

Table of Contents

- [President's Message](#)
- [Editor's Update](#)
- [Review of the 33rd Annual Society for Obstetric Anesthesia and Perinatology Meeting](#)
- [Research Column](#)

- Pro / Con:
Combined Spinal-Epidural Technique Should be Offered to All Laboring Parturients
 - [Pro: Vernon Ross, MD](#)
 - [Con: Regina Fragneto, MD](#)

- [Current Review: Considerations for the Parturient with Advanced Maternal Age](#)
- [Obstetric Anesthesia Board Review Questions](#)
- [ASA Overseas Teaching Program](#)
- [Kybele - Goddess of Childbirth](#)
- [The SOAP Box: Doulas at Cesarean Births](#)
- [Letters from Members: Questions about safety of administering regional anesthesia to parturients with tattoos over the lumbo-sacral region](#)

[Newsletters Archive](#)

[Back to Inside Soap](#)

[Back to Soap Home](#)



Society for Obstetric Anesthesia and Perinatology

SOAP Newsletter Highlights

Summer 2001

A Publication of the
Society for Obstetric Anesthesia & Perinatology

For a printed issue of the SOAP Newsletter (not including the online newsletter exclusives) please contact:
soap@societyhq.com

© Copyright 2001 The Society for Obstetric Anesthesia & Perinatology

President's Message



Greetings to all of you and I hope that you have had an enjoyable summer! I have a number of exciting developments to share with you.

First, planning is actively underway for SOAP 2002 to be held in Hilton Head, SC, May 1-5. Based on your feedback, meeting planners Gary Vasdev, M.D. and Joy Hawkins, M.D. will offer several new educational opportunities including an optional Neonatal Advanced Life Support certification course and an optional Hands On Airway Management Course. Abstract submission will again be online with the site going live on November 1, 2001 and abstracts due by January 31, 2002. Enhancements have been made to the site to facilitate data entry. Hilton Head is a wonderful venue for the entire family with the resort offering sailing, swimming, tennis, golf and kayaking so bring the whole family!

For those of you with innovative ideas about education, the 2002 meeting will be the first opportunity to compete for the SOAP Research in Education Award. The criteria for this award follows on page 2. Also, in response to your feedback, the Research Committee, under the direction of Chair Robert D'Angelo, MD, has standardized abstract grading forms and judging forms for the oral competitions at the meetings. The judging criteria can be seen on SOAP's website <www.soap.org> under the section for meetings.

The Hilton Head meeting will offer another "first". SOAP has received approval from the Accreditation Council for Continuing Medical Education to provide CME credits for its meetings. The Society had to go through an extremely rigorous evaluation to receive this accreditation and I want to thank Dr. Alan Santos, Stewart Hinckley and Bob Specht at Ruggles for seeing this through to completion. Having this accreditation will also decrease meeting expenses for the Society, as we previously have had to pay the Society for Education in Anesthesia to provide our CME credits. Society members play a critical role in maintaining our accreditation by completing meeting evaluations and communicating ideas for future meetings to the annual meeting planners.

In case you just can't wait until next spring for your next dose of SOAP, please attend the Sol Shnider Breakfast Panel at this year's ASA meeting. It will be held Tuesday, October 16, 2001 from 7:30 - 8:45 am at the Hilton New Orleans Riverside Hotel. Topics include: an update on coding for OB anesthesia services, complying with new ASA and ACOG guidelines, severe preeclampsia and spinal anesthesia, and the platelet count and regional anesthesia.

The next time that you are online, check out SOAP's enhanced website at www.SOAP.org, which now includes online dues payment, registration for the annual meeting and a regularly updated, password protected membership roster.

During the upcoming year, the Society will be considering several new potential areas of involvement. Shortly after the Annual Meeting some SOAP members were invited to attend a symposium sponsored by the Maternity Center Association (MCA) and the New York Academy of Medicine entitled "The Nature and Management of Labor Pain, An Evidence Based Symposium". The MCA is a not-for-profit organization founded in 1918 that works to improve the quality of maternity care in the U.S. through innovative woman and family-centered approaches to maternity care. MCA is involved in prenatal care, childbirth education, nurse-midwifery education and care in out-of-hospital birth centers. The objectives of the symposium included making accurate information about labor pain and methods to relieve it easily available to relevant health care professionals, childbearing women and the general public; to improve women's access to a choice of reasonably safe and effective pharmacological and non-pharmacological methods for pain relief during labor and assure that women receive full information on all methods of labor pain relief available in their place of birth; to identify gaps in our knowledge base and develop research priorities. Obstetricians, nurse midwives, childbirth educators, pediatricians, epidemiologists, and public health researchers attended the meeting. A unique aspect of this meeting was that all presentations had to be put in paper format and submitted for peer review prior to the meeting. These papers were critiqued and the presentations adjusted accordingly. Dr. Lawrence J. Saidman (former Editor-in-Chief of *Anesthesiology*) was the reviewer representing our specialty. Thus, the quality of presentations was quite high. We were well represented by Drs. Caton, Leighton, and Rosen, each of whom spoke on various aspects of labor analgesia. It was an extremely interesting experience and not nearly as "anti-anesthesia" as I expected the meeting to be. I walked away with a greater understanding of the viewpoint of the non-anesthesiologists in attendance. There was no debate that epidural analgesia is the safest and best form of labor analgesia for women with any sort of complicated delivery or significant co-existing medical problem. The real issue for many of the attendees was that for healthy women with normal pregnancies and labors, the increasing predominance of epidural analgesia has resulted in decreased availability of alternative techniques (Jacuzzis, birthing balls, Doulas etc.). For those women who truly want an unmedicated labor, these alternatives are increasingly scarce. Although some of the participants were clearly anti-epidural, I had the sense that the majority was more interested in assuring the continued availability of non-pharmacologic options than anti-epidural. The proceedings from this symposium will be published in a January supplement to the *American Journal of Obstetrics and Gynecology*. I am working on a mechanism to get this supplement to SOAP members. As a result of this meeting, I have been invited to sit on the National Advisory Council for the Maternity Center Association's Listening to Mothers national survey of women's experiences with childbirth.

On the international front, SOAP has been approached by the ASA Overseas teaching program at Ghana Medical School to assist with training in neonatal resuscitation and obstetric anesthesia. The SOAP Education Committee is working on this project.

Richard Wissler, MD represented the Society at a recent exploratory meeting with MedTeams. This is a group sponsored by the Department of Defense that looks at how teams function and ways of improving that function in order to enhance patient care. They have recently completed a project with Emergency Medicine. They are now considering developing a curriculum to promote teamwork between Obstetricians, Anesthesiologists and labor and delivery nurses working in labor and delivery units.

Finally, the Society has had preliminary discussions with the Wood Library-Museum of Anesthesiology to consider this site as a repository for SOAP documents, newsletters and other memorabilia.

It is shaping up to be an exciting year and I look forward to reporting the Society's progress to you as the year progresses.

The Blue Line: Editor's Update

Greetings and welcome to the Summer 2001 edition of the SOAP newsletter. For those of you who did not attend the annual meeting in San Diego, there is a [meeting review](#) by meeting co-hosts Alex Pue and Larry Reisner that is the next best thing to having been there, minus the beautiful surroundings and the unbelievable weather. There is also a review of anesthetic considerations for the elderly parturient, a pro-con forum on combined-spinal epidural analgesia, and a lively SOAP Box.



David Wlody, MD, Editor

I would like to use my editorial prerogative to draw your attention to two programs that will enable obstetric anesthesiologists to contribute their skills and knowledge to improve the medical care of mothers and newborns in the developing world. The Overseas [Training](#) Program of the ASA needs anesthesiologists to travel to Ghana to help provide training in neonatal resuscitation. [Kybele](#), a non-profit organization that seeks to promote obstetric anesthesia in countries that have a well-organized hospital infrastructure but which lack physician training, is seeking obstetric anesthesiologists who are able to spend 1-2 weeks in Turkey. Information about each of these worthy programs, including the names of contact persons, can be found on the SOAP website. I urge all of you with the time and the flexibility to participate in these programs to seriously consider becoming involved.

David Wlody, MD, Editor
New York, NY
dwlody@aol.com

Review of the 33rd Annual Society for Obstetric Anesthesia and Perinatology Meeting



Drs. Reisner and Pue

The Society for Obstetric Anesthesia and Perinatology held its Thirty-Third Annual Meeting April 25-28, 2001 at the Hyatt Regency Hotel in San Diego, California. There were 448 registered attendees. On the morning before the official commencement of the meeting, forty-five interested guests attended a tour of the Sharp/Mary Birch Hospital for Women led by meeting co-host Alex Pue. This freestanding women's hospital has one of the largest delivery services in California. Dr. Reisner and Dr. Pue officially opened the meeting at 14:00 on Wednesday, April 25, 2001 with an audio-visual presentation set to the music from the movie "2001-A Space Odyssey".

First on the program was a lively session dealing with "Lawsuits in OB Anesthesia" moderated by Dr. Pue. He presented a theoretical obstetric anesthesia case with a bad outcome and three experts discussed their approach to the resulting lawsuit. Ken Sigelman, J.D., M.D., discussed the approach of the plaintiff's attorney, David Nugent, J.D. discussed the approach of the defendant's attorney, and Gershon Levinson, M.D. discussed the role of the expert witness. This was followed by a session dealing with

"Politics and OB Anesthesia" moderated by McCallum R. Hoyt, M.D. The panelists represented a variety of perspectives. Patsy Dailey, M.D. discussed state and national specialty politics.

Maryland State Senator Andrew Harris, M.D. discussed governmental politics at a state level. Finally, Tom Joas, M.D. discussed his most recent political experience as a member and chairman of the Medical Board of California. SOAP members opting instead to refresh their clinical knowledge were able to attend simultaneous refresher course lectures. David Gambling, M.B.B.S. gave the first lecture entitled "Combined Spinal Epidural Analgesia and Patient Controlled Epidural Anesthesia". Barbara Zucker-Pinchoff, M.D. then discussed the perils of "Latex Allergy". SOAP attendees then participated in a wine and cheese



Political Panel



Opening Reception

reception on the hotel's outdoor patio.

The next morning began with a continental breakfast and viewing of scientific exhibits and posters. Alan Santos, M.D. moderated the presentation of papers selected for the Gertie Marx Symposium. Six papers were presented. The winning paper was "The ED₉₅ of Intrathecal Bupivacaine with Opioids for Cesarean Section" by Mirikitani et al. of Stanford University, presented by Edward Mirikatani, M.D. There was a tie for the 2nd place award, awarded to presenter Jeremy Davis, F.R.C.A. and his colleagues from the Royal Free Hospital, London for their paper entitled "Platelet Function in Preeclampsia: Platelet Function Analyzer (PFA-100) vs. TEG". The other paper honored with the 2nd place award was "Low Dose Lidocaine Causes Toxic Changes in Neuronal Morphology", presented by Pushkar Dadarkar, F.R.C.A. on behalf of his colleagues at the Mayo Clinic. Next, David Gambling, M.B.B.S. provided a thoughtful and thorough discussion and analysis of the first group of twenty-five poster presentations. Gary Vasdev, M.D. followed by moderating the first group of four oral presentations, which dealt with the topic of cesarean section.

David Birnbach, M.D. ushered in the afternoon session by moderating a stimulating debate titled "An Anesthesia Provider Should Be Present For Vaginal Delivery In All Patients Receiving Neuraxial Analgesia".

Brett Gutsche, M.D. presented the pro side of the argument and William Camann, M.D. fielded the con opinion. The audience then learned about "What's New in In Vitro Fertilization" in a presentation by Christo Zouves, M.D. This well-presented lecture dealt with the issues of trans-vaginal egg retrieval, multiple pregnancy, pregnancy induced hypertension, heparin/aspirin therapy, advanced maternal age and the management of the ovarian hyper-stimulation syndrome. Lively and knowledgeable audience participation in the question and answer period demonstrated that this was a timely topic. Lawrence Tsen, M.D. then artfully conducted the second poster review session of twenty-nine posters. The afternoon meeting concluded with simultaneous sessions on "Hemodynamic Control in Obstetrics" by Chris Rout, FFARCS and "Research Works in Progress" moderated by Robert D'Angelo, M.D.

The evening was a special event for the many SOAP attendees who joined the various Dine-Arounds hosted by local SOAP members and SOAP board members. Restaurants of various cuisines were available to accommodate practically any culinary desire, and participants made new acquaintances and renewed old ones. One unique dinner was arranged by co-host Dr. Reisner at



Edward Mirikatani, MD



David Gambling, MBBS



Elizabeth Bell, MD



Lawrence Tsen, MD

Morton's Steak House. Mark Greenberg, M.D., a University of California San Diego pediatrician and anesthesiologist and a consultant to the San Diego Zoo, gave a fascinating presentation of his experiences anesthetizing and caring for animals at the San Diego Zoo and Wild Animal Park.

Friday morning, April 27, 2001 began with a refresher course on "Neurologic Complications of Regional Anesthesia in Obstetrics" presented by Mark Zakowski, M.D. SOAP members and guests then went off to compete in a variety of physical activities.

Fifty-two people participated in the Braun Annual SOAP Fun Run/Walk. This year's event was organized by Eileen Pue and was held at scenic Harbor Island. The women's winners were first place Heidi Splete, and second place, Anusasuya Vasudevan. The men's winners were Frank

Storniolo, who once again won the race and Jim Flanigan who came in second. Golfers were treated to the Maderas Golf Club where Owen Ellis, M.D. arranged a best ball tournament. Larry Reisner roamed the course offering "Mulligans" and "Free Throws" for sale to provide funds for prizes. First place score was 61 with team members Mark Gunn, M.D. and Robert Parker, D.O. Ginny Ferrari hit the "Longest Drive - Women" and the "Longest Drive- Men" was hammered in by Mark Gunn. Mark Siegman received the award for "Closest to Pin".

The Tennis Tournament was organized and managed by David Gambling, M.B.B.S. and George Wahab, M.D. The weather was conducive to vigorous

play and the winning team consisted of Robin Goldsmith, M.D. and her mystery partner. For those interested in seeing San Diego, a Deluxe City Tour and Harbor Excursion was available. This included a visit to the Mission in Old Town, Balboa Park, the Gaslamp Quarter, and a harbor cruise.



William Camann, MD



Chris Rout, FFARCS



Brett Gutsche, MD



Mark Zakowski, MD



After a quick lunch SOAP held its annual business meeting. At the end of the meeting, outgoing SOAP president, Alan Santos, handed over the gavel to the incoming president, Valerie Arkoosh, M.D. SOAP members then listened to six oral presentations moderated by H. Jane Huffnagle, D.O. The topics all dealt with issues of labor analgesia and local anesthetics. This was followed by the four papers, presented by obstetricians, which were entered in the Zuspan Competition. After great deliberation the judges chose "Cardiotocographic Abnormalities Associated With Labor Induction" by Balitona J, Meyer I, Ramin K, Vasdev G, and Ramsey P of the Mayo Clinic. Dr. Patrick Ramsey presented this informative paper.



Alan Santos, MD presents the gavel to Valerie Arkoosh, MD

The final educational session for the day was the "What's New in Obstetrics" lecture delivered by Robert Resnik, M.D. This extremely interesting and enlightening talk delved into the issues of the current role of fetal heart rate

monitoring in obstetrics, and the relationship between cervical length, fetal fibronectin, bacterial vaginosis and preterm labor. Dr. Resnik also talked about the management of placenta accreta/percreta, thrombophilic disorders in pregnancy, gestational diabetes, the current role of fetal pulse oximetry, and new concepts in the use of corticosteroids to induce fetal lung maturation. He concluded with the management of Rh isoimmunization and the utilization of the measurement of fetal middle cerebral artery blood flow by doppler ultrasonography. Immediately after this talk, Kathy Zuspan, M.D. and Valerie Arkoosh, M.D. presented the Zuspan Award to Patrick Ramsey, M.D., and SOAP members retired to prepare for the evening banquet.



H. Jane Huffnagle, DO



Gertie Marx Award

The SOAP Banquet was held at Sea World and began with a social hour outside of the Penguin Encounter. Guests then entered the Nautilus Pavilion, a large, semi-permanent, tent-like structure, for an excellent meal and entertainment. Gertie Marx herself presented the awards to the winners of Gertie Marx Symposium. The remaining dinner



Robert Resnik, MD

entertainment focused on this year's recipient of the SOAP Distinguished Service Award, Mieczyslaw Finster, M.D. Barbara Zucker-Pinchoff, M.D. serenaded Mike with her beautiful voice and made many accolades to Mike. Charles Gibbs, M.D. offered verbal praises, and Mike, his usual modest fashion, accepted them with grace and charm. Mike is surely an inspiration not only to those interested in obstetric anesthesia, but also to those in academic anesthesia. His boundless energy and exuberance have led him through a long career of research, publishing, educating, editing, and advising. His dedication and service to SOAP are well known and we always await his sage comments during our scientific sessions. After dinner SOAP members enjoyed a spectacular private Nighttime Shamu Show.



Kathy Zuspan, MD, Patrick Ramsey, MD, and Valerie Arkoosh, MD



Charlie Gibbs, Lilly and Mike Finster and Barbara Zucker-Pinchoff



Penny Balem, MD

Saturday morning, the final day of the meeting, was launched with an outstanding Clinical Forum on Coagulopathies and Transfusion Medicine moderated by Shiv Kumar Sharma, M.D., Terese Horlocker, M.D. brought us up to date on the use of low molecular weight heparin and neuraxial anesthesia, while Penny Balem, M.D. presented a lecture on "Bleeding Disorders, Transfusion Therapy, and the Cell Saver in Obstetrics".



Joanne Douglas, MD

M. Joanne Douglas, M.D then delivered the keynote Fred Hehre Lecture. Her focus was on "Looking To The Past To Find A Vision For The Future." She reviewed the historic advances made in regional anesthesia and analgesia as they relate to obstetric anesthesia over the past several decades. She then defined those areas that need further consideration and research.

Following this entertaining and informative

lecture, Geraldine O'Sullivan, M.D. moderated a debate entitled "Most OB Patients With A `Wet Tap' Should Get A Prophylactic Blood Patch."

The always-game Brett Gutsche, M.D. was valiant enough to take on the pro side of the controversy on extremely short notice when the scheduled speaker was unable to attend. Gary Vasdev, M.D. ably defended the con side. Although the audience was split, more people changed from the con side to the pro side, so the moderator declared Dr. Gutsche the winner. Don Penning, M.D. then moderated seven oral presentations competing for the "Best Paper of the Meeting" award. After careful deliberation, the judges awarded this honor to "Allopregnanolone protects against NMDA-induced cellular injury in human NT2-N neurons", by Ellen



Gary Vasdev, MD, Geraldine O'Sullivan, MD, and Brett Gutsche, MD

Lockhart, M.D. who presented the paper, and her colleagues from Duke University and the University of Toronto. One of the presentations that all SOAP attendees look forward to is the Gerard W. Ostheimer Lecture "What's New in Obstetric Anesthesia". This lecture brings us up to date with the latest and most important issues in our subspecialty.

B. Scott Segal, M.D., expertly and creatively delivered this year's talk. Dr. Segal gave a thorough and stimulating review of many topics ranging from "Alternative Medicine" through "Workload, Resources, and Training." He augmented his lively and creative presentation by providing an outstanding annotated bibliography with no less than 442 citations. This bibliography alone was worth the price of admission and is an excellent resource.



B. Scott Segal, MD

As the meeting headed for its close, Cheryl DeSimone, M.D. moderated a series of four oral presentations on various topics of interest to obstetric anesthesiologists. For the finale, Laurence Reisner, M.D. elegantly reviewed and discussed the twenty-one papers from Poster Session #3. Don Penning and Valerie Arkoosh then presented the "Best Paper Of The Meeting Award" to Ellen Lockhart

Valerie Arkoosh gave the closing remarks and at 4:30 PM on April 28, 2001,

the 33rd Annual Meeting of SOAP concluded. Those attending were exhilarated from the exchange of information and from the exciting social events.

Laurence S. Reisner, MD and Alex Pue, MD
Meeting Co-hosts

Editor's Note: Many thanks to Alex Pue, Larry Reisner, and Divina Santos for their wonderful photographs.



Cheryl DeSimone, MD

Strengths and Limitations of the Up-Down Study Design

The up-down sequential allocation study (up-down study) design as described by Dixon and Massey¹ has become increasingly utilized to estimate an ED₅₀ (effective dose in 50% of patients) or compare ED₅₀'s of a variety of anesthetic drugs including inhalational agents,² intravenous agents,³ local anesthetics,⁴ and epidural or spinal opioids.⁵⁻⁶ Although the up-down study design offers a new approach for estimating an ED₅₀, some of these studies have yielded controversial findings, especially when the technique has been used to estimate local anesthetic potency.⁷⁻⁸ The purpose of this article is to briefly describe the up-down study design and to discuss the strengths and limitations of the technique.

The up-down study design is simple, efficient and allows an ED₅₀ to be quickly estimated (usually less than 25 patients) for virtually any drug. The ED₅₀ is estimated much more efficiently with an up-down study design than with a traditional dose response study because all of the data points are focused in the immediate vicinity of the ED₅₀ rather than scattered along the entire dose response curve. An up-down study is open label by design with each patient's dose determined by the previous patient's response, except for the initial patient's dose which is arbitrarily chosen by the investigators. Likewise, the investigators predetermine the dosing intervals, endpoints and define what constitutes a success, failure or rejection. Investigators choose these variables using either clinical experience or repeating the design of a previously described up-down study. This somewhat arbitrary component of the up-down study design is important since these parameters can significantly influence outcome. For example, since only data from doses that approximate the ED₅₀ are used in the statistical analysis, patients and time are wasted if the initial chosen dose is much greater (or smaller) than the final estimated ED₅₀. When this occurs all initial responses will be categorized a success with each subsequent dose being reduced until the first failure occurs. Nearly all of these successes will be omitted from statistical analysis. In addition, if the spacing of incremental doses does not approximate the standard deviation of the final estimated ED₅₀, the 95% confidence limits become biased. Unfortunately, neither good estimates of the ED₅₀ nor its standard deviation may be available when designing a study. And finally, since relatively few patients are enrolled in an up-down study, the potential for selection bias may be more likely to occur than with other types of study design.

To illustrate potential problems encountered in designing an up-down study, I will describe some of the questions we asked as we designed the first up-down study estimating an ED₅₀ for the intrathecal opiate sufentanil. Questions we initially asked included: 1) What is a clinically relevant duration of spinal analgesia? We chose 60 min (up-down studies estimating the ED₅₀ of local anesthetics use a reduction in VAS score to less than 10mm within 30 min rather than a reduction in VAS for a particular duration). 2) What initial dose of intrathecal sufentanil will produce 60 min of analgesia in 50% of patients? We guessed 5mg based on clinical experience. 3) What dosing increments to utilize? We chose 1mg because of ease of dilution. 4) How many patients to enroll? We chose 40 since the up-down study technique

described with local anesthetics typically enrolled 40 patients.⁴⁻⁵ 5) Do we enroll nulliparous or multiparous patients? Once again we enrolled both as was described in the local anesthetic up-down studies.

In retrospect, although most of our guesses were fairly accurate, we made two major errors. First, we enrolled more patients than necessary. We determined approximately 20 patients, rather than 40, are needed to estimate an ED₅₀ for intrathecal sufentanil. Second, and most importantly, we found that parity is a confounding variable with intrathecal sufentanil administration since VAS pain scores and estimated ED₅₀'s vary significantly between nulliparous and multiparous women (which is in contradistinction from the up-down studies administering local anesthetics which report no such affect of parity). The data from our first 40 patients was thrown out and the study was repeated using only nulliparous women. The ED₅₀ for intrathecal sufentanil that produces 60 min of labor analgesia was estimated to be 4.1 mg.⁵ It is important to note that this ED₅₀ is only for 60 min of labor analgesia. Any duration of analgesia other than 60 min would yield a different ED₅₀. However, durations significantly longer than 60 min would most likely increase side effects while durations significantly shorter than 60 min may lessen any practical clinical implications.

Although the major strength of the up-down study design is that all data points concentrate in the vicinity of the ED₅₀, this is also the primary limitation of the study design. No reliable estimation of the ED₉₅ (effective dose in 95% of patients) or the slope and shape of the dose response curve can be made from findings of an up-down study since all the data points are concentrated near only one point of the curve. Thus, an up-down study cannot substitute for a traditional dose response study that does produce this additional information. However, since traditional dose response studies are time consuming and many patients (usually more than 90) are required to estimate the dose response curve while an isolated ED₅₀ can be estimated with as few as 20 patients, it is easy to see why the up-down study design has become so popular. The important question is how useful is an isolated ED₅₀ when the rest of the dose response curve remains unknown?

This question is central to the current controversy surrounding the ED₅₀ estimations for ropivacaine and bupivacaine using the up-down study design. While two similar studies estimate the ED₅₀ of ropivacaine to be 40% greater than that of bupivacaine (suggesting ropivacaine may be 40% less potent than bupivacaine),⁶⁻⁷ the findings have been generalized to the entire respective dose response curves, previous clinical studies and to clinical practice. Generalizing isolated ED₅₀'s to the entire dose response curve assumes the respective dose response curves are parallel, which may not be the case. Since similar concentrations of ropivacaine and bupivacaine were administered in nearly every previous clinical study comparing the two local anesthetics, a potential relative overdose of bupivacaine was administered if ropivacaine indeed was clinically less potent than bupivacaine. Likewise, clinicians may be underdosing ropivacaine since similar concentrations of each local anesthetic are typically administered in clinical practice.

Although tempting to generalize the findings from an up-down study, it must be remembered that an ED₅₀ estimated from up-down study is simply a single point along the dose response curve that may or may not be clinically applicable. Traditional dose response studies comparing ropivacaine and bupivacaine do not exist. Therefore, the slope and shape of the respective dose response curves and the ED₉₅ concentrations remain unknown (and an ED₉₅ concentration is more clinically relevant than an ED₅₀ concentration). Until adequate dose response data exists, clinical practice should be based on evidence from clinical studies rather than findings from an up-down study. And nearly all clinical studies comparing ropivacaine and bupivacaine suggest the two drugs are equipotent and clinically indistinguishable.⁹⁻¹⁰

With this in mind, is an isolated ED₅₀ of any clinical value? Absolutely! With relatively few patients information is produced about a drug or drugs which can then be used to design additional clinical studies. For example, we now know, that at least under study conditions, there are differences in potency between ropivacaine and bupivacaine at the ED₅₀ concentration. It now must be considered that differences in potency may exist at other points of the respective dose response curves, including the more clinically relevant ED₉₅ concentrations. Clinical studies should now be designed to detect differences in potency at these higher concentrations. However, until results from these clinical studies are known, I would not alter my clinical practice based solely on the results of an up-down study.

References:

1. Dixon WJ, Massey FJ. Introduction to statistical analysis. 4th Edition, New York, McGraw-Hill 1983, 428-39.
2. Inomata S, Watanabe S, Taguchi M, Okada M. End-tidal sevoflurane concentration for tracheal intubation and minimum alveolar concentration in pediatric patients. *Anesthesiology* 1994; 80:93-6.
3. Powell H, Morgan M, Sear JW. Pregnanolone: a new steroid intravenous anaesthetic. Dose-finding study. *Anaesthesia* 1992; 47:287-90.
4. Columb MO, Lyons G. Determination of the minimum local analgesic concentrations of epidural bupivacaine and lidocaine in labor. *Anesth Analg* 1995; 81:833-7.
5. Polley LS, Columb MO, Naughton NN, Wagner DS, Dorantes DM, van de Ven CJ. Effect of intravenous versus epidural fentanyl on the minimum local analgesic concentration of epidural bupivacaine in labor. *Anesthesiology* 2000; 93:122-8.
6. Nelson KE, D'Angelo R, Foss ML, Meister GC, Hood DD, Eisenach JC. Intrathecal neostigmine and sufentanil for early labor analgesia. *Anesthesiology* 1999; 91:1293-8.
7. Polley LS, Columb MO, Naughton NN, Wagner DS, van de Ven CJM. Relative analgesic potencies of ropivacaine and bupivacaine for epidural analgesia in labor: implications for therapeutic indexes. *Anesthesiology* 1999; 90:944-50.
8. Capogna G, Celleno D, Lyons G, Columb M, Fusco P. Minimum local analgesic concentration of extradural bupivacaine increases with progression of labour. *Br J Anaesth* 1998; 80: 11-3.
9. Owen MD, D'Angelo R, Gerancher JC, Thompson JM, Foss ML, Babb JD, Eisenach JC. 0.125% ropivacaine is similar to 0.125% bupivacaine for labor analgesia using patient-controlled epidural

infusion. *Anesth Analg* 1998; 86:527-31.

10. Eddleston JM, Holland JJ, Griffin RP, Corbett A, Horseman EL, Reynolds F. A double-blind comparison of 0.25% ropivacaine and 0.25% bupivacaine for extradural analgesia in labour. *Br J Anaesth* 1996;76:66-71.

Robert D'Angelo, MD

Associate Professor of Anesthesiology

Wake Forest University School of Medicine

Combined Spinal-Epidural Technique Should be Offered to All Laboring Parturients

PRO

Combined spinal-epidural analgesia (CSE) has gained in popularity over the past decade. The epidural space is identified in the conventional manner with a Touhy or Weiss needle, and then a 26 or 27 gauge (5 inch) pencil point needle is passed through the epidural needle until the dura is pierced, signified by the free return of cerebrospinal fluid. At this point, medication consisting of a narcotic (typically sufentanil or fentanyl) alone or in combination with a small amount of local anesthetic, usually bupivacaine, is injected into the subarachnoid space. The spinal needle is removed and then a catheter is placed into the epidural space. There are also specialized epidural/spinal combination needles available; in which the epidural needle has a special hole or channel through which the spinal needle can pass⁽¹⁾.

This technique achieves the goals of rapid onset of analgesia with minimal effects on lower extremity motor function, to a much greater extent than can be accomplished with a conventional epidural. This technique also allows more reliable placement of the epidural catheter. CSE is effective in late, rapidly progressing labor, and it permits the patient to ambulate if she desires to⁽²⁾. The disadvantages of the technique include pruritus, transient fetal bradycardia, hypotension, and respiratory depression. In addition, since the catheter is not routinely dosed until patient discomfort returns, catheter function is not immediately confirmed after placement; this may pose a management dilemma if urgent cesarean section is required.

The earliest reference to CSE described a technique that consisted of injecting local anesthetic into the epidural space and subsequently into the subarachnoid space⁽³⁾. When CSE was rediscovered for laboring parturients, narcotics alone were used^(4, 5,6). Early studies described the use of morphine 0.25 mg. This provided prolonged analgesia, but delayed respiratory depression was a concern. Fentanyl 25 mcg and sufentanil 10 mcg proved to be effective analgesics with less risk of respiratory depression. Fentanyl and sufentanil were both found to produce significant pruritus, which could be treated with diphenhydramine, but usually more effectively with naloxone. The analgesia produced by these agents lasted from 90 to 120 minutes. In the earliest version of this technique, medications were not injected via the epidural catheter until the patient began to complain of pain. Attempts to prolong the duration of intrathecal analgesia, and thus the time to initial dosing through the catheter, led to the supplementation of the narcotic with a small amount of local anesthetic (bupivacaine 1.25-2.5 mg, ropivacaine 1 to 2 mg). This did indeed lengthen the duration of analgesia^(7,8). It was discovered, however, that even with the addition of local anesthetic to the intrathecal narcotic, there would be patients, whose length of labor exceeded the duration of analgesia. These patients would require supplementation via the catheter. Many practitioners began to initiate dilute local anesthetic/opioid infusions soon after the placement of the epidural. This is a safe practice as long as the level of sensory blockade levels is closely monitored⁹. With the immediate initiation of an epidural infusion, the duration of analgesia after the initial dose is

less important. This permits the use of lower doses of intrathecal narcotic⁽¹⁰⁾. This should decrease the incidence of side effects, since in many cases these are dose related⁽¹¹⁾.

The technique used in our practice has evolved over time. We have found that fentanyl 10-15 mcg or sufentanil 5-7.5 mcg in combination with bupivacaine 1.5-2.5 mg or ropivacaine 1-2 mg provides rapid, reliable analgesia. This is followed by a standard lidocaine-epinephrine test dose, and an infusion of bupivacaine 0.125% with fentanyl 2 mcg/ml (at a rate of 8 to 10 cc/hr depending on the analgesic level) is then initiated. We have found that this regimen provides good long term analgesia and allows ambulation if desired in most cases. An additional suggested advantage of CSE in early labor is more rapid cervical dilation in nulliparous women⁽¹²⁾. It has also been suggested that return of CSF via the spinal needle provides more reliable identification of the epidural space⁽¹³⁾.

Most of the practitioners who are opposed to the routine use of CSE cite its side effects and complications. I will address each of these concerns

- 1. Pruritus:* While common, the incidence appears to be decreased when smaller initial doses of narcotic are used. Treatment with diphenhydramine or naloxone is effective, but seldom required. Patient satisfaction with the rapid onset and high quality of analgesia outweighs this relatively minor complication.
- 2. Respiratory depression:* The incidence has been reported to be 0.01% to 0.1%. Respiratory depression usually occurs soon after drug administration. Close monitoring for 15-30 minutes after drug administration should ensure that appropriate treatment will be initiated before respiratory compromise occurs.
- 3. Hypotension:* Most of the recent studies have shown that the incidence of hypotension is similar to that for conventional epidural analgesia^(14, 15). In our practice, the need for ephedrine appears to be greater in patients receiving conventional epidural analgesia.
- 4. Transient fetal bradycardia:* It has been suggested that the cause of fetal bradycardia is the sudden decrease in circulating catecholamines secondary to the rapid onset of profound analgesia. As epinephrine levels decrease, its beta agonist effects rapidly diminish as well, especially tocolytic effects on uterine muscle. This will potentially lead to uterine tetany, which will decrease uterine blood flow and fetal oxygen delivery, leading to fetal bradycardia (8, 14,15,16). This is typically transient and can be treated with nitroglycerin or terbutaline (17,18). The incidence is small and it is extremely unusual for this bradycardia to lead to cesarean delivery. Changes in fetal heart rate have been reported to be extremely common during conventional epidural analgesia^(14, 15,16).
- 5. Unconfirmed epidural function:* It is true that if a catheter has not been dosed, it is not certain that it will function if rapid extension of the block is necessary for emergent cesarean section. However, even apparently well-functioning labor epidurals occasionally fail to provide adequate anesthesia for surgery. I have been able to top up CSE catheters as reliably as conventional epidural catheters for urgent C-

section. Additionally, one study confirmed an overall decreased failure rate for epidural catheters placed via CSE for both labor analgesia and surgical anesthesia⁽¹⁹⁾. In our practice, we have found both a decreased need to replace epidurals inserted with the CSE technique, as well as a decreased incidence of one-sided blocks.

In conclusion, CSE provides rapid and reliable labor analgesia while preserving lower extremity motor function, and in many cases allowing ambulation. The side effects and risks are comparable to conventional epidurals and are easily manageable. For this reason, combined spinal epidural analgesia should be offered to all routine laboring parturients.

References

1. Rawal N, VanZundert A, Holmsrom B, Crowhurst JA. Combined spinal-epidural technique. *Regional Anesthesia* 22:406-423
2. Eisenach JC. Combined spinal-epidural analgesia in obstetrics. *Anesthesiology* 91:299-302, 1999.
3. Soresi A. Episubdural anesthesia. *Anesth Analg* 16:306-310, 1937.
4. Abouleish E, Rawal N, Shaw J et al. Intrathecal morphine 0.2mg versus epidural bupivacaine 0.125% or their combination: effect on parturients. *Anesthesiology* 74:711-716, 1991.
5. D'Angelo R, Anderson M, Philip J, Eisenach J. Intrathecal sufentanil compared to epidural bupivacaine for labor analgesia. *Anesthesiology* 80:1209-1215, 1994.
6. Honet JE, Arkoosh VA, Norris MC et al. Comparison among intrathecal fentanyl, meperidine and sufentanil for labor analgesia. *Anesth Analg* 75 734-739, 1991.
7. Campbell DC, Camann WC, Datta S. The addition of bupivacaine to intrathecal sufentanil for labor analgesia. *Anesth Analg* 305-309, 1995.
8. Palmer, CM, Van Maren, G, Nogami WM, Alves D. Bupivacaine augments intrathecal fentanyl for labor analgesia. *Anesthesiology* 84-9, 1999.
9. Gaiser RR, Lewin SB, Cheek TG, Gutche BB. Effects of immediately initiating an epidural infusion in the combined spinal and epidural technique in nulliparous parturients. *Reg Anesth and Pain Med* 25:223-227, 2000.
10. Sia ATH, Chong JL, Chiu JW. Combination of intrathecal sufentanil 10 mcg plus bupivacaine 2.5 mg for labor analgesia: Is half the dose enough? *Anesth Analg* 88:362-6, 1999.
11. Herman NL, Choi KC, Affleck PJ et al. Analgesia, pruritus, and ventilation exhibit a dose-response relationship in parturients receiving intrathecal fentanyl during labor. *Anesth Analg* 89: 378- 83, 1999.
12. Tsen LC, Thue B, Datta S, Segal S. Is combined spinal-epidural analgesia associated with more rapid cervical dilation in nulliparous patients when compared with conventional epidural analgesia? *Anesthesiology* 920-925, 1999.
13. Pratt SD, Hess PE, Kaon B et al. Intrapartum epidural failure rates in residency program: a quality improvement benchmark report (abstract) *Anesthesiology* April 1999; SOAP Suppl: A63
14. Palmer CM, Maciulla JE, Cork RC et al. The incidence of fetal heart rate changes after intrathecal fentanyl for labor analgesia. *Anesth Analg* 88:577-81, 1999.
15. Nielsen PE, Erickson JR, Abouleish EI et al. Fetal heart rate changes after intrathecal sufentanil or

- epidural bupivacaine for labor analgesia: incidence and clinical significance. *Anesth Analg* 83:742-6, 1996.
16. Norris MC. Intrathecal opioids and fetal bradycardia: is there a link? *Internatl J Obstet Anesth* 9: 264-269, 2000.
 17. Mercier FJ, Dounas M, Boouziz H et al. Intravenous nitroglycerin to relieve intrapartum fetal distress related to uterine hyperactivity: a prospective observational study. *Anesth Analg* 84:1117-20, 1997.
 18. Patriarco MS, Viechnicki BM, Hutchinson TA et al. A study on intrauterine fetal resuscitation with terbutaline. *Am J Obstet Gynecol* 157: 384-7, 1987.
 19. Albright GA, Forster RM. The safety and efficacy of combined spinal and epidural analgesia/anesthesia (6,002 blocks) in a community hospital. *Regional Anesthesia and Pain Medicine* 24:117-125, 1999.

Vernon Ross, M.D.

Assistant Professor

Virginia Commonwealth University/Medical College of Virginia

Current Review: Considerations for the Parturient with Advanced Maternal Age

The term "elderly parturient" was defined in 1958 by the Council of International Federations of Obstetrics as "one aged 35 years or more at the first delivery" (1). Advanced maternal age has traditionally been defined as age ≥ 35 years at delivery (2). Delayed childbirth has become a common phenomenon in the developed world as a result of social, educational, and economic factors (3). A woman's career priorities, advanced education, infertility, control over fertility, late and second marriages, and financial concerns may play a role in delaying childbearing (1, 4). In the United States during 1992 there were over 4,000,000 births, with 2000 live births to women 45 to 49 years of age (2, 5). In 1994, 45% of US college graduate women giving birth for the first time were older than 30 years of age, compared to 10% of US college graduate women in 1969 (6). With advances in assisted reproductive technologies and oocyte donation, births to women over 40 years of age are becoming common (7). Management of parturients of advanced maternal age requires an understanding of the effects of age, pre-existing comorbidities, and complications during pregnancy and delivery (7). Older age is associated inherently with a higher incidence of chronic disease (3). Older women are more likely than younger women to have hypertensive disorders, diabetes, placental complications, and cesarean delivery (8, 9). The anesthetic management of the parturient with advanced maternal age should be tailored to a given parturient who may have preexisting medical conditions, in addition to obstetric complications. This discussion will review maternal and fetal considerations in parturients of advanced maternal age.

Maternal and Perinatal Morbidity and Mortality

Maternal morbidity and mortality increase with maternal age (10, 11). Hoyert et al. reported that from 1982-1997, maternal mortality rates were nearly three times higher for women 35-39 years of age compared to women 20-24 years of age, and nearly five times higher for women age 40 years and older compared to women 20-24 years of age (11). Infants of healthy older parturients have been shown to have a significantly higher incidence of low birth weight, preterm delivery, and intrauterine growth restriction (IUGR) (2, 12, 13). In addition, fetal chromosomal abnormalities begin to rise in number at approximately 35 years of age, rising sharply at 40 years of age with a peak occurring at 45 years of age (14-16). Genetic screening is commonly performed in older parturients to determine if the pregnancy will be terminated. Thus, a number of studies actually report that the incidence of chromosomal abnormalities in neonates is the same or lower in parturients of advanced maternal age compared to younger parturients (17, 18). The incidence of spontaneous abortion increases in women ≥ 35 years of age (14, 15, 19). Also, the incidence of stillbirth is higher in healthy women older than 35 years of age than in younger women (8, 12).

Hypertension and Preeclampsia

The association of an increased incidence of hypertension with increasing age in the nonpregnant state is

continued when pregnancy occurs (14). Chronic hypertension is more common in parturients of advanced maternal age compared to younger parturients (2, 3, 9, 13, 15, 20, 21). Also, parturients with pre-existing hypertension have an increased incidence of preeclampsia, placental abruption, and IUGR (22). Obesity and diabetes increase the incidence of preeclampsia (23, 24). The incidence of preeclampsia is increased in both nulliparous and multiparous parturients of advanced maternal age (13, 18, 25, 26). One study reported that 17% of parturients over the age of 35 years develop preeclampsia (18).

Uterine Leiomyomata

Parturients of advanced maternal age have an increased incidence of uterine leiomyomata (27). Uterine leiomyomata are independently associated with placental abruption, dysfunctional labor, fetal malpresentation, and cesarean delivery (27).

Placental Abruption / Placenta Previa

Abu-Heija et al found a high incidence of placental abruption (6.1%) in parturients >45 years of age compared to younger parturients (0.8%) (13). Parturients with a history of chronic hypertension, cigarette smoking, or prior stillbirth also have an increased incidence of placental abruption (8, 28). Abu-Heija et al reported an increased incidence of placenta previa (4.4%) in parturients > 45 years of age compared to younger parturients (1.6%) (13). Thus, appropriate intravenous access and availability of blood products must be confirmed in preparation for potential intrapartum and/or postpartum hemorrhage.

Endocrine Abnormalities

Parturients of advanced maternal age are more likely to have diabetes compared to younger parturients (2, 3, 18, 20, 21, 23). Pancreatic B cell function and insulin sensitivity fall with age (12). In fact, up to 16% of parturients of advanced maternal age have an abnormal glucose tolerance test (18).

Maternal weight, both prior to pregnancy and at term, increases with maternal age (21). Independent of maternal age, obesity increases the incidence of preeclampsia, diabetes, induction of labor, and cesarean delivery (23).

Multiple Gestation

Fertility decreases with age. The increased utilization of assisted reproductive techniques, especially in women of advanced maternal age, has resulted in an increased incidence of multiple gestation. Multiple gestation is associated with preeclampsia, antepartum and postpartum hemorrhage, preterm delivery, cesarean delivery, low infant birth weight, and increased maternal and perinatal mortality (29).

Fetal Malpresentation

Breech presentation is more common in parturients of advanced maternal age (2, 12, 30, 31). Dildy et al reported an incidence of 11% breech presentation in parturients > 45 years of age. Interestingly, this increased incidence of breech presentation may be secondary to uterine leiomyomata, which are increased in women of advanced maternal age (27).

Preterm Labor and Delivery

Parturients of advanced maternal age are more likely to deliver prior to term and more likely to delivery at < 32 weeks gestation (12). Pugliese et al reported preterm delivery in 18% of women > 40 years of age compared to a 12% incidence of preterm delivery in younger women (17). The presence of multiple gestation also contributes to an increased incidence of preterm labor and delivery (27).

Dysfunctional Labor and Cesarean Delivery

The incidence of cesarean delivery for dystocia increases with age (2, 3, 9, 11, 12, 13, 15, 26). Some postulate deteriorating myometrial function with increasing age as the etiology for dysfunctional labor in women of advanced maternal age (32). Popov et al observed that with advancing age in primiparous women, there was a progressive thickening of the muscular layer of myometrial arteries due to fibrosis which may ultimately lead to reduced uterine contractility (32, 33). The cesarean delivery rate is more than twice as high in parturients > 35 years of age than in women 20-29 years of age (34). Among nulliparous women > 35 years of age, cesarean delivery rates of 21-52% have been reported (17, 18, 30, 34). In addition, the incidence of emergency cesarean delivery is higher in parturients of advanced maternal age (32). This may be due to an increased incidence of placental abruption, placenta previa, breech presentation, preterm labor, and multiple gestation in parturients of advanced maternal age.

Conclusion

As more women delay childbearing, older parturients constitute a large and growing fraction of our obstetric patient population. The parturient of advanced maternal age is a patient with a high risk of maternal and perinatal morbidity and mortality. Anesthesia care providers should be aware of the associated problems in this patient population so that appropriate anesthetic management plans can be formulated to ensure good maternal and perinatal outcomes.

REFERENCES

1. Kirz DS, Dorchester W, Freeman RK. Advanced maternal age: The mature gravida. *Am J Obstet Gynecol* 1985; 152: 7-12.
2. Dildy GA, Jackson GM, Fowers GK, et al. Very advanced maternal age: Pregnancy after age 45. *Am J Obstet Gynecol* 1996; 175: 668-74.
3. Dulitzki M, Soriano D, Schiff E, et al. Effect of Very Advanced Maternal Age on Pregnancy Outcome and Rate of Cesarean Delivery. *Obstet Gynecol* 1998; 92: 935-9.
4. Lialios G, Kaponis A, Adonakis G. Maternal age as in independent risk factor for cesarean

- delivery. *Int J Gynecology and Obstetrics* 1999; 67: 187-8.
5. Ventura SJ, Martin JA, Taffel SM, et al. Advance report of final natality statistics, 1992. Hyattsville (MD): National Center for Health Statistics. 1994. *Monthly Vital Statistics Report*, Vol 43, No 5 (Suppl).
 6. Heck KE, Schoendorf KC, Ventura SJ, et al. Delayed childbearing by education level in the United States, 1969-1994. *Matern Child Health J* 1997; 1: 81-8.
 7. Nesbitt IDE, Bythell V, Redfern N. Anaesthetic management of Caesarean section in an elderly parturient with preeclampsia. *Anaesthesia* 1999; 54: 879-98.
 8. Raymond EG, Cnattingius S, Kiely JL. Effects of maternal age, parity, and smoking on the risk of stillbirth *Br J Obstetrics and Gynecology* 1994; 101: 301-6.
 9. Bianco A, Stone J, Lynch L, et al. Pregnancy Outcome at Age 40 and Older. *Obstet Gynecol* 1996; 87: 917-22.
 10. Panchal S, Arria AM, Labhsetwar SA. Maternal Mortality During Hospital Admission for Delivery: A Retrospective Analysis Using a State-Maintained Database. *Anesth Analg* 2001; 93: 134-41.
 11. Hoyert DL, Danel I, Tully P. Maternal Mortality, United States and Canada, 1982-1997. *Birth* 2000; 27: 4-11.
 12. Jolly M, Sebire N, Harris J, et al. The risks associated with pregnancy in women aged 35 years or older. *Hum Reprod* 2000; 15 (11): 2433-37.
 13. Abu-Heija AT, Jallad MF, Abukteish F. Maternal and Perinatal Outcome of Pregnancies after Age of 45. *J Obstet Gynaecol Res* 2000; 26 (1): 27-30.
 14. Hollander D, Breen JL. Pregnancy in the Older Gravida: How Old Is Old? *Obstetrical and Gynecological Survey* 1990; 45 (2): 106-12.
 15. Prysak M, Lorenz R, Kisly A. Pregnancy Outcome in Nulliparous Women 35 Years and Older. *Obstet Gynecol* 1995; 85: 65-70.
 16. Goldberg M, Edmonds L, Oakley G. Reducing birth defect risk in advanced maternal age. *JAMA* 1979; 242 (21): 2292.
 17. Pugliese A, Vicedomini D, Arsieri R. Perinatal outcomes of newborn infants of mothers over 40 years old. A case control study. *Minerva Gynecol* 1997; 49: 81-4.
 18. Tan KT, Tan KH. Pregnancy and delivery in primigravidae aged 35 and older. *Singapore Med J* 1994; 35: 495-501.
 19. Roghmann K, Doherty R. Reassurance through prenatal diagnosis and willingness to bear children after age 35. *Am J Public Health* 1983; 73: 760.
 20. Sauer MV, Paluson RJ, Lobo RA. Oocyte donation to women of advanced reproductive age: Pregnancy results and obstetrical outcomes in patients 45 years and older. *Hum Reprod* 1996; 11: 2540-3.
 21. Lagrew DC Jr., Morgan MA, Nakamoto K, Lagrew N. Advanced maternal age: Perinatal outcome when controlling for physician selection. *J Perinatol* 1996; 16: 256-60.
 22. Sibai BM. Hypertension in Pregnancy. In: *Obstetrics: Normal and Problem Pregnancies*, 3rd Edition, Churchill Livingstone, New York, 1996; pp 935-96.
 23. Michlin R, Oettinger M, Odeh M, et al. Maternal obesity and pregnancy outcome. *Isr Med Assoc J* 2000; 2: 10-13.
 24. Roach VJ, Hin LY, Tam WH, et al. The incidence of pregnancy-induced hypertension among

- patients with carbohydrate intolerance. *Hypertens Pregnancy* 2000; 19: 183-9.
25. Savitz DA, Zhang J. Pregnancy-induced hypertension in North Carolina, 1988 and 1989. *Am J Public Health* 1992; 82: 675-9.
 26. Bobrowski Ra, Bottoms SF. Underappreciated risks of the elderly multipara. *Am J Obstet Gynecol* 1995; 172: 1764-7.
 27. Williams MA, Lieberman E, Mittendorf R, et al Risk factors for abruptio placentae. *Am J Epidemiol* 1991; 134: 965-72.
 28. Kinzler WI, Ananth CV, Vintzileos AM. Medical and economic effects of twin gestations. *J Soc Gynecol Investig* 2000; 7: 321-7.
 29. Erza Y, McPartland P, Farine D. High delivery intervention rates in nulliparous women over age 35. *Eur J Obstet Gynecol Reprod Bio* 1995; 62: 203-7.
 30. Jonas O, Chan A, Roder D, et al. Pregnancy outcomes in primigravid women aged 35 years and over in South Australia, 1986-1988. *Med J Aust* 1991; 154: 246-9.
 31. Rosenthal AN, Paterson-Brown S. Is there an incremental rise in the risk of obstetric intervention with increasing maternal age? *Br J Obstet Gynecol* 1998; 105: 1064-69.
 32. Popov I, Ganchev S, Bakurdzhiev G. The morphological findings in the myometrial arteries and in the placenta with reference to the age of primiparae. *Akush Ginecol* 1990; 29: 20-3.
 33. Lubarsky SL, Schiff E, Friedman SA, et al. Obstetric characteristics among nulliparas under age 15. *Obstet Gynecol* 1994; 84: 365-8.

Sumedha Panchal, MD

Assistant Professor, Department of Anesthesiology

Weill Medical College of Cornell University

New York, New York

Obstetric Anesthesia Board Review Questions

1. In a patient undergoing vaginal birth after cesarean section, the most common sign of uterine segment scar dehiscence or rupture is:

- A. pain
- B. maternal tachycardia
- C. maternal hypotension
- D. maternal hemorrhage
- E. non-reassuring fetal heart rate tracing

Answer: E

Pain, uterine tenderness, and maternal cardiovascular instability have both low sensitivity and specificity in regard to the diagnosis of uterine scar dehiscence. The most common sign for patients both with and without epidural analgesia is non-reassuring fetal heart rate tracing.

References:

1. Johnson C, Oriol N. The role of epidural anesthesia in trial of labor. *Reg Anesth* 1990; 15: 304-8.
2. Chestnut DH. Vaginal Birth After Cesarean Section in *Obstetric Anesthesia: Principles and Practice*, 2nd ed., Mosby, St. Louis, 1999, pp 438-48.

2. A risk factor for placental accreta in a patient with a previous cesarean section is:

- A. placenta abruptio
- B. chorioamnionitis
- C. placenta previa
- D. macrosomia
- E. breech presentation

Answer: C

Variations of abnormal placentation include accreta, increta, and percreta. Placenta accreta occurs when the villi adhere to the myometrium, increta into the myometrium; and percreta through the myometrium. By attaching to the myometrium, normal separation of the placenta following delivery is impaired. The relative risk for placenta accreta in patients with placenta previa was 35 times higher in those with a previous cesarean section than in those with an unscarred uterus.

References:

To WW, Leung WC. Placenta previa and previous cesarean section. *Int J Gynaecol Obstet* 1995; 51: 25-31.

3. An infant is born limp and apneic. After adequate ventilation with 100% oxygen for 30 seconds and then chest compressions for 30 seconds, the heart rate remains 60 beats per minute. The most appropriate medication to administer at this point is:

- A. atropine 0.01 mg/kg
- B. dopamine 5 ug/kg/min
- C. naloxone 0.1 mg/kg
- D. epinephrine 0.01 mg/kg
- E. sodium bicarbonate 2 meq/kg

Answer: D

Medications are administered following adequate ventilation and chest compressions if the neonates heart rate remains below 80 beats per minute or if the neonatal heart rate is 0 beats per minute. Epinephrine may be administered either intravenously or endotracheally.

References:

Neonatal Resuscitation Provider Textbook, 4th ed., American Heart Association and American Academy of Pediatrics, 2000.

You Can Make a Difference

For the past 12 years the ASA Overseas Teaching Program (ASA -OTP) has been making a difference in the practice of anesthesiology in sub-Saharan Africa. The OTP is now planning a perinatal outreach project aimed at assisting anesthesia providers, obstetricians, midwives, and birth attendants in Ghana to recognize perinatal emergencies and medically respond to them in order to promote healthy mothers and infants in Ghana.

Dr. Nicholas Greene founded the ASA OTP over a decade ago. Since that time, the OTP has sent and fully sponsored expenses for ASA members to serve as volunteers in teaching hospitals and medical schools in both East and West Africa. The main role of the ASA OTP is to "teach the teachers" and to increase the number and quality of anesthesiology providers in sub-Saharan Africa. This region of the world is sorely underserved by qualified anesthesiology providers. In some areas anesthesia is the sole limiting factor in surgical services. Over the last decade the OTP has trained over 400 anesthesia providers in East Africa. Initially there were less than 75 trained anesthesia providers in the region served by our Tanzanian site.

Currently the OTP is making advances in training of physician anesthesiologists in both East and West Africa. Our site in West Africa is at the University of Ghana Medical School (UGMS). At UGMS, 6 of Ghana's 7 anesthesiologists practice and teach both fellowship and diploma level physicians. Here the OTP is working collaboratively with The World Federation of Societies of Anesthesia and the Minister of Health of Ghana to increase the practice of anesthesiology as a medical specialty. The main role of the ASA OTP is to provide instructional assistance in areas of anesthesiology practice that are currently understaffed at the medical school. We are working closely with local teachers and administrators to provide a visible presence of anesthesiologists and foster the development of the specialty.

One area of special need is in obstetric anesthesiology. The University of Ghana Medical School has an OB anesthesia section headed by Dr. Frank Boni. Dr. Boni is a brilliant native Ghanaian, who trained in anesthesiology in the United Kingdom, and has returned home to promote safe perinatal care. Ghana is in particular need of assistance especially in upcountry areas where the maternal mortality is between 1000-1100/ 100,000 live births and the eclampsia (not pre eclampsia) rate approaches 10%. . Currently Dr. Boni is working single-handedly in many sites to improve perinatal anesthesia and newborn resuscitation. The OTP has joined with Dr. Boni and the other faculty of UGMS to expand this outreach and provide ongoing training courses in newborn resuscitation for up country physicians and health care workers.

What can you do to help? You can volunteer your time, talent and resources in a number of ways. The OTP is looking for volunteers to travel to Ghana for a period of 2- 6 weeks to help Dr. Boni organize and deliver these outreach courses. You will live and work in the safe and friendly environs of an academic community at UGMS and spend most of your time teaching anesthesia rather than providing direct anesthesia care. Of course there will be time for travel to some of the most beautiful rain forests in West

Africa, the cultural treasures of slave castles and the Ashanti Gold region and perhaps a camel ride to Timbuktu!

The ASA provides your airfare and accommodation expenses while you are there. The teaching is hands on, even if you do not have formal academic experience; all volunteers make valuable contributions. Over the years, close to 60% of OTP volunteers have come from private practice. If you are unable to assist directly in the teaching you can support this Perinatal project by providing working and reliable, preferably new anesthesia monitoring equipment for the practitioners, principally automated blood pressure monitors and fetal heart tone monitors . If you are interested read on to Dr. Paul Preston's account of his time at UGMS and contact:

ASA Overseas Teaching Program
ASA Headquarters
520 Northwest Parkway
Park Ridge Ill, 60068

Alice Edler, MD
Vice Chairman, African Section
ASA Overseas Teaching Program

Obstetric Anesthesia in Africa-a Call for Volunteers

The American Society of Anesthesiologists is looking for volunteers to teach obstetric anesthesia. The ASA has sponsored an Overseas Training Program (OTP) to Africa for a number of years, which provides a rewarding and unique opportunity to teach and learn in developing countries. We currently perceive a great need for obstetric anesthesia expertise, as well as a real potential to make a long-term difference. As a practicing OB anesthesiologist and ASA volunteer, I would like to give my personal perspective on this opportunity.

Current State of Obstetric Anesthesia in Africa

There are immense differences between countries and cultures in Africa, but there seem to be some common threads in medical care. All levels of practitioners are in short supply. Health care budgets are very low, and costly drugs and equipment are often not available. On the other hand, anesthesia and other students are very intelligent and hard working, and basic drugs and equipment may well be provided.

The shortages of personnel produce some especially tragic results in the area of OB care. Most areas are

served by small district hospitals, staffed by a very few doctors or other professionals. These facilities may have no one trained in anesthesia or basic airway management. They will frequently refer out surgical cases to larger facilities, although there may be considerable delays in this process. OB emergencies are a real dilemma for these hospitals. One common approach is to attempt surgical delivery by using a ketamine drip and spontaneous ventilation. Another is to transfer the patient by truck and to hope for the best. This inability to intervene in a reasonably safe and timely manner certainly contributes to the maternal mortality in our host countries. While it is difficult to obtain exact figures on this, estimates of 300 to 700 maternal deaths per 100,000 live births are cited.

Larger referral hospitals do have anesthesia providers, usually nursing or paramedical. These people are trained to provide a basic general anesthetic. Ketamine, thiopental, halothane, ether and succinylcholine are usually available. Many of these providers are not comfortable with regional anesthesia techniques, although the supplies may well be available, and are often less costly than the comparable general anesthesia supplies.

Physician anesthesiologists are in very short supply. More are desperately needed to run the teaching programs and serve as consultants for the other anesthesia providers in their districts.

The Ghana Experience

Ghana has great potential to begin solving these problems. The government is stable and committed to using its limited resources to help the health care systems. Ghana is a safe and relatively easy place to live. English is the language for instruction. Accra has a large community of African and expatriate professionals. These colleagues provide welcome perspective and advice, greatly enhancing the volunteer experience. While the setting is urban, volunteers stay at a guesthouse on hospital grounds, which provides peace and quiet.

Our Ghanaian site is at Korle Bu hospital, University of Ghana Medical School (UGMS), in the capital city of Accra. This is the principal teaching hospital for the country. As the only show in town, it must manage a great deal of OB pathology, with hemorrhage and frank eclampsia commonly seen. Resources are limited. Our colleagues do their best to manage the sickest patients, and are not yet able to offer much in the way of labor analgesia.

The UGMS program benefits from good local leadership. Our hosts are well aware of the problems that need to be addressed, and have plans to do so. They are very short of staff, however, and greatly appreciate our help in teaching at all levels. The plan at UGMS is to train a number of physician anesthesiologists to serve as consultants throughout West Africa. With support from the WFSA and ASA, this program is up and running, and attracting good numbers of talented doctors.

A major request from the Ghanaian faculty has been for help in obstetric anesthesia instruction. I believe this gives us a unique opportunity to help improve OB care in West Africa. Despite an enormous workload, the Korle Bu staff work hard to give safe, up to date care. Magnesium is used to manage

eclampsia, and plans are being developed for better infant resuscitation.

Of course, some of these problems cannot be fixed by short-term volunteers. However, we do get to work with the anesthesia trainees. These students, both physician and otherwise, are amazing. They are frequently brilliant, talented, and committed to improving care in their own countries. They respond very positively to clinical training in OB anesthesia, and realize this will be a large part of their careers. Many are willing to learn regional anesthesia, but need just a little coaching and reassurance to do this. These are the leaders of the next generation of West Africa, and will ultimately design the solutions that work for their health care systems.

Most volunteers come home with a very different view of not only Africa but also their own culture. While teaching people from a different culture has real challenges, many of us find the rewards to be very great, and have hopes that our colleagues and students will change things for the better.

Paul Preston, MD

Kybele - Goddess of Childbirth



Kybele [Kçy-bell-â] is a non-profit 501(c)(3) organization to promote safe childbirth in developing countries through physician training in obstetric anesthesia and in newborn resuscitation. Kybele seeks to promote obstetric anesthesia in countries that have an infrastructure of hospitals and supplies, but lack physician training. This includes countries in Eastern Europe, the Middle East, and Northern Africa.

We are targeting Turkey, a country with 65 million people (roughly 25% of the US population) and one million annual births. In a recent survey,¹ we learned that the cesarean section rate is nearly 75% in private Turkish hospitals. Since most Turkish anesthesiologists are untrained in regional anesthesia for cesarean

section, general anesthesia is utilized, rendering a mother unconscious and jeopardizing her safety. The survey also found that 90% of cesarean sections in Turkey are preformed with general anesthesia¹ which may partially explain why maternal mortality in Turkey is one of the highest in Europe (and more than 15 times greater than in the US and the UK).

Many Turkish women prefer to undergo cesarean section with general anesthesia because pain relief is unavailable for vaginal delivery. In Turkish hospitals, epidural analgesia is rarely provided due to the following very real scenario:

Imagine you are a Turkish anesthesiologist. A pregnant woman is in active labor and crying in pain. You want to help her but you have never done an epidural for labor analgesia. Your knowledge is limited because there are only 20 pages of printed material in your language on the subject. You are not sure you can safely perform the procedure and there is no one else in your hospital with training in this area. The nurses and obstetricians you work with are uneasy because they've heard epidural analgesia can be dangerous. But you know that in other countries anesthesiologists are providing epidural analgesia and there are many books written in English about the topic so it must be safe. You've used epidural anesthesia for surgery but for labor you don't know which medication to use, how much of it to administer or what side effects might occur. Also, since problems might jeopardize the safety of the woman and her baby, you don't want to take the risk. You want to help, but under the circumstances you don't feel comfortable.

If you were in this situation, what would you do? Chances are, it would not be a labor epidural. Sadly, this is the reality today for many anesthesiologists in developing countries.

In Turkey, interest in obstetric anesthesia is great. The receptivity of Turkish doctors to change can be demonstrated by work started at Uludag University (Bursa, Turkey) in 1997. Shortly after training, the use of general anesthesia for cesarean section decreased from 80% to 30% and a labor analgesia service and newborn resuscitation program were initiated. We have seen firsthand how basic education in obstetric anesthesia can dramatically change physician practice patterns, improve safety, and enhance childbirth for many women. Training is needed throughout Turkey, and we are working with a group of motivated Turkish doctors who want to improve health care delivery to pregnant women. We aim to educate Turkish physicians, who can in turn, train others in their country.

To make obstetric anesthesia a reality in Turkey and in other countries we need your help. We are organizing a database of physicians interested in working abroad to promote obstetric anesthesia. If you would be interested in sharing your knowledge and experience in a Turkish hospital for 1 to 2 weeks, please contact me at: mowen@wfubmc.edu. If you or your anesthesia group would rather support this project financially, you can mail your tax-deductible contribution to Kybele, Inc., in care of Linda Combs, Treasurer, 5052 Marble Arch Road, Winston-Salem, North Carolina, 27104. Contributions will be used for education in developing countries, not for university support.

Medge D. Owen, M.D.
Associate Professor of Obstetric Anesthesiology
Wake Forest University
Founder, Kybele, Inc.

Reference:

Owen MD, Sahin S. Obstetric anaesthesia practices in Turkey. In: Regional Analgesia in Obstetrics: a millennium up-date. Editor: Felicity Reynolds. London, Springer Verlag; 2000.

Statement of support

We have come a long way in the field of obstetric anesthesiology in the USA during the last 30+ years thanks to the efforts of SOAP and its members. As we move into the 21st century SOAP and its members could expand their horizons and work to improve conditions in less fortunate nations. In the era of the global economy, programs such as this could represent a wonderful way for the world to come closer in a positive manner.

Francis M. James, III, M.D.
Past-president, American Board of Anesthesiology
Co-Founder of Kybele, Inc.

Figure Legend

The Kybele Goddess originated in Anatolia in 8000-2700 BC. Anatolia is considered the "cradle of

civilization" because community and agriculture developed there during this period. Clay "Kybele" figurines have been found throughout the region and represent a once matriarchