisciplinary planning, a successful vaginal delivery was achieved.

References: 1. J Electrocardiol 2019; 57:31-34 2. Heart Rhythm 2023;20(2):282-290 3. Circulation 2022;145(18):e895-e1032 4. JACC Adv 2024;3(4):100901 5. Circulation 2024;150(8):e183-e196

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 06

Anesthetic Challenges in a Parturient with history of Peripartum Cardiomyopathy status post AICD Implantation, and Morbid Obesity: A Case Report

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Co-Authors: David A. Hundley, DO - UT Health Science Center at Houston
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Introduction: • Peripartum cardiomyopathy (PPCM) is a rare life-threatening disease of unknown cause that occurs in the peripartum period in previously healthy women and is becoming the leading cause of maternal death in the USA and the UK. [1] • Physiological changes in pregnancy have the potential to exacerbate symptoms of heart failure, particularly in patients with a reduced ejection fraction. • Obesity increases the risk of maternal cardiovascular complications in pregnant women with heart disease. • Peripartum cardiomyopathy and obesity together pose increased risks of cardiac decompensation, venous thromboembolism, and significant anesthetic risks such as difficult neuraxial and airway placements.

Case One: A 29-year-old female G2P1 at 37w2d with a medical history significant for peripartum cardiomyopathy in prior pregnancy status post AICD, morbid obesity (BMI 53), and chronic hypertension presented for a repeat C-section. TTE before delivery showed a mildly dilated left ventricle with normal left ventricular wall thickness. LV systolic function is moderately reduced. Ejection Fraction = 35%. RV is normal in size and function. ICD lead noted. Management The patient was evaluated by a multidisciplinary team including MFM, cardiology, obstetric anesthesiology, and cardiac anesthesiology. Prior to cesarean delivery, a FloTrac A-line was placed for continuous monitoring of hemodynamic data. ECMO sheaths were placed in preparation for circulatory collapse. Neuraxial anesthesia was achieved with an epidural at L3-L4 using a gradually titrated dose of 0.5% Bupivacaine and 2% Lidocaine with epinephrine, along with Phenylephrine infusion to maintain blood pressure and avoid sudden changes in hemodynamics. Epinephrine infusion was readily available in the OR to augment contractility. The intraoperative period was uneventful, and the patient was transferred to the Cardiac ICU for further management. ECMO sheaths were removed on postoperative day 1, and she was discharged on day 4.

Case Two:

Discussion: - This case highlights the need to address obesity as a modifiable risk factor at the time of preconception counseling. [2] - Neuraxial anesthesia (spinal/epidural) offers significant benefits for patients with obesity and cardiac disease by reducing 30-day mortality, minimizing airway manipulation risks, and providing stable hemodynamics. It avoids general anaesthesia-related airway complications in obese patients and, in cardiac cases, decreases catecholamine release, reduces myocardial infarction risk, and provides superior pain relief. [3] - Multidisciplinary collaboration and management are critical in

the care of parturients with significant cardiovascular disease. - To ensure optimal maternal and fetal outcomes, meticulous anesthesia planning, vigilant intraoperative care, and close postoperative monitoring are key components in the management of a parturient with multiple comorbidities.

References: 1. Masui. 2014 Jan; 63(1): 31–8 2. j.jacc.2021.01.010 3. Local Reg Anesth. 2019 Nov 18;12:111–124.

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 07

Continuous Spinal Anesthesia for Cesarean Delivery in a Parturient with Severe Cardiomyopathy, Pulmonary Hypertension, and Wolff–Parkinson–White Syndrome

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Co-Authors: Evelyn Carrero, MD - University of Puerto Rico-Medical Sciences Campus
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Introduction: The administration of anesthesia to pregnant patients with severe cardiac comorbidities poses significant challenges and increases intraoperative risk. Cardiovascular disease(CVD) is recognized by the American Heart Association as a leading cause of pregnancy-related mortality in the United States[1]. We present the successful anesthetic management of a time-sensitive cesarean delivery in a parturient with multiple CVD comorbidities using continuous spinal anesthesia(CSA).

Case One: A ASA 4 20-year-old Gravida 1 with dichorionic-diamniotic twins at 28 weeks of gestation presented to the emergency department with chest pain, shortness of breath and palpitations. Her cardiac history included dilated cardiomyopathy, decompensated heart failure with ejection fraction of 30-35%, Wolff-Parkinson-White syndrome status post failed ablation, severe mitral regurgitation, and pulmonary hypertension. She was admitted to the medical intensive care unit(MICU) and, after optimization and multidisciplinary discussion, was scheduled for cesarean delivery due to maternal deterioration. Given her extreme cardiac risk, CSA was selected to provide gradual onset sympathectomy and hemodynamic stability. Standard ASA monitoring, including an arterial catheter and external defibrillator pads were placed. An intrathecal catheter was placed, and an initial bolus of 2.5mg of 0.75% bupivacaine with 25µg of fentanyl was administered. An additional intrathecal bolus of 1.5mg of 0.75% bupivacaine was given to maintain a T4 sensory block. A phenylephrine infusion was initiated to maintain systemic vascular resistance. Twins were delivered successfully and transferred to the neonatal intensive care unit. The patient remained hemodynamically stable during the procedure and was transferred to the MICU postoperatively. Guideline-directed medical therapy was initiated, and a wearable cardioverter-defibrillator was placed. Patient was discharged with cardiology follow-up.

Case Two:

Discussion: This case demonstrates the successful use of CSA in an extremely high-risk cardiac obstetric patient. Compared with epidural or combined spinal–epidural techniques, CSA provides a denser, more predictable neural blockade with a controlled onset of sympathectomy[2]. Unlike single-shot spinal anesthesia, CSA allows incremental titration of anesthetics, enabling a consistent level of surgical anesthesia while supporting the use of adjunctive vasopressor infusions to maintain hemodynamic stability [3]. In contrast, general anesthesia requires airway manipulation and exposure to anesthetic

agents, which may provoke laryngoscopy induced tachycardia, arrhythmias, or myocardial depression. This case highlights CSA as a viable anesthetic strategy for carefully selected high-risk cardiac obstetric patients and underscores the importance of multidisciplinary planning to optimize maternal and neonatal outcomes.

References: 1. Circulation 2023;147:e657 2. Best Pract Res Clin Anaesthesiol 2023;37:139 3. Anesthesiology 2021;135:164

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 08

Mobitz Type II AV Block in a Healthy Cesarean Delivery

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Introduction: Mobitz type II atrioventricular block is a critical dysrhythmia that may progress unpredictably to hemodynamic compromise. Its occurrence in the setting of spinal anesthesia (SAB) for cesarean delivery (CD) warrants concern, as pregnancy-related physiologic changes and neuraxial shifts are known to exacerbate conduction disturbances in patients with preexisting conditions;[1] this case illustrates risk even in patients without known cardiac disease.

Case One: A 35-year-old G5P2022 at 39w2d presented for a scheduled CD under SAB. Pregnancy was complicated by advanced maternal age (AMA) and prior cesarean deliveries. Preoperative evaluation demonstrated >4 METs without cardiac disease history. Airway examination revealed Mallampati class II; ASA II. Following SAB administration and initiation of a phenylephrine infusion, the patient developed intermittent type II AV block intraoperatively. She was asymptomatic and hemodynamically stable; the arrhythmia resolved spontaneously without intervention. Postoperatively, she was discharged home in stable condition on postoperative day two after meeting all milestones.

Case Two:

Discussion: Dysrhythmias during SAB for CD have been reported in approximately 7% of cases, with type I and type II AV block each occurring in 3.5%; AMA is the most significant associated risk factor.[2] Spinal anesthesia produces sympathetic blockade with decreased venous return, while surgical stimulation may further augment vagal tone. The extent of sympathetic blockade, however, is variable and influenced by individual anatomic and functional variation.[3] Overdose of phenylephrine results in hypertension and reflexive bradycardia, which may contribute to the sympathetic-parasympathetic imbalance. In this case, the intermittent type II atrioventricular block is likely explained by an anatomic variant permitting more extensive blockade of cardiac sympathetic pathways, resulting in near-complete sympathetic block and unopposed parasympathetic dominance. The spontaneous resolution supports a functional, neuraxial-related mechanism. Although uncommon, neuraxial-associated dysrhythmias pose significant risk in pregnant patients due to physiologic vulnerability and autonomic shifts. Awareness of sympathetic chain variability and vigilant monitoring are essential to guide appropriate management while avoiding unnecessary intervention in hemodynamically stable patients.

References: 1. Can J Anaesth 1992;39:173–175 2. Can J Anaesth 2000;47:393–397 3. Acta Anaesthesiol Scand 2007;51:1297–1304

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 09

Anesthesiologic Considerations in a Parturient with Brugada Syndrome and Immune Thrombocytopenia

Presenting Author: Thomas Quisenberry, MD

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Introduction: Brugada syndrome (BrS) is a rare cardiac channelopathy predisposing patients to ventricular arrhythmia and sudden cardiac death.1 Affected individuals often present with ECG findings of pseudo-right bundle branch block and coved ST elevations in V1-V3, however this pattern can be intermittent.1 BrS has significant implications for anesthetic management, particularly for parturients. Several pharmacologic agents have been implicated in arrhythmias in patients with BrS, including propofol, local anesthetics (especially bupivacaine), and ketamine, among others.2 The approach to patients with BrS often emphasizes early neuraxial labor analgesia to limit sympathetic surge and arrhythmia and avoiding the above agents.3 However, what does a provider do if neuraxial analgesia is contraindicated? This case report addresses anesthetic challenges in a patient with BrS complicated by immune thrombocytopenia (ITP).

Case One: A 27-year-old G2P1001 at 30 weeks presented to the OB anesthesia precare clinic in the setting of ITP, family history of BrS, and known sodium channel mutation associated with BrS. The patient had no classic ECG findings of BrS, but had frequent palpitations requiring ambulatory ECG patch and close cardiology care throughout pregnancy. A plan made with Maternal Fetal Medicine, Cardiology, and Anesthesia recommended early neuraxial epidural analgesia using ropivacaine and continuous telemetry. If general anesthesia was required, a single bolus of propofol could be used, but no infusion. Her presentation was complicated by ITP in the 2nd and 3rd trimesters, with platelet count of 76 at 37 weeks. Hematology recommended a course of prednisone prior to scheduled induction, and at admission for induction of labor at 39 weeks her platelet count was 104. The patient was placed on continuous telemetry monitoring, and underwent uncomplicated epidural placement and loading with 0.125% bupivacaine + 50 mcg fentanyl. An infusion of 0.1% ropivacaine + fentanyl 2 mcg/ml was started. Her labor course and delivery were uncomplicated, and she was discharged on postpartum day 2.

Case Two:

Discussion: This case presents a patient with conflicting clinical priorities. Avoiding ventricular arrhythmia was paramount, and early epidural placement to decrease endogenous catecholamine release during labor (itself arrhythmogenic) was recommended. Additionally, epidural ropivacaine infusion was selected instead of bupivacaine given ropivacaine's weaker cardiotoxic effects. However, there was question whether early neuraxial anesthesia would be safe given her ITP. Fortunately, hematology provided a plan to improve her platelet count by the day of induction, allowing neuraxial anesthesia to be performed safely. To our knowledge, this is the first case report of a patient with BrS and ITP, and

highlights the importance of an early multidisciplinary approach when caring for these complex patients.

References: 1: Am J Cardiol (2017) Sep 120:1031-1036 2: J of Clin Anes (2017) Feb 36:168-173 3: Cureus (2025) Sep 17(9)

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 10

New Onset Complete Heart Block In A Parturient With Corrected Tetralogy Of Fallot

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Co-Authors: Jessica Galey, MD - University of Maryland School of Medicine
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Introduction: Tetralogy of Fallot (TOF) is the most common cyanotic congenital heart disease. Complete heart block (CHB) is a rare sequalae of repair of TOF. The mechanisms of arrhythmias are diverse and may involve structural, electrical, and hemodynamic factors. Transannular patch is a risk factor for late-onset conduction system disease due to scarring.

Case One: A 27yo G1P0 at 32w6d presented with vaginal bleeding in preterm labor was transferred to our center for maternal bradycardia to the 30s, and hypoxemia requiring high flow nasal cannula. She had a history of DiGeorge Syndrome and TOF with transannular patch repair at age 6. ECG showed CHB(fig A) and bedside echo showed normal biventricular function, moderate pulmonic and aortic regurgitation, and a small VSD with left to right flow. Patient was brought to the OR for non-reassuring fetal heart rate. She had rapid cervical change from 4 to 9cm. Her HR remained in 40s with BP 130s/60s, SpO2 96% on 10L NRB. Pads were placed for possible transcutaneous pacing. Decision for CS was made given her oxygen requirement and persistent maternal bradycardia. General anesthesia was induced due to acuity and concern of sympathetic blockade from neuraxial anesthesia worsening hemodynamics. She underwent rapid sequence induction with propofol and rocuronium as her potassium was elevated to 5.8mEq/L from lactic acidosis, and maintained on propofol infusion. She received insulin, dextrose and calcium for her hyperkalemia. Her BP was maintained with norepinephrine and she did not require pacing. A transvenous pacer was placed for possible hemodynamic instability postdelivery and she was transferred to ICU intubated due to her tenuous preoperative respiratory status. She was extubated postoperative day (POD) 1 and weaned to room air on POD4. She was evaluated extensively for possible causes of complete heart block including Chagas and Lyme's disease, sarcoidosis, fibrosis, and hypothyroidism, all of which were negative. She had a permanent dual chamber pacemaker placed POD5.

Case Two:

Discussion: New-onset or worsening arrhythmias should incite a thorough assessment for altered cardiac physiological conditions, and hemodynamic interventions should prompt careful consideration of arrhythmic issues. Maternal and fetal outcomes are optimized by a multidisciplinary team and an evidence-based approach. Choice of anesthesia must be carefully considered, as neuraxial anesthesia can cause sympathetic blockade, which can cause hypotension and worsening bradycardia. In cases of hemodynamic instability, transcutaneous or transvenous pacing should be initiated promptly.

References: 1.BMJ Case Reports. 2019 Apr;12(4):e228642. 2. BMJ Case Rep. 2022 Jan 20;15(1):e244598. 3. CJC Pediatr Congenit Heart Dis. 2023 Sep 16;2(6Part A):404-413. .

SUN - CR - BS 4 - BR 3B - Arrhythmias, AICDs, and Pacemakers – 11

Peripartum Cardiovascular Collapse Following Cesarean Delivery in a Parturient with Severe Biventricular Failure and Pulmonary Hypertension

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Introduction: Pregnancy in patients with advanced cardiomyopathy and pulmonary hypertension (pHTN) carries substantial risk of maternal morbidity and mortality. Peripartum hemodynamic shifts, particularly abrupt changes in preload and pulmonary blood flow, can precipitate acute ventricular failure despite intensive management.

Case One: We report a 35-year-old G8P4 at 31 weeks with worsening hypoxia managed jointly by cardiology and obstetrics. Medical history notable for dilated cardiomyopathy (EF 20%), chronic thromboembolic pHTN, severe MR, moderate TR, Factor V Leiden, substance use disorder, MI ×2 with coronary stents, ischemic stroke ×2, and multiple DVTs/PEs, most recently one month prior. Viral panel positive, complicating interpretation of her hypoxia. She was initiated on milrinone for escalating oxygen requirements. Due to progressive maternal decompensation, she underwent planned CS after completion of antenatal steroids.

Case Two:

Discussion: Anesthetic Management: Given chronic anticoagulation and potential need for emergent mechanical circulatory support, general anesthesia was planned. A pre-induction arterial line, large-bore introducer with pulmonary artery catheter, and groin preparation for potential VA ECMO were performed. Initial PA pressures were approximately 70s/30s. General anesthesia was induced with ketamine, propofol, remifentanil, and rocuronium. During the case, PA pressures progressively increased, heart rate rose from baseline 120s to 150s, and systemic blood pressure declined. During fascial closure and while TTE was being performed, the patient became progressively more hypotensive, and TTE showed global hypokinesis followed by PEA. ACLS was initiated immediately with return of spontaneous circulation after three rounds. There was no evidence of hemorrhage, amniotic fluid embolism, pulmonary embolism, or malignant arrhythmia. Outcome and Conclusion: Cardiovascular collapse was attributed to acute BiV failure driven by postpartum autotransfusion and relief of aortocaval compression, resulting in RV dilation, septal shift, LV underfilling, and worsening pHTN. The patient was cannulated for VA ECMO and transferred to the CVICU, with subsequent Impella placement. This case underscores the profound impact of peripartum preload shifts in patients with severe cardiopulmonary disease and highlights the importance of invasive monitoring, echo guidance, and readiness for MCS. This case highlights how the normal postpartum autotransfusion and relief of aortocaval compression can precipitate catastrophic R-to-

L ventricular failure in parturients with severe pHTN and cardiomyopathy, even in the presence of invasive monitoring and inotropic support. It underscores the importance of anticipating abrupt preload shifts and maintaining immediate access to MCS during high-risk cesarean delivery.

References: 1. Cardio-Obstetrics and Heart Failure: JACC: Heart Failure State-of-the-Art Review. PMID: 37678960.

SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 01

Pain-Selective Epidural Analgesia: Isobolographic Analysis of Lidocaine and Chloroprocaine

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Abstract :

Introduction

Epidural analgesia provides excellent pain relief during labor but is commonly limited by motor block and sympathectomy. A long-standing goal has been to achieve nociceptor-specific local anesthesia without other side effects. TRPV1 channels are expressed exclusively on nociceptors and have been exploited to selectively deliver polarized local anesthetics into nociceptors.[1] In mice, co-administration of capsaicin (TRPV1 agonist) with QX-314 (polarized lidocaine derivative) produced profound nociceptor-selective anesthesia without motor or sympathetic block.[1] However, burning injection pain from capsaicin and QX-314 neurotoxicity prevented clinical translation. Here we use lidocaine as the TRPV1 agonist[2] and chloroprocaine as the most polarized local anesthetic in clinical use. We hypothesize that this co-administration will be synergistic.

Methods

We designed an isobolographic study design[3] to assess synergism between epidural chloroprocaine and lidocaine. 1st stage: We determined success of epidural lidocaine and chloroprocaine at 20min using a 5-point Likert scale and used this to determine ED50 by the Dixon–Massey up–down sequential method[4], with probit regression. 2nd stage: We used individual ED50s to assess the ED50 of drug combinations (ED50 of lidocaine co-administered with ½ED50 chloroprocaine; ED50 of chloroprocaine co-administered with ½ED50 lidocaine, and the ED50 of a 1:1 fixed dose ratio). We determined synergy using the interaction index3, where $\gamma=(a/A)+(b/B)$. If $\gamma< 1$ the combination is synergistic; if $\gamma=1$ the combination is additive[3]. Women were eligible if they were in active labor, VAS ≥30mm, dilation ≤5cm, ≤4 previous deliveries, no prior cesarean.

Results

We enrolled 140 patients. ED50 for lidocaine alone was 0.26% (95% CI 0.20–0.31) and for chloroprocaine alone was 0.27% (95% CI 0.12–0.42). In combination with approximately ½ED50 chloroprocaine (0.15%), the ED50 of lidocaine was 0.16%. In combination with ½ED50 lidocaine (0.15%), the ED50 of chloroprocaine was 0.185%. In fixed 1:1 ratio combinations, the ED50 of each drug was 0.18%. The interaction index in all cases was ≥1. The combination of chloroprocaine and lidocaine is not synergistic.

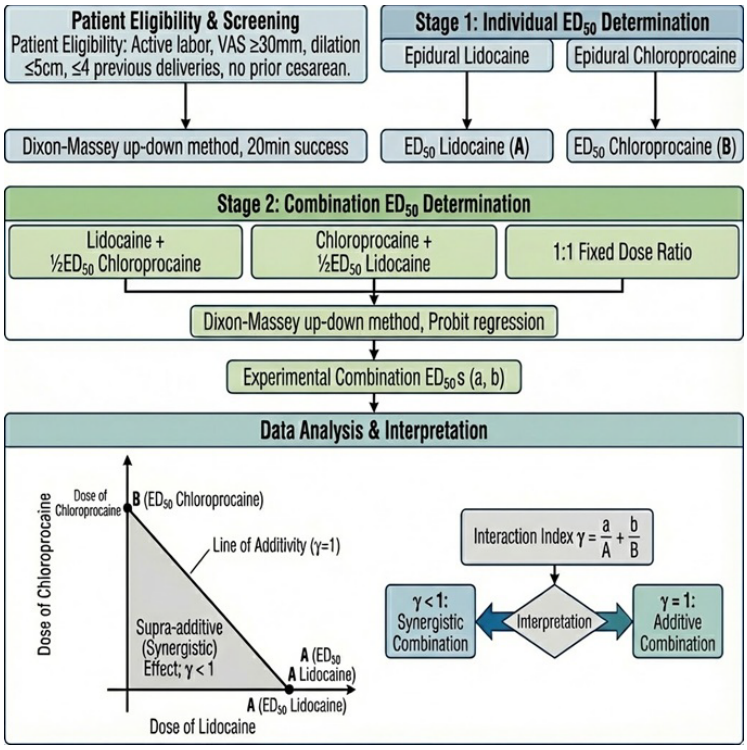
Conclusions

This is the first clinical study to attempt combining a TRPV1agonist with a polarized local anesthetic with the aim of attaining nociceptor-selective anesthesia without motor block. If the TRPV1 agonist interaction with polarized local anesthetic would be as hypothesized, we would have expected synergism between chloroprocaine and lidocaine; this was not observed.

References:

1. Nature 2007;449:607–610

2. Anesthesiology 2009;111:127–137
3. Anesth Analg 1995;81:833–83
4. J Clin Pharm Ther 2013;38:190–19



SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 02

Assisted Reproductive Technology Is Not Associated With Satisfaction With Labor Epidural Analgesia

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Abstract :

Background:
Assisted reproductive technology (ART) pregnancies are associated with higher rates of obstetric interventions, such as labor induction, operative vaginal delivery, intrapartum cesarean section, and postpartum hemorrhage, compared with spontaneous conception. These interventions are often accompanied by prolonged or complex labor courses and increased pain intensity, which may influence the analgesic experience during labor. Maternal satisfaction with labor epidural analgesia (LEA) is closely related to the degree of pain relief, continuity of analgesia, and procedural factors during labor. Factors such as nulliparity, induced or augmented labor, and maternal overweight—conditions more frequently observed in ART pregnancies—have been reported to be associated with increased labor pain and may therefore affect satisfaction with LEA. However, whether ART pregnancy itself is associated with satisfaction with LEA, independent of these clinical factors, remains unclear. This study aimed to compare maternal satisfaction with LEA between women with ART pregnancies and those with non-ART pregnancies.

Methods:
This retrospective observational study was conducted at Osaka Women's and Children's Hospital. Women with singleton pregnancies who planned vaginal delivery and received LEA between January and December 2024 were included. Pain intensity and satisfaction with LEA were assessed using 0–10 numeric rating scales on the first postpartum day. Participants were categorized into ART and non-ART groups. Group comparisons were performed using appropriate statistical tests, and multivariable linear regression analysis was conducted to identify factors independently associated with LEA satisfaction.

Results:
A total of 629 women were analyzed, including 141 in the ART group and 488 in the non-ART group. Women in the ART group were older and more likely to use oxytocin, instrumental delivery, intrapartum cesarean section, and experience postpartum hemorrhage. The duration of LEA was longer in the ART group, and maximum pain intensity during labor was slightly higher. However, satisfaction with LEA was similarly high in both groups, with no significant difference between ART and non-ART pregnancies. In multivariable analysis, higher maximum pain intensity during labor and the need for epidural epidural replacement were independently associated with lower satisfaction, whereas ART conception itself was not.

Conclusions:
Satisfaction with labor epidural analgesia was high and comparable between women with ART and non-ART pregnancies. Maternal satisfaction was influenced primarily by pain intensity and procedural factors rather than ART conception. Optimizing analgesic efficacy and minimizing interruptions in pain relief may improve maternal satisfaction regardless of conception method.

References:

1. BMC Pregnancy Childbirth. 2019;19:77.

2. Dev Med Child Neurol. 2022 Jul 18;65(1):38-49..

3. Acta Obstet Gynecol Scand. 2014 Sep;93(9):880-7.

SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 03

Neuraxial Anesthesia in Parturients With Syphilis: Safety and Short-Term Outcomes

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Goran Ristev, MD - The Ohio State University Wexner Medical Center

Abstract :

Introduction:

The incidence of syphilis among pregnant patients is increasing in the United States.[1] Concern for epidural or intrathecal access in the setting of treponemal infection may limit neuraxial analgesia for parturients with syphilis.[2] Anesthetic management and short-term outcomes were analyzed to evaluate the safety of neuraxial anesthesia in parturients with syphilis at a single institution.

Methods:

A retrospective review of Labor and Delivery admissions over a 60-day period in 2025 was performed. Inclusion criteria were admission to Labor and Delivery and positive Treponema pallidum IgG/IgM antibody screening during the current pregnancy.

Results:

Twelve parturients with positive Treponema pallidum antibody testing were identified over a 60-day period. RPR titers were available on admission for 10/12 patients (83.3%), with a median titer of 1:4. Mean maternal age was 31 ± 4 years, and mean gestational age at delivery was 37 weeks 6 days ± 4 weeks 5 days (Figure 1). Prenatal care was documented in 9/12 patients (75.0%), and partial or complete syphilis treatment was confirmed for all patients (12/12, 100%). No patients demonstrated clinical features of neurosyphilis.

Neuraxial procedures were attempted in 8/12 patients (66.7%). Two patients with concern for systemic disease underwent Cesarean delivery under general anesthesia, and two patients delivered vaginally without epidural analgesia. Overall, 8/12 patients (66.7%) delivered vaginally and 4/12 (33.3%) underwent Cesarean delivery. Substance use during pregnancy was identified in 6/12 patients (50.0%), and hepatitis C antibody positivity in 4/12 (33.3%); no patients had HIV co-infection. Postpartum obstetric follow-up was completed by 5/12 patients (41.7%), and additional postpartum penicillin treatment was administered to 3/12 patients (25.0%). No neurologic or infectious complications attributable to syphilis were observed following neuraxial anesthesia through 4 months of follow-up

Discussion:

The safety of neuraxial anesthesia in parturients with syphilis remains unclear due to limited published data. We report a single institution's experience evaluating the safety of neuraxial procedures in this population. Neuraxial access was attempted in >50% of patients; suspected systemic disease prompted Cesarean delivery under general anesthesia. No neurologic findings altered anesthetic management, and neuraxial techniques were frequently performed without short-term neurologic or infectious complications. These findings support the safety of neuraxial anesthesia in parturients with syphilis in the absence of neurologic involvement; multidisciplinary evaluation remains appropriate when concern for neurosyphilis exists.

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Neuraxial Anesthesia in Parturients With Syphilis- Safety and Short-Term Outcomes.pdf

SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 04

Management of Accidentally Disconnected Labour Epidural Catheters: A Canadian Modified-Delphi Consensus Study

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Abstract :

Background:

Accidental disconnection of labour epidural catheters presents a common yet challenging clinical dilemma in obstetric anesthesia. Clinicians must balance the pragmatic option of reconnecting the catheter, particularly in situations where replacement may be difficult, against the potential risk of neuraxial infection. In the absence of robust evidence to guide practice, significant variability exists in clinical management.[1,2] The purpose of this study was to develop consensus-based best-practice recommendations for the management of accidentally disconnected labour epidural catheters.

Methods:

After institutional ethics committee approval and participant consent, a national panel of Canadian obstetric anesthesiologists from major academic centers representing a broad geographic distribution was assembled, comprising experts with obstetric anesthesia fellowship training and/or substantial clinical experience in the field (>10 years). A literature review was first performed to generate candidate statements.[1-5] These pre-specified items were then iteratively refined across successive Delphi rounds. In Round 1, panelists anonymously rated key clinical considerations and procedural approaches using a combination of open-ended and structured questions. Based on these responses, existing statements were refined and new ones generated, which were circulated for rating in Round 2. Consensus was defined a priori as ≥70% agreement or disagreement. A third round is currently ongoing to assess stability of responses.

Results:

Eighteen experts representing 7 Canadian provinces participated in Rounds 1 and 2, after which consensus was achieved for 11 of the 18 statements (Table). Experts agreed that reconnection is acceptable following a witnessed disconnection; their decision to reconnect is influenced by the urgency to proceed with cesarean delivery, and soiled bedding favors replacement. Location of the disconnection was important: for disconnections occurring at the adapter, consensus supported disinfection (at least 10 cm) and cutting of the exposed end of a catheter (at least 5 cm from the tip or at the first window for wired catheters); for disconnections between the filter and the adapter, replacement of these parts was deemed sufficient. In-hospital follow-up should occur daily for signs of infection until discharge. Consensus was not achieved regarding the optimal disinfection solution, duration of post-discharge follow-up, or other specific clinical factors influencing the decision to reconnect.

Discussion:

These practice recommendations for the management of accidentally disconnected labour epidural catheters will help standardize practice and support the development of a clinical protocol. Areas requiring future research are necessary where consensus could not be achieved.

References:

1. Can J Anaesth. 2003 May;50:523
2. Eur J Anaesthesiol. 2012 Sep;29:453-5
3. Anesthesiol. 2017 Apr;126:585-601
4. J Hosp Infect. 2014 Feb;86:133-7
5. Anesthesiol. 1996 Oct;85:883-8

Round 2 Results: Management of Accidentally Disconnected Labour Epidural Catheters (n = 18)

Domain	*Statement*	*Agree n (%)*	*Disagree n (%)*	*Consensus Achieved*
Disconnection	**Replace filter/adapter/pump tubing if distal to filter**	**16 (89)**	**2 (11)**	**YES**
	Disinfect + cut catheter if proximal to filter/adapter	**15 (83)**	**3 (17)**	**YES**
Clinical	**Imminent cesarean delivery influences reconnection**	**17 (94)**	**1 (6)**	**YES**
	Do not reconnect if bedding visibly soiled	**17 (94)**	**1 (6)**	**YES**
	Reconnect if fully dilated and no time to replace	12 (67)	6 (33)	NO
	Reconnect if unwitnessed disconnection with adequate block	6 (33)	12 (67)	NO
Cutting	**Cut spring catheter at first window**	**14 (78)**	**4 (22)**	**YES**
	Cut catheter >5 cm from exposed tip	**15 (83)**	**3 (17)**	**YES**
	Do not cut catheter prior to reconnection	**2 (11)**	**16 (89)**	**YES**
	Cut catheter ≤5 cm from exposed tip	**2 (11)**	**16 (89)**	**YES**
Disinfection	**Disinfect ≥5 cm beyond anticipated cut**	**13 (72)**	**5 (28)**	**YES**
	Disinfect only to anticipated cut location	**3 (17)**	**15 (83)**	**YES**
Cleaning Solution	Isopropyl alcohol	11 (61)	7 (39)	NO
	Chlorhexidine 0.5% in alcohol	9 (50)	9 (50)	NO
	Chlorhexidine 2% in alcohol	12 (67)	7 (33)	NO
Follow-up	Post-discharge follow-up up to 2 weeks	7 (39)	11 (61)	NO
	Daily inpatient follow-up until discharge	**16 (89)**	**2 (11)**	**YES**

Consensus defined as ≥70% agreement or disagreement.

SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 05

A Surrogate Evaluation of Dura Proximity Across Loss-of-Resistance Techniques During Combined Spinal–Epidural Analgesia: A Prospective Cohort Study

Presenting Author: JAVIERA VARGAS, MD, MSc

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Abstract :

Epidural space identification is achieved using the loss-of-resistance (LOR) technique. LOR can be performed with air or saline and with intermittent or continuous needle advancement. The combination of medium and injection method may influence procedural outcomes. We hypothesized that the continuous-saline technique offers a safer mechanical profile during epidural space identification. This technique permits immediate entry of fluid into the epidural space at the moment LOR is encountered, generating a volume-dependent hydraulic separation of the dura from the Tuohy needle. Such displacement cannot be achieved with air, which lacks hydraulic properties and may be associated with known risks.

This single-center prospective cohort compared different LOR techniques during combined spinal–epidural (CSE) using a standardized Portex® CSEcure™ kit. The sample represents a subgroup of patients enrolled in the anesthesia registry approved by the local ethics committee. The primary endpoint was the advancement, in millimeters, of the spinal needle beyond the Tuohy tip required to obtain cerebrospinal fluid, measured using the Portex® CSEcure™ calibrated markings as a surrogate marker of dural proximity. A sample size of 100 patients (20 per group) provides 80% power to detect a 3.0-mm between-group difference. The five LOR techniques were: continuous saline using 1 mL (C/S1), intermittent saline (I/S), continuous air (C/A), intermittent air (I/A), and continuous saline using 4 mL (C/S4). The technique for each procedure was selected by the attending anesthesiologist based on practice preference.

Eighty-seven parturients (90% of the planned sample) were included. Demographics were comparable across groups. Linear regression demonstrated significant differences in Tuohy–dura distance across techniques ($F(4,85)=5.36$, $p=0.0007$). Pairwise margins analysis identified the continuous-saline 4-mL technique (C/S4) as producing the greatest mean distance—11.28 mm (SD 2.13)—representing the largest separation between the Tuohy tip and the dura. Using C/S4 as the reference, the C/A (–3.07 mm, $p< 0.001$) and I/S (–2.38 mm, $p=0.006$) techniques produced significantly smaller distances. Both C/S1 and I/A showed trends toward smaller distances ($p=0.064$ and $p=0.076$), indicating that the dura was positioned closer to the advancing needle. The lower limit of the 95% CI for C/A remained ≥7.23 mm. No post–dural puncture headache occurred.

Continuous saline injection—particularly with higher volumes—produced the greatest dura displacement at LOR, supporting a potentially safer mechanical profile for epidural space identification. This increased separation may offer an added margin of safety for trainees. However, among experienced anesthesiologists, all techniques appeared clinically acceptable, as even the smallest measured distances remained at least 7 mm from the dura.

References: 1. Antibas PL et al. **Cochrane Database Syst Rev.** 2014
2. Evron S et al. **Anesth Analg.** 2004

SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 06

Comparative Study of the Onset Time of Labor Analgesia Initiated with Epidural Technique with Lidocaine *vs* Dural Puncture Epidural Technique with Bupivacaine: a Prospective, Randomized Clinical Trial

Presenting Author: Xinzhong Chen, Sr., MD

Presenting Author's Institution: Women's Hospital, school of medicine, zhejiang university - hangzhou, Zhejiang

Abstract

Background: The dural puncture epidural (DPE) technique has been reported to provide a faster onset compared with the traditional epidural (EP) technique for labor analgesia. We hypothesized that the EP technique using lidocaine could achieve a similar onset of analgesia to the DPE technique using an equivalent dose of bupivacaine.

Methods: Term parturients with singleton pregnancy at cervical dilation < 5.0 cm with no major complications were randomized to receive either the DPE or EP technique for labor analgesia. Analgesia was initiated with 20 mL of 0.1% bupivacaine plus 0.3 μg/mL sufentanil in the DPE group, and with 20 mL of 0.57% lidocaine plus 0.3 μg/mL sufentanil in the EP group. Analgesia was maintained with a solution of 0.1% bupivacaine with 0.3 μg/mL sufentanil, administered using patient-controlled epidural analgesia (PCEA) with programmed intermittent epidural bolus (PIEB) regimen. Blinded investigators collected data every 5 minutes for the first 30 minutes, and then hourly until delivery. The primary outcome was time to adequate analgesia, defined as the time a Numerical Pain Rating Scale (NPRS) score ≤ 1 achieved within 30 minutes after analgesia initiation. Secondary outcomes included: time from epidural needle placement to adequate analgesia, NPRS scores, sensory blockade, motor block, PCEA use, physician-administered top-ups, local anesthetic consumption, duration of labor, mode of delivery, Apgar scores, maternal adverse events.

Results： A total of 119 parturients were included in the final analysis. The time to adequate analgesia in the DPE technique using bupivacaine was significantly longer than that in the EP technique using lidocaine (15(12~21) minutes *vs* 24(18-60) minutes) ($P < 0.001$). However, compared to EP using lidocaine, DPE using bupivacaine was associated with significantly fewer patient-requested PCEA boluses ($P = 0.032$), fewer delivered PCEA boluses ($P = 0.028$), lower mean hourly bupivacaine consumption ($P = 0.016$). No statistically significant differences were observed between groups for other secondary outcomes.

Conclusions： EP technique with lidocaine provided a faster onset of labor analgesia than the DPE technique with bupivacaine, with no increase in motor blockade. Nevertheless, the EP group required more PCEA boluses and exhibited higher hourly bupivacaine consumption.

References: 1. *N Engl J Med* 2010, **362**(16):1503-1510.
2. *Anesth Analg* 2021, **132**(4):971-978.
3. *Anesthesiology* 2022, **136**(5):678-687
4. *Br J Anaesth* 2025, **134**(5):1402-1414.
5. *Anesth Analg* 2021, **132**(4):971-978.

SUN - RA - BS 4 - BR 1 - Labor Analgesia Challenges and Tips – 07

Epidural catheter insertion depth of 4 cm versus 5 cm for labor analgesia: a double-blind randomized trial

Presenting Author: William Turner, BMBS

Presenting Author's Institution: Kingston Hospital - New Malden, England

Co-Authors: Naveed T. Siddiqui, MD, MSC - Mount Sinai Hospital, University of Toronto
Franziska Wellner, MD - Universität Basel

Abstract :

Background
Epidural analgesia is the most effective pain relief for labor, yet failure rates of 10–20% persist.[1,2] Shorter insertion may lead to displacement, while deeper insertion has been associated with misdirection or unilateral block.[3] This study compared labor analgesia outcomes with catheters inserted at 4 cm vs 5 cm within the epidural space. We hypothesized that insertions to 4 cm would have a lower rate of failure compared to 5 cm.

Methods
This prospective, patient- and assessor-blinded randomized controlled trial enrolled laboring women with body mass index < 40 kg/m² requesting epidural analgesia. Participants were randomized 1:1 to catheter insertion at 4 or 5 cm. The inserting anesthetist was unblinded; patients, bedside nurses, and outcome assessors remained blinded. Lumbar epidurals were placed using a standardized loss of resistance technique with a 17G Tuohy needle, catheters threaded to the allocated depth, loaded with bupivacaine 0.125% (10-15 mL) with fentanyl (50-100 mcg), and maintained using a 0.0625% bupivacaine-fentanyl 2 mcg/mL regimen with programmed intermittent boluses of 10 mL q 40 min and patient-controlled doses.

The primary outcome was a prespecified composite of ineffective epidural after one hour, consisting of: inadequate analgesia (Verbal Numerical Rating Score, VNRS >3), insufficient block (below T10), unilateral or patchy block, catheter manipulation or replacement, or abandonment of the technique. Secondary outcomes included pain scores, top-ups, catheter-related events, conversion to surgical anesthesia, and maternal and neonatal adverse events. Categorical outcomes were compared using χ^2 or Fisher's exact tests as appropriate, with statistical significance defined as $p < 0.05$.

Results
193 participants were included in the final analysis (4 cm: n = 94; 5 cm: n = 99). Baseline characteristics were comparable between groups. The composite primary outcome occurred in 35.1% of participants in the 4 cm group and 37.4% in the 5 cm group (p = 0.859). VNRS >3 during labor occurred in 31.9% versus 32.3%, respectively (p = 1.000). Rates of unilateral block, patchy block, catheter manipulation, replacement, and migration did not differ between groups. Conversion to surgical anesthesia (n=52) was successful in 90.5% versus 96.8% (p = 0.558). Maternal motor block and fetal bradycardia were infrequent in both groups (Table 1).

Conclusion
Epidural catheters fixed at 4 cm vs 5 cm within the epidural space did not result in meaningful differences

in analgesic efficacy, catheter performance, or safety outcomes. These findings suggest that, within the commonly used range of 4–5 cm, catheter depth alone is unlikely to be a major determinant of epidural success in labor. Emphasis should instead be placed on technique, fixation, and dosing strategy when managing labor epidural analgesia.

References:

1. Thangamuthu. Int J Obstet Anesth 2013;22:310–315
2. Arendt. Rev Obstet Gynecol 2008;1:49–55
3. Afshan. Anaesthesia 2011;66:913–918

Table 1. Outcomes with 4 cm vs 5 cm epidural catheter depth insertion

Outcome	4 cm (n = 94)	5 cm (n = 99)	p value
Composite primary outcome (inadequate or sub-optimal analgesia), n (%)	33 (35.1)	37 (37.4)	0.859
Patchy block, n (%)	3 (3.2)	2 (2.0)	0.676
Unilateral block (greater than three dermatomes), n (%)	10 (10.6)	8 (8.1)	0.717
Block below T10 at any time, n (%)	18 (19.1)	20 (20.2)	0.998
Verbal Numerical Rating Score greater than three at any time during labor, n (%)	30 (31.9)	32 (32.3)	1.000
Catheter manipulated, n (%)	3 (3.2)	3 (3.0)	1.000
Catheter replaced, n (%)	3 (3.2)	3 (3.0)	1.000
Catheter abandoned or displaced greater than 2 cm, n (%)	0 (0)	0 (0)	Not calculated
Persistent intravascular placement, n (%)	0 (0)	1 (1.0)	1.000
Any nursing top-up required, n (%)	10 (10.6)	14 (14.1)	0.586
Any physician top-up required, n (%)	16 (17.0)	20 (20.2)	0.660
Motor block (any), n (%)	1 (1.1)	1 (1.0)	1.000
Fetal bradycardia, n (%)	0 (0)	3 (3.0)	0.247
Successful conversion to surgical anesthesia*, n (%)	19/21 (90.5)	30/31 (96.8)	0.558

*Among participants requiring cesarean delivery.

All outcomes were available for all randomized participants unless otherwise stated.

VNRS = Verbal Numerical Rating Score.

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 01

Management of indwelling labor epidural catheters for intrapartum cesarean delivery: a single-center retrospective study

Presenting Author: Sahithi Puvvala, BA

Presenting Author's Institution: Baylor College of Medicine - Temple, Texas

Co-Authors: Emily E. Sharpe, MD - Mayo Clinic - Rochester
Diana Villazana-Kretzer, DO - Baylor Scott & White Medical Center-Temple

Abstract :

Background

Pain during cesarean delivery (CD) can have long term consequences. A previous study reported that removal of an indwelling labor epidural catheter followed by a new neuraxial block could decrease the risk of requiring adjunct medications.[1] We hypothesized that removal of an indwelling labor epidural catheter would be independently associated with adjunct free anesthesia for intrapartum CD compared to catheter top up.

Methods

We conducted a retrospective chart review of patients with an indwelling labor epidural catheter who had intrapartum CD between July 1, 2023 and June 30, 2025. Patients who received any dose of intravenous dexmedetomidine, fentanyl, ketamine, or propofol or inhaled nitrous oxide were considered to have received adjunct anesthesia. We used a bivariate analysis to compare patients who had adjunct-free anesthesia with patients who received one or more adjunct medication or conversion to general anesthesia. We used a multivariate logistic regression with variables of interest to identify variables that were independently associated with adjunct-free anesthesia.

Results

Among patients who had intrapartum CD with indwelling labor epidural catheters, 198 received adjunctive anesthetic medications or conversion to general anesthesia and 299 did not. Patients receiving adjunct medications were more likely to have top-up of an indwelling labor epidural catheter, have a history of anxiety, and longer operative times. Complete data for the cohorts are presented in Table 1. Twelve (5.2%) patients who had removal of an indwelling labor epidural catheter required general anesthesia (GA) compared to 25 (9.4%) who had top up (p=0.08). Three patients who had GA did so because their epidural catheter was removed and a new neuraxial block was unable to be obtained. One patient who had a single injection spinal after epidural removal required GA due to documented dyspnea (1:230; 95% CI 1:41-1:1302). In our multivariate logistic regression, removal of an indwelling labor epidural catheter was associated with adjunct-free anesthesia (aOR 3.86; 95% CI 2.45-6.08; p< 0.001) along with physician-administered boluses during labor (aOR 0.75; 95% CI 0.60-0.94; p=0.01), urgency of CD (aOR 1.50; 95% CI 1.04-2.14; p=0.03), and operative time (aOR 0.90; 95% CI 0.84-0.97; p=0.004). History of depression, history of anxiety, indication for admission, replacement of labor epidural catheter during

labor, and time from epidural catheter placement to entering operating room were not independently associated with adjunct-free anesthesia.

Discussion

Patients who had removal of an indwelling labor epidural catheter with a new neuraxial anesthetic for intrapartum CD anesthesia were approximately four times more likely to have adjunct-free anesthesia. Future prospective patient-reported outcome studies are needed to evaluate the practice of removal of indwelling labor epidural catheters for CD.

References: 1. Proc (Bayl Univ Med Cent). 2023;36:473-477

Table 1 (2).pdf

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 02

Racial and Ethnic Disparities in Modes of Anesthesia for Cesarean Delivery Among American Indian and Alaskan Native Patients

Presenting Author: Melissa Torbey, MHA

Presenting Author's Institution: University of New Mexico School of Medicine - Albuquerque, New Mexico

Co-Authors: Tim Petersen, PhD - University of New Mexico Department of Anesthesiology and Critical Care Medicine

Abstract :

Introduction: Neuraxial anesthesia is the preferred mode of anesthesia for cesarean delivery (CD) and is associated with significant benefits to patients. Research shows Hispanic/Latinx and non-Hispanic Black patients are more likely to undergo general anesthesia for CD[1]. There is limited data on the mode of anesthesia for American Indian/Alaskan Native (AI/AN) parturients[1,2], with many studies combining multiple races, including AI/AN, into the "other" race category[3,4]. Our hospital is the state's only Level IV Regional Perinatal Healthcare Center and is the quaternary referral hospital for a large number of AI/AN communities. We aim to determine the mode of anesthesia for CD for AI/AN women in comparison to other racial and ethnic groups.

Methods: This IRB approved retrospective study included all women who underwent cesarean delivery at our institution between 2021 and 2025. Mode of anesthesia was classified as neuroaxial (spinal, epidural, or combined spinal-epidural anesthesia) or general anesthesia (GA). Women who received both neuroaxial and GA were classified as receiving GA. A statistical analysis summarized the frequency of anaesthesia modes for AI/AN women who underwent a cesarean delivery. The mode of anesthesia will be compared across racial/ethnic groups using chi-squared, with supplemental relative risk.

Results: Among 3197 patients in our cohort, 297 (9.3%) received GA. GA rates were 10.1% (66/587) in non-Hispanic white patients, 9.4% (149/1444) in Hispanic/Latinx patients, 9.3% (51/495) in AI/AN patients, and 11.3% (14/110) in Black/African American patients. There was no statistically significant difference in the relative risk of GA across any racial or ethnic group when compared to non-Hispanic white patients, including AI/AN. Rates of GA were highest among Black/African American patients (11.3%), but the relative risk did not reach statistical significance.

Conclusion: This study is essential because it addresses a gap in the literature regarding racial and ethnic disparities in modes of anesthesia among women having cesarean deliveries. Our focus is on AI/AN women who are historically underrepresented in research. These crucial findings help establish a baseline for understanding modes of anesthesia in cesarean deliveries for a race that is typically categorized as "other".

References:

1. *Can J Anaesth*. 2023;70(6):1035-46.

2. *Obstet Gynecol*. 2019;134(6):1155-62.

3. *Jt Comm J Qual Patient Saf*. 2024;50(8):552-59.

4.*Anesth Analg*. 2016;122(2):472.

	General (n=297)	Neuraxial (n=2882)
American Indian/Alaska Native	51 (9.44%)	495 (90.66%)
Black/African American	14 (11.29%)	110 (88.71%)
Hispanic/Latina (n)	149 (9.35%)	1444 (90.65%)
Non-Hispanic White (n)	66 (10.11%)	587 (89.89%)
Other (n)	17 (6.46%)	246 (93.54%)

Table 1: Anesthesia type categorized by race. The effect did not reach statistical significance p>.05

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 03

A Survey Study to Assess Patient Opinions of Anxiolysis Prior to Neuraxial Anesthesia for Cesarean Delivery

Presenting Author: Patrick Hesketh, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Yara Aboshady, MD - Vanderbilt University Medical Center
Jessica Klein, BA - Vanderbilt University School of Medicine
Afif Kraitem, MD - Vanderbilt University
Laura L. Sorabella, MD - Vanderbilt University Department of Anesthesiology

Abstract :

Introduction

Anxiolysis is commonly administered during neuraxial anesthesia (NA) for non-obstetric indications but is rarely administered during NA for cesarean delivery (CD) due to concerns regarding fetal exposure and need for neonatal resuscitation. Parturients are too rarely asked about their stress level or whether they desire anxiolytic medications prior to NA for CD, which fails to recognize their autonomy and could contribute to birth trauma. The aim of this survey study was to assess the level of preoperative anxiety experienced by patients who did not receive anxiolytic medications and quantify the proportion of these patients who felt they would have benefited from receiving anxiolysis had it been offered. We hypothesized that many patients who were not treated with anxiolytic medication still experience anxiety related to their CD or NA and would want to receive anxiolytic medications if offered.

Methods

Following Institutional Review Board approval, a survey was conducted on eligible patients who underwent CD with NA performed in the operating room. Subjects were approached 12-48 hours following delivery to complete an electronic REDCap survey administered via iPad (Figure 1). Screened patients were excluded if they were < 18 years of age, non-English speaking, or received any form of intravenous or neuraxial anxiolysis. A convenience sample of 100 participants was planned for this pilot study.

Results

Between 3/2/2025 and 1/16/26, 941 patients were screened for participation, 180 patients were approached for enrollment, and 100 patients agreed to participate in the study. On a 10-point Likert scale, patients reported anxiety about the cesarean delivery as median [IQR] 6 [3,8] and anxiety about the neuraxial procedure as median 5 [3,7]. Fifty participants (50%) denied being offered anxiety relieving medication at any time before or during the cesarean delivery, while 31 patients reported that they were unsure if it had been offered. When asked whether they would have accepted anxiolysis if offered, 45% reported they would not accept if it affected their memory and 69% reported they would not accept if baby might require additional resuscitation after delivery. Overall, 17 patients (17%) reported they would have wanted to receive anxiolytic medication to decrease worry or anxiety prior to CD.

Discussion

This survey study demonstrates that patients experience significant levels of anxiety regarding NA for CD, and many patients desire anxiolysis even after a discussion of potential risks. Patient autonomy dictates that all patients deserve a discussion of risks and benefits and the ability to make an informed decision regarding anxiolysis. While anxiolytic medications have not been shown to have a significant impact on neonatal outcomes when administered prior to delivery[1,2], future studies are required to fully assess the impact of anxiolysis on maternal and neonatal outcomes.

References: 1.PMID:24565384.
2.PMID:16371613.

Anxiety Survey pdf for SOAP Abstract.pdf

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 04

Comparison of Enhanced Recovery after Surgery Protocol and Standard Protocol for Cesarean Delivery: a Two-center, Double-blind, Randomized Controlled Trial

Presenting Author: Sherry Wu

Presenting Author's Institution: Obstetrics and Gynecology Hospital of Fudan University - Shanghai, Shanghai

Abstract :

Background:
Enhanced recovery after cesarean delivery (ERAC) protocols have been designed to optimize maternal recovery. Although its potential has been demonstrated, high-quality evidence supporting the efficacy of ERAC protocols remains limited. This study aimed to evaluate the effect of anesthesiologist-led bundled ERAC interventions on perioperative adverse events and recovery quality.

Methods:
A two-center, double-blind, randomized controlled trial that included 122 pregnant women undergoing elective cesarean delivery under spinal anesthesia was conducted. Participants were randomized to either the standard care or ERAC protocol. The ERAC bundle included: preoperative personalized and information-based education; intraoperative prophylactic phenylephrine infusion, mandatory non-opioid analgesia (intravenous acetaminophen and ketorolac), prophylaxis for postoperative nausea and vomiting (ondansetron/dexamethasone), and active fluid warming; and postoperative scheduled ketorolac. The primary outcome was a composite of anesthesia-related adverse events (hypotension, nausea/vomiting, shivering, hypothermia, and moderate-to-severe pain). Secondary outcomes included opioid consumption, length of hospital stay, pain scores at rest and with movement, the ObsQoR-11 recovery score, and anxiety scores.

Results:
Of the 122 randomized participants (61 per group), 116 completed the study (57 standard care and 59 ERAC). The ERAC group showed a significantly lower incidence of poor primary composite outcomes (38% vs. 71%; absolute risk difference: -31.4%, 95%; confident intervals: 48.1 to -14.7%; odd ratio: 0.25, 95% CI 0.11-0.56; p=0.001). ERAC patients demonstrated superior recovery with lower worst pain ($p< 0.01$) and movement-related pain scores ($p< 0.01$), fewer patient-controlled analgesia boluses ($p< 0.01$), and higher ObsQoR-11 scores ($p< 0.01$) on postoperative day 1 compared to that observed in the standard care group (Table). No differences were observed in the rest pain scores, adverse events, length of stay, or anxiety scores between the groups.

Conclusion:
Our randomized controlled trial demonstrated that, compared to the standard care protocol group, an anesthesiologist-led bundled ERAC protocol significantly reduced anesthesia-related adverse events and enhanced postoperative recovery in women who underwent elective cesarean deliveries.

References:

Anesth Analg. 2021;132(5):1362-1377.

Am J Obstet Gynecol. 2026 Jan;233(6S):S170-S183.

Table.pdf

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 05

Patterns of postoperative nausea and vomiting prophylaxis in patients undergoing cesarean delivery: a multicenter retrospective cohort study

Presenting Author: Allison Dear

Presenting Author's Institution: Duke University School of Medicine - Durham, North Carolina

Co-Authors: Rania Elkhateb, MD, MS - Oregon Health and Science University
Jane La, MS - Duke University School of Medicine
Jill M. Mhyre, MD - Department of Anesthesiology, University of Arkansas for Medical Sciences
Shauna Rakshe, PhD, MS - Oregon Health and Science University

Abstract :

Background: Cesarean delivery (CD) rates are continuing to rise, accounting for over 30% of live births in the US in 2023. Postoperative nausea and vomiting (PONV) has been reported to occur in 30%-80% of patients and is a significant source of concern for this population. Based on the PONV consensus guidelines and the SOAP Enhanced Recovery After Cesarean (ERAC) guidelines, the Multicenter Perioperative Outcomes Group (MPOG) has created metrics to track compliance with the guidelines in terms of prophylactic antiemetics used (PONV-01, updated in 2022 to PONV-05). Success in PONV-01 and PONV-05 for patients undergoing CD was defined as receipt of combination therapy consisting of at least two prophylactic pharmacologic anti-emetic agents of different classes preoperatively or intraoperatively. This study aims to describe PONV prophylaxis patterns in patients undergoing CD across 69 MPOG-participating institutions from 2018-2024.

Methods: In this retrospective study, the MPOG database was used to identify patients who underwent CD between January 1, 2018 and June 30, 2024. Exclusion criteria included: cesarean hysterectomies and missing PONV-03 (outcome measure) or PONV-05 metric. Adherence to PONV prophylaxis guidelines was defined by MPOG-ASPIRE process measure PONV-05 (previously PONV 01. Descriptive statistics were used to describe the overall cohort and stratified by pass or fail status of PONV-05 metric. Standardized mean differences (SMDs) were used to compare patient demographics and prophylaxis patterns between the two PONV05 groups.

Results: 407,241 cases were identified from 69 institutions. Of these, 59.9% passed the PONV-1/PONV-05 metric. This increased over the duration of the study from 35.4% in 2018 to 78.1% in 2024. Most patients (81.6%) had 4 PONV risk factors. Of the 40% of patients who failed the metric, 21.8% received no prophylaxis and 78.1% received one antiemetic. The most common single antiemetic class given was 5-HT3 receptor antagonists (29.1%). Ondansetron accounted for 37.1% of all 5-HT3 receptor antagonists given. A combination of two antiemetics was the most used regimen in 42.8% of cases. The most common combination of antiemetics given was 5-HT3 receptor antagonists + glucocorticoids (26.5%). The most common drug combination was ondansetron + dexamethasone, at 77.2% of the class combination group. Results are summarized in the table.

Conclusions: In this cohort, 60% of patients received PONV prophylaxis according to MPOG and PONV consensus guidelines recommendations, and the guideline compliant prophylaxis increased over the duration of the study. The most common category of antiemetics given was a combination of 5-HT3

receptor antagonists and glucocorticoids. Further research is needed to assess the impact of PONV compliant prophylaxis on the occurrence of PONV.

References: 1. CDC, 2025
2. BMC Pregnancy Childbirth 2025, 25:244
3. Anesth Analg 2020, 131:2

Patterns of postoperative nausea and vomiting prophylaxis in patients undergoing cesarean delivery TABLE1.pdf

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 06

Effect of energy drink on body temperature during combined spinal-epidural anesthesia for elective Cesarean delivery: A noninferiority randomized controlled trial

Presenting Author: Jie Zhou, MD, MBA, FASA

Presenting Author's Institution: Peking University People's Hospital - Peking, Beijing

Abstract :

Background

Global cesarean section rates are rising, with 88.2% in low- and middle-income countries (LMICs) where warming devices (e.g., warming mattresses) are scarce. Intraoperative hypothermia (36%–85% post-neuraxial anesthesia) increases infection/bleeding risks. ERAS guidelines recommend preoperative oral carbohydrates, but medical-grade formulations are unavailable in low-resource settings. Low-cost, accessible energy drinks share similar components but lack high-quality efficacy/safety evidence.

Methods

Healthy mothers undergoing elective cesarean section under combined spinal-epidural anesthesia were randomly assigned to energy drink (n=149, 250 ml 2h preoperatively) or warming mattresses (n=147, 40 °C post-anesthesia to surgery end) groups. Operating room temperature was 22°C. CSEA was administered with 0.75% ropivacaine, sensory block ≥T6 required. Core temperature and surface temperature were measured at baseline and post-anesthesia. Fetal umbilical blood gas and Apgar scores were recorded. Intraoperative complications (hypothermia; nausea/vomiting; shivering) were documented.

Results

Maximum intraoperative core body temperature drop was non-inferior between groups (energy drink: 0.4 (0.25, 0.6) °C vs. warming mattresses: 0.45 (0.25, 0.6) °C, P=0.76). No significant differences existed in minimum core body temperature (P=0.09). Core/forehead/arm temperatures were comparable at all post-anesthesia time points. Umbilical artery blood gas was similar; 1-minute Apgar score was higher in energy drink group (P=0.02), 5-minute score no difference. Adverse reactions: No differences in hypothermia (8.1% vs.7.5%, P=0.85), hypotension (21.5% vs.20.4%, P=0.82), nausea (16.1% vs.17%,

P=0.84), vomiting (3.4% vs.3.4%, P=0.98), shivering (7.4% vs.12.9%, P=0.11), or tramadol use (2.7% vs.7.5%, P=0.06).

Conclusion

Preoperative 250 mL energy drink is a safe, accessible alternative to warming mattresses for intraoperative warming in healthy singleton mothers (BMI≤35 kg/m²) undergoing elective cesarean section, especially suitable for low-resource settings.

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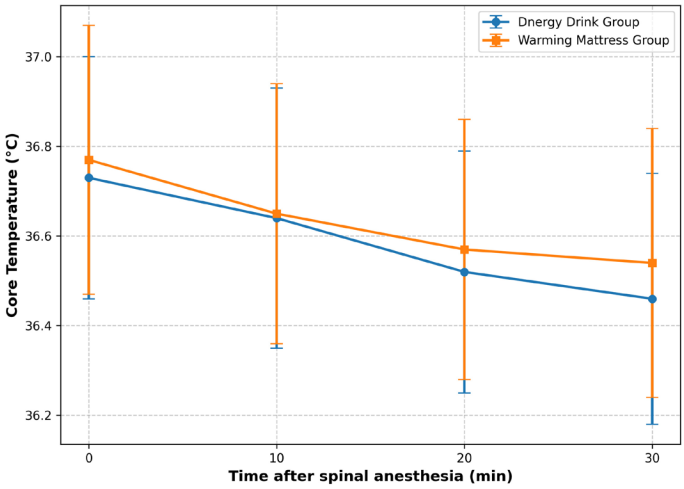

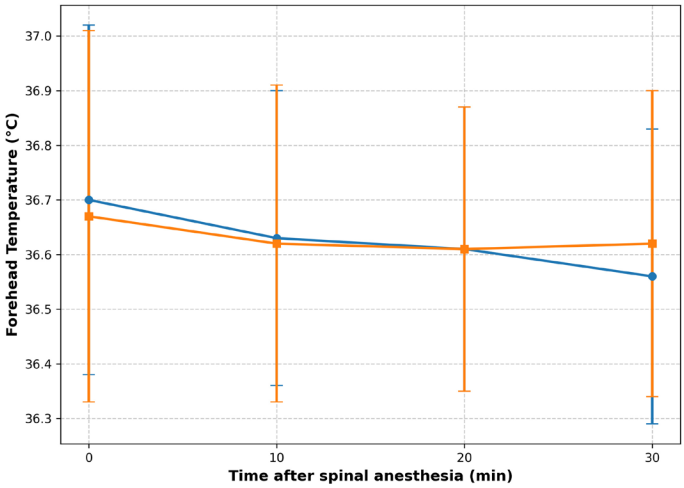

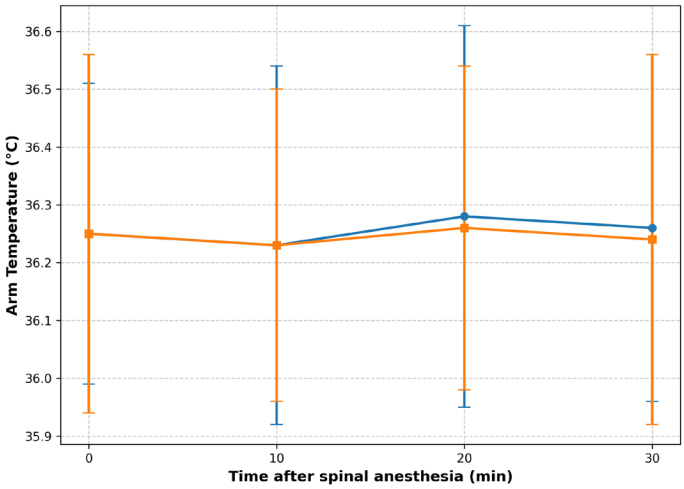

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 07

Effect of Standardization of Care on Racial and Ethnic Disparities in Pain Management After Cesarean Delivery

Presenting Author: Kelley A. Smith, MD

Presenting Author's Institution: University of Virginia - Charlottesville, Virginia

Co-Authors: Ashley Garneau, MD - University of Virginia
Natalie Pate, MD - University of Virginia
Lacey Straube, MD - UNC Hospitals
Mohamed Tiouririne, MD - University of Virginia
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Abstract :

Abstract:

Despite sustained efforts to advance health equity, racial and ethnic disparities in health care still persist. One example is the management of postoperative pain following cesarean section, where evidence shows that women from racial and ethnic minority groups are less likely to receive adequate analgesia compared to their White counterparts. In this context, we examined the effect of standardization of care on racial and ethnic disparities in pain management after cesarean delivery.

Methods:

This retrospective observational study employed segmented regression analysis to evaluate outcomes of interest among 5,344 women who underwent scheduled cesarean deliveries at the between 2014 and 2022, comparing pre- and post-intervention periods following the implementation of a standardized protocol aligned with Enhanced Recovery After Cesarean (ERAC) guidelines. The pre-intervention cohort (n=651) received routine, non-standardized perioperative management. In contrast, the post-intervention cohort (n=4,693) was managed using a standardized protocol.

Results:

Compared with non-Hispanic White patients, non-Hispanic Black patients experienced a small decrease in postoperative IV morphine equivalent use over time during the pre-ERAC period. At the start of the post-ERAC period, non-Hispanic Black patients received substantially higher postoperative IV morphine equivalents than non-Hispanic White patients, despite an overall reduction in opioid use across all patients. It is also noted that, compared to non-hispanic White patients, hispanic and non-hispanic other patients received less postoperative IV morphine equivalents, on average.

Conclusion:

The results of this study suggest that non-hispanic Black women received more opioids to manage pain during post-ERAC period when compared to the pre-ERAC cohort of the same race/ethnicity. Standardization of care through an ERAC protocol altered patterns of opioid utilization after cesarean delivery. While overall opioid use declined, disparities persisted and, in some cases, shifted, particularly among non-Hispanic Black patients. These findings suggest that standardization alone may be insufficient to affect racial and ethnic disparities in postoperative pain management.

References:

Effect of Standardization of Care on Racial and Ethnic Disparities in Pain Management After Cesarean Delivery - Table 1.pdf

SUN - RA - BS 4 - BR 2 - Cesarean Delivery Quality – 08

Association between guideline-compliant prophylaxis and the incidence of post-operative nausea and vomiting in patients undergoing Cesarean Delivery: a multicenter retrospective cohort study

Presenting Author: Allison Dear

Presenting Author's Institution: Duke University School of Medicine - Durham, North Carolina

Co-Authors: Rania Elkhateb, MD, MS - Oregon Health and Science University
Jane La, MS - Duke University School of Medicine
Jill M. Mhyre, MD - Department of Anesthesiology, University of Arkansas for Medical Sciences
Shauna Rakshe, PhD, MS - Oregon Health and Science University

Abstract :

Background: Postoperative nausea and vomiting (PONV) occurs in 30%-80% of patients undergoing cesarean delivery (CD). Based on the PONV consensus guidelines, the Multicenter Perioperative Outcomes Group (MPOG) has created metrics to track compliance with the guidelines (PONV-05, previously PONV-01), as well as PONV outcomes defined as receipt of rescue antiemetics and/or documented PONV from post-anesthesia care unit start up to 6 hours after anesthesia end (PONV-03). Success of the PONV01/05 metric is achieved by receipt of at least two prophylactic antiemetics from different pharmacologic classes. We expect that guideline compliance will be associated with improved PONV outcomes, but this has not been previously investigated. Our aim is to investigate the relationship between compliant prophylaxis (passing PONV-05) and the incidence of PONV (failing PONV-03) in patients undergoing CD.

Methods: In this retrospective study, the MPOG database was used to identify a cohort of patients who underwent CD between January 1, 2018 and June 30, 2024. Exclusion criteria included: cesarean hysterectomies and missing PONV-03 or PONV-05 metric. Descriptive statistics were used to describe the cohort overall and according to the success/failure of the PONV-03 metric. Adherence to PONV prophylaxis guidelines was defined by MPOG-ASPIRE process measure PONV-01/05. Incidence of PONV was defined by MPOG-ASPIRE outcome measure PONV-03. An unadjusted logistic mixed-effects model was fit to the data with outcome PONV-03 (pass/fail, passed as reference), primary predictor PONV-05 (pass/fail, passed as reference), and clustering by institution.

Results: 407,214 cases were identified from 69 institutions. PONV-05 passed (at least two antiemetics given) in 59.9% of cases. PONV-03 failed (rescue antiemetics or documentation of PONV) in 20% of cases. Description of the cohort overall and according to passed/failed PONV-03 is displayed in the table. In the unadjusted model, failed PONV-05 status was associated with lower odds of failed PONV-03 (OR 0.84, 95% CI 0.82-0.85, p< 0.001). The distribution of passed PONV03 varied widely over the years of the study, in particular between 2018-2019 and later years. Adjusting the model by year resulted in a non-statistically significant association between PONV-05 and PONV-03 (OR 0.99, 95% CI 0.97-1.01, p=0.437).

Conclusions: Based on our preliminary analysis, failing the PONV-05 metric is surprisingly associated with passing the PONV-03 metric. However, given the model adjusted by year, the unadjusted modeling results should be interpreted with caution. Further characterization of the data with additional multivariable modeling is needed to fully illustrate the association between prophylaxis guideline compliance and the incidence of PONV.

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Association between guideline-compliant prophylaxis and the incidence of post-operative nausea and vomiting in patients undergoing Cesarean Delivery TABLE1.pdf

SUN - RA - BS 4 - BR 3 – Preeclampsia – 01

A High-Precision Machine Learning Approach Comparing AGT/VASN Ratio and sFlt-1/PlGF for Severe Preeclampsia Diagnosis: A Case-Control Study

Presenting Author: Xiao Lu Zhang, DO, PhD

Presenting Author's Institution: University of Alabama at Birmingham - Birmingham, Alabama

Co-Authors: Tamas Jilling, MD - Arnold School of Public Health,University of South Carolina
Saravanakumar Murugesana - Department of Anesthesiology and perioperative medicine UAB.
Annalese G. Neuenschwander, MD - University of Alabama at Birmingham
Lakshmi Saravanakumar - University of Alabama at Birmingham
Alan Tita, MD - University of Alabama at Birmingham

Abstract :

INTRODUCTION: Preeclampsia (PE), a hypertensive disorder of pregnancy, remains a major driver of maternal morbidity (1). Current diagnostic challenges persist in accurately differentiating between early- and late-onset phenotypes (2). There is a critical need for high-precision biomarkers, both as standalone metrics and within machine learning (ML) frameworks, to refine the identification of severe preeclampsia (sPE). This study evaluates the diagnostic performance of two novel biomarkers, Vasorin (VASN) and Angiotensinogen (AGT), comparing their utility against the gold-standard sFLT-1/PlGF ratio for sPE detection and phenotype stratification.

METHODS: This case-control study analyzed 72 pregnant individuals: 43 with sPE (19 early-onset, 24 late-onset) and 29 normotensive controls. Plasma levels of VASN, AGT, sFLT-1, and PlGF were quantified using standard assays. Statistical analysis utilized ROC curves to determine Area Under the Curve (AUC) and Youden's Index for optimal cut-off points. To optimize diagnostic precision, three ML models, Logistic Regression (LR), Random Forest (RF), and Support Vector Machines (SVM) were trained using a 5-fold cross-validation approach to integrate biomarkers with clinical covariates such as BMI and gestational age.

RESULTS: The sPE cohort exhibited a significantly higher BMI ($p < 0.05$), particularly in the late-onset subgroup, though no significant differences were noted in age or racial distribution (sPE: 48% White, 32% Black, 12% Hispanic, 8% Other; Control: 51% White, 28% Black, 14% Hispanic, 7% Other). VASN was significantly downregulated in sPE, while AGT was significantly elevated. Individual biomarker AUCs ranged from 0.78 to 0.85. The novel AGT/VASN ratio achieved an AUC of 0.88, nearly identical to the sFLT-1/PlGF ratio (AUC 0.89). At optimal cutoffs, the AGT/VASN ratio demonstrated 82% sensitivity and 86% specificity. ML Optimization: Integration of top features into ML models significantly boosted precision. The Logistic Regression model achieved the highest performance (AUC 0.94), followed by Random Forest (AUC 0.92).

CONCLUSION: The AGT/VASN ratio demonstrates diagnostic parity with the gold-standard sFLT-1/PlGF ratio in identifying sPE. By integrating these novel markers into machine learning models, clinicians can significantly enhance the precision of gestational subtype differentiation. These findings support a more robust, personalized approach to PE screening and early biomarker identification.

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SUN - RA - BS 4 - BR 3 – Preeclampsia – 02

Eclampsia Is a Perioperative Emergency: Delays to Magnesium and Anesthetic/ICU Utilization in a Timestamped Multi Hospital Electronic Health Record Cohort

Presenting Author: Pedro Gallardo, MD

Presenting Author's Institution: Mass General Brigham/Harvard Medical School - Boston, Massachusetts

Co-Authors: Kathryn J. Gray, MD, PhD - University of Washington \\
Ricardo Kleinlein, PhD - Brigham and Women's Hospital/Harvard Medical School
Nolan K. Wheeler, BS - Department of Anesthesiology, Perioperative and Pain Medicine, Brigham and Women's Hospital, Harvard Medical School, Boston, Massachusetts, USA

Abstract :

Background: Eclampsia is a time-sensitive hypertensive emergency with perioperative implications, including aspiration/airway risk after seizures, hemodynamic instability, and potential need for urgent delivery and intensive care unit (ICU)-level care. The American College of Obstetricians and Gynecologists (ACOG) endorses magnesium sulfate ($MgSO_4$) as the treatment of choice for eclampsia, initiated promptly and continued through delivery and 24 hours postpartum to prevent recurrent seizures.[1] However, real-world care pathways and the timeliness of $MgSO_4$ initiation, especially when seizures occur out of hospital or postpartum, are not well characterized.

Methods: We performed a retrospective electronic health record (EHR) study across a multi-hospital health system. Eclampsia cases were identified using an International Classification of Diseases (ICD)-based phenotype plus natural language processing of clinical notes for seizure/eclampsia concepts, followed by manual validation. Seizure onset time and setting were manually ascertained. Timestamped $MgSO_4$ administration was linked from structured medication data. Cases were categorized as antepartum/intrapartum versus postpartum. Primary outcomes were seizure-to-admission and seizure-to-$MgSO_4$ initiation; secondary outcomes included anesthetic technique at delivery, sedative/antiepileptic use, and ICU admission. Continuous variables are reported as medians with interquartile ranges (IQR) and compared using Wilcoxon rank-sum tests; categorical variables are reported as n (%) and compared using Fisher's exact tests; p-values are exploratory and unadjusted.

Results: Among 44 adjudicated eclampsia cases, 16 (36.4%) were postpartum and 28 (63.6%) antepartum/intrapartum. Seizures occurred before hospital admission in 25 (56.8%), with a median seizure-to-admission time of 11.2 hours (IQR 4.5–18.5). Among postpartum cases, median delivery-to-seizure time was 84.6 hours (IQR 19.4–204.2), and 10/16 (62.5%) occurred ≥48 hours after delivery. Among those with $MgSO_4$ initiated after seizure (n=40), median seizure-to-$MgSO_4$ initiation was 379 minutes (IQR 56.5–825). Only 11/40 (27.5%) received $MgSO_4$ within 60 minutes of seizure; this benchmark was met in 8/14 (57.1%) postpartum versus 3/26 (11.5%) antepartum/intrapartum cases.

General anesthesia occurred in 11/44 (25.0%) overall and was more common antepartum/intrapartum than postpartum (35.7% vs 6.2%). ICU admission occurred in 12/44 (27.3%).

Conclusions: In this timestamped cohort, eclampsia frequently presents outside immediate L&D-native workflows, with more than half of seizures occurring prior to admission and postpartum events often occurring beyond 48 hours after delivery. There were substantial delays in $MgSO_4$ administration following seizure onset. These findings support anesthesia-inclusive, cross-unit eclampsia response pathways with EHR-derived timeliness metrics to identify and remediate delay points.

References: 1. Obstet Gynecol 2020;135:240

Table 1.pdf

SUN - RA - BS 4 - BR 3 – Preeclampsia – 03

Sleep Trajectories During Pregnancy and Postpartum: Insights from Digital Health on Cardiovascular Health and Preeclampsia

Presenting Author: Alana Davidson

Presenting Author's Institution: Duke University School of Medicine - Durham, North Carolina

Co-Authors: Jerome J. Federspiel, MD, PhD - Duke University
Matthew Fuller, MS - Duke Anesthesiology
Ashraf S. Habib, MMBCh, MSc, MHSc, FRCA - Duke University School of Medicine
Emma E. Peek, BS - Duke University School of Medicine
Tatiana X. Solis-Montenegro, BS - Vanderbilt University School of Medicine

Abstract :

Introduction: Sleep disturbance is highly prevalent during the perinatal period[1,2] and is well recognized by the American Heart Association as a contributor to adverse cardiovascular outcomes.[3,4] Abnormal sleep parameters are associated with autonomic dysregulation which is commonly observed in cardiovascular and inflammatory diseases that increase preeclampsia (PreE) risk.[5] Associations between sleep quantity and quality and baseline CVD risk in pregnancy are poorly understood. The aims of our study were (1) to determine if wearable digital health sleep data studies are possible in pregnant and postpartum individuals and (2) to describe sleep parameters during and after pregnancy among healthy individuals and individuals with CVD risk factors and those who develop PreE. We hypothesize that less total sleep, worse sleep quality (sleep efficiency), and greater sleep fragmentation (sleep latency, wake after sleep onset (WASO)) are present in the high CVD risk group and in those who develop PreE.

Methods: This is an interim analysis of a prospective, observational study of pregnant people enrolled at 10–16 weeks' gestation and followed through two weeks postpartum (Feb 28, 2025–Jan 22, 2026). Subjects were classified as healthy or having CVD risk factors (prior PreE, hypertension, obesity, or diabetes) and then stratified by development of PreE per American College of Obstetricians and Gynecologists (ACOG) criteria. Total sleep duration, sleep efficiency, WASO, and sleep latency were summarized as weekly averages by cohort. Data points with a weekly average sleep duration of < 2 hours were excluded. Good sleep efficiency is categorized as >85%. Due to sample size, results are described visually.

Results: This interim analysis includes 17 healthy subjects and 23 with CVD risk factors. PreE developed in 12% of healthy subjects and 26% of those with CVD risk factors. Sleep latency tended to be highest (worse) in those with CVD risk factors who developed PreE when compared to healthy subjects in the antepartum period (Panel C). Similarly in the antepartum period, WASO tended to be higher (worse) in subjects with CVD risk factors who developed PreE (Panel D). Lower than normal sleep efficiency was seen across all subjects during and after pregnancy (< 85%) (Panel B).

Discussion: This pilot study demonstrates feasibility of healthy and high-risk obstetric patients in a digital health study. Trends suggest that greater sleep fragmentation (sleep latency, WASO) occurred in patients with CVD risk factors who developed PreE, most notably during the antepartum period. Although we are underpowered to detect significant differences, these trends are consistent with previous data linking sleep disturbances with poor CVD health.

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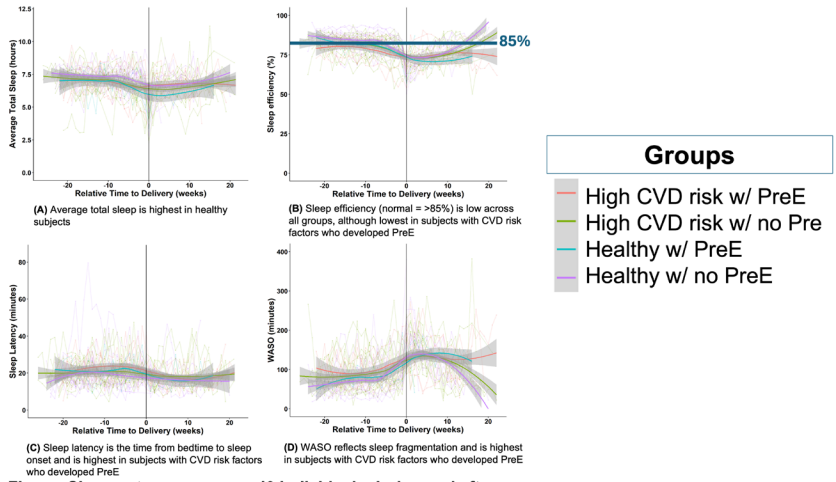

Figure. Sleep outcomes among 40 individuals during and after pregnancy

SUN - RA - BS 4 - BR 3 – Preeclampsia – 04

Evaluation of Myocardial Function and Metabolism in Patients with Early Onset Preeclampsia with Severe Features

Presenting Author: Adrienne Shami, MD, PhD

Presenting Author's Institution: Duke University Hospital - Bahama, North Carolina

Co-Authors: Ashraf S. Habib, MMBCh, MSc, MHSc, FRCA - Duke University School of Medicine
Maggie Nguyen, PhD - Duke University

Abstract :

Introduction: Preeclampsia (PEC) is associated with cardiovascular disease in the peripartum period and later in life.[1] PEC-related cardiomyopathy is often not detected until overt systolic dysfunction occurs, though subclinical cardiac dysfunction, including diastolic dysfunction and strain impairment have been observed.[2] However, prevalence and mechanisms of cardiac dysfunction in PEC, especially those with early-onset, severe PEC, are under studied. We hypothesize that PEC-related cardiac dysfunction may share similar underlying metabolic mechanisms to chronic heart failure, such as altered myocardial metabolism. Our aim was to determine the prevalence of cardiac dysfunction in pregnant people with early-onset PEC with severe features, and to determine if this cardiac dysfunction is measurable through metabolic biomarkers reporting on fundamental fuel substrate pathways.

Methods: This single site study prospectively enrolled pregnant patients with early onset (< 34 weeks) PEC with severe features from 8/2021 to 2/2023 (total N=22). Maternal cardiac function was assessed by echocardiography and plasma samples for metabolomic profiling were collected after PEC diagnosis, but prior to delivery. Diastolic function and left ventricular (LV) global longitudinal strain (GLS) were determined on echocardiograms; impaired strain was defined as >-18%. Profiling of 115 metabolites was performed by targeted tandem-flow mass spectrometry. Association between individual metabolite levels with cardiac function was evaluated in linear (strain %) or logistic (diastolic dysfunction presence/absence) models adjusted for age, delivery BMI, chronic hypertension.

Results: Utilizing recently updated echo criteria, diastolic dysfunction was present in 5/22 (23%) and impaired GLS was present in 13/20 (65%) of individuals. One patient had a mildly reduced ejection fraction with LVEF 49%. Individual metabolites associated with cardiac function measures included acylcarnitines C18-OH/C16-DC in the diastolic dysfunction model and C6-DC/C8-OH in the LV strain model at nominal statistical significance (p= 0.047 and 0.033, respectively).

Conclusion: We found a high prevalence of myocardial diastolic and subclinical systolic function (GLS) impairment in early onset PEC with severe features. Normal healthy pregnant women should not have strain impairment nor diastolic dysfunction. Concordant with known fuel substrates, we also found evidence of impairment in metabolic pathways central to healthy myocardial function including fatty acid oxidation. These results suggest possible mechanisms underlying cardiac dysfunction in PEC, and that impaired strain and diastolic dysfunction should be considered as possible new severe features of PEC. Future studies are needed to further examine these newly identified potential metabolic markers in larger cohorts.

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Evaluation of Myocardial Function and Metabolism in Patients with Early Onset Preeclampsia with Severe Features.pdf

SUN - RA - BS 4 - BR 3 – Preeclampsia – 05

Puerperal Cerebrovascular Complications of Preeclampsia with Severe Features: A Case Series on Anesthetic Management

Presenting Author: Victoria M. Brookshire, MD, MPH

Presenting Author's Institution: Duke University Medical Center - Durham, North Carolina

Co-Authors: Jerome J. Federspiel, MD, PhD - Duke University
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Ashraf S. Habib, MMBCh, MSc, MHSc, FRCA - Duke University School of Medicine
Andrea Ibarra, MD, MS - Stanford University
Marie-Louise Meng, MD - Vanderbilt University Medical Center

Abstract :

Background: Puerperal cerebrovascular disease (PCD) is a rare, yet life-threatening, complication that occurs in approximately 0.33% of patients with preeclampsia with severe features during delivery hospitalization.1 Perioperative blood pressure (BP) fluctuations during general endotracheal anesthesia (GETA) for cesarean delivery have been proposed as a contributor to cerebrovascular injury.[2] We conducted a chart review of patients with preeclampsia with severe features who experienced a CDC-defined Severe Maternal Morbidity (SMM) PCD event to identify intrapartum hemodynamic patterns temporally associated with PCD.

Methods: After IRB approval, delivery hospitalizations from 2016–2020 were reviewed. Patients with preeclampsia with severe features and an ICD-10 code corresponding to a CDC SMM PCD event were included. Significant anesthesia-related hemodynamic changes were defined as: (1) severe pre-induction hypertension (SBP ≥160 mm Hg and/or DBP ≥110 mm Hg); (2) intraoperative hypotension (25–50% reduction from baseline SBP); and (3) severe rebound hypertension on emergence (SBP ≥160 mm Hg and/or DBP ≥110 mm Hg). Two authors independently adjudicated PCD diagnosis and assessed potential anesthetic contribution. Results are descriptive.

Results: Among 24,946 deliveries, 1,365 (5.47%) had preeclampsia with severe features. Of these patients, nine patients had a PCD diagnosis code. Two were excluded after adjudication: a preexisting aneurysm,2 and Bell's palsy. Seven patients experienced confirmed PCD events during delivery hospitalization (Figure 1). All underwent neurologic imaging, with posterior reversible encephalopathy syndrome being the most common PCD (5/7). In four cases, anesthetic management was not contributory, including severe pre-existing hospital disease (n=2), vertebral artery dissection attributed to an anatomic variant (n=1), and traumatic intraparenchymal hemorrhage related to intimate partner violence (n=1). In three cases (43%), significant anesthesia-related hemodynamic changes were observed: severe hypertension prior to induction, intraoperative decline, and severe rebound hypertension on emergence. All three patients received GETA and experienced postpartum hemorrhage

(PPH).

Discussion: In this case series, we identify a relationship between PCD and blood pressure fluctuations that occurred only in patients that required GETA and experienced PPH. These findings highlight the importance of vigilant BP management, minimizing hemodynamic fluctuations, and preventing rebound hypertension during this challenging scenario. These findings can serve as the framework to study cardiovascular vulnerability and the impact of anesthesia-related hemodynamic changes in patients with preeclampsia undergoing cesarean delivery. Future prospective and retrospective studies should evaluate the absolute risk of PCD in this population.

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Puerperal Cerebrovascular Complications of Preeclampsia with Severe Features- A Case Series on Anesthetic Management.pdf

SUN - RA - BS 4 - BR 3 – Preeclampsia – 06

Blunted Autonomic Adaptation in Preeclampsia: A Prospective Digital Biomarker Study

Presenting Author: Marie-Louise Meng, MD

Presenting Author's Institution: Vanderbilt University Medical Center - Nashville, Tennessee

Co-Authors: Alana Davidson, BS - Duke University School of Medicine
Jerome J. Federspiel, MD, PhD - Duke University
Matthew Fuller, MS - Duke Anesthesiology
Ashraf S. Habib, MMBCh, MSc, MHSc, FRCA - Duke University School of Medicine
Emma E. Peek, BS - Duke University School of Medicine

Abstract :

Intro: Heart rate variability (HRV) is the variation in time between heartbeats. Higher HRV is associated with autonomic and overall health.[1-6] Lower HRV is associated with low vagal activity. Pregnancy is characterized by sympathetic predominance that normalizes postpartum.[3-6] HRV patterns in pregnancy are not well defined, and the relationship between sympathetic predominance over cardio-vagal modulation on HRV and preeclampsia (PreE) is unclear.[3-8] We hypothesized cardio-vagal HRV would be lower in pregnant and postpartum patients with cardiovascular disease (CVD) risk factors compared with those without risk factors, and lower in those who develop PreE.

Methods: This is prospective, observational study enrolled people at 10–16 weeks' gestation and followed them until two weeks postpartum (Feb 2025–Jan 2026). Participants were classified as healthy or having CVD risk factors (prior PreE, hypertension, obesity, or diabetes) and stratified by development of PreE per ACOG criteria. HRV by Root Mean Square of Successive Differences (RMSSD), an indirect marker of cardio-vagal modulation, was calculated from sleep using continuous recordings with the Oura Ring wearable device. HRV trajectories of weekly averaged RMSSD (values³10ms) in pregnancy and postpartum were examined by CVD risk status and PreE development.

Results: This interim analysis includes 17 healthy participants and 22 with CVD risk factors. PreE developed in 12% of healthy participants and 26% of those with CVD risk factors. Healthy participants without CVD risk factors had higher HRV across pregnancy than those with CVD risk factors (Panel A). Among those who did not develop PreE, HRV trajectory had a U-shaped pattern, increasing in the weeks preceding delivery. In contrast, those who developed PreE had monotonically declining HRV trajectories. Postpartum HRV was lower after pregnancies complicated by PreE compared with non-PreE pregnancies (Panel B). HRV recovered postpartum in healthy participants regardless of PreE status, whereas those with CVD risk factors maintained low postpartum HRV, lowest in those with CVD risk factors and PreE (Panel C).

Discussion: Distinct HRV trajectory patterns of cardio-vagal modulation were observed before and after delivery. PreE was characterized by failure of HRV to rise predelivery and reduced HRV postpartum. Persistent postpartum low HRV among participants with CVD risk factors—especially those with both CVD risk and PreE—suggests impaired vagal tone. These findings support further investigation into mechanisms underlying failure of normalization of sympathetic and vagal activity after pregnancy and whether altered HRV trajectories signal increased long term CVD risk. Continuous HRV monitoring may help identify PreE before delivery, detect incomplete postpartum recovery, and reveal subclinical autonomic dysfunction.

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SUN - RA - BS 4 - BR 3 – Preeclampsia – 07

Loss of EV-miR-125a-5p in CSF may permit local sFLT1-mediated neurovascular injury in severe pre-eclampsia

Presenting Author: David W. Melton, MD, PhD

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Abstract :

Preeclampsia is a serious vascular disease that impacts 5-8% of all pregnancies and is linked to significant morbidity and mortality. Severe neurological sequelae are frequent and are a major cause of mortality. Neurovascular dysfunction has been suggested to be mediated by microRNAs (miRNAs) that are associated with extracellular vesicles (EV). EVs isolated from preeclamptic patients have a distinct expression pattern of miRNAs (EV-miRNAs) that can be useful as an early biomarker for the disease but also may play a critical role in its pathogenesis. However, the EV-miRNA population of the cerebrospinal fluid (CSF) has never been surveyed in the pre-eclamptic patient population.

Hypothesis: The CSF maintains a distinct EV-miRNA population and may provide a more direct insight into the cerebrovascular dysfunction underpinning severe neurological features (SNF) of preeclampsia.

Methods: Plasma and CSF were collected from three patient cohorts during spinal anesthesia or and categorized as Control (no evidence of preeclampsia), Preeclampsia without evidence of severe neurological features (PreE), and Preeclampsia with at least one severe neurological feature (PreE w/SNF; include headache, vision changes, altered mental status, or seizure). EV-miRNA was isolated using Qiagen ExoRNeasy kit. A panel of 7 miRNAs (hsa-miR-125a-5p, -155-5p, -210-3p, -520a-5p, -125b-5p, -190a-5p, and -297) were chosen based on previous literature and were assayed utilizing the Taqman platform.

Results: EV-miRNA levels were found to be lower in the CSF relative to plasma, as expected given the smaller population of CSF EVs; however, miR-125b-5p was elevated in the CSF relative to plasma of all cohorts. Of the related EV-miRNA, miR-125a-5p, interestingly demonstrated a >2-fold lower expression in the CSF of PreE w/SNF relative to PreE disease controls (see Figure). This difference is observed only in the CSF not the plasma. This miRNA has been shown to negatively regulate the expression of sFLT1 and inhibition of miR-125a-5p leads to increased sFLT1.

Conclusion: The pathogenic role of sFLT1 in preeclampsia and vascular dysfunction is well established. Therefore, further exploration of the dynamics of miR-125a-5p:sFLT1 in the CSF of preeclamptic patients demonstrating severe neurological features is warranted. These findings support a model in which neurological severity in pre-eclampsia reflects compartment-specific failure of neurovascular miRNA-mediated angiogenic restraint, rather than systemic anti-angiogenic burden. This observed divergence between decreased CSF EV–miR-125a-5p, a negative regulator of FLT1/sFLT1, and increased levels of miR-125b-5p, associated with endothelial stress responses, suggests coordinated shifts toward anti-angiogenic and pro-inflammatory signaling within the cerebral microvasculature in PreE patients with severe neurological features.

References:

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Physical Activity and Total Sleep Levels in Patients with Cardiovascular Risk Factors Using the Oura Ring

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Abstract :

Background: Regular physical activity during pregnancy reduces rates of adverse pregnancy outcomes and is essential for long term cardiovascular health.[1,2] The aims of our study were to (1) determine if wearable digital health devices could be used in pregnant subjects to gather information regarding physical activity and (2) to examine physical activity and its relation to sleep in a cohort of healthy pregnant subjects, pregnant subjects who have cardiovascular disease (CVD) risk factors, and pregnant subjects who develop preeclampsia (PreE). We hypothesize that subjects with CVD risk factors and patients who develop PreE regardless of chronic risk factors will have lower physical activity during the antepartum period, and that this will correlate with worse daily sleep.

Methods: This is an interim analysis of a prospective, observational study of pregnant people enrolled at 10–16 weeks' gestation (Feb 28, 2025–Jan 22, 2026). Subjects were classified as healthy or having chronic CVD risk factors (prior PreE, hypertension, obesity, or diabetes) and then stratified by development of PreE per American College of Obstetricians and Gynecologists (ACOG) criteria. Total sleep duration was summarized as weekly averages. Average daily step counts were recorded as our measure of physical activity. Due to sample size, results are described visually and qualitatively.

Results: This interim analysis includes 17 healthy subjects and 23 with CVD risk factors. PreE developed in 12% of healthy subjects and 26% of those with CVD risk factors. Subjects without CVD risk factors and no PreE diagnosis tended to have a higher average daily step count than those with PreE, while among patients with chronic CVD risk factors, step counts were similar regardless of PreE diagnosis (Table 1a). However, differences in daily steps were not statistically significant in adjusted and unadjusted models (Table 1b). The majority of subjects in our study had less than 10,000 steps per day - the suggested daily amount for all ambulatory people (Table 1a, Figure 1).[3] Subjects with both lower than typical step counts and lower daily sleep were almost exclusively patients with CVD risk factors (Figure 1).

Conclusion: Our pilot study demonstrates that collecting digital activity data from both healthy and high-risk pregnant individuals is feasible, with high participant acceptance of the technology and reliable follow-up. Although average daily step counts were not significantly different between groups, the numeric difference in steps counts support proceeding to an adequately-powered cohort. Pregnant patients with CVD risk factors may not be attaining appropriate daily step counts, and suboptimal physical activity may be correlated with worse sleep.

References:

1. Gascoigne EL, et al. *Am J Obstet Gynecol MFM*. 2023.
2. Lloyd-Jones DM, et al. *Circulation*. 2022.
3. Brown HL, et al. *Circulation*. 2018.

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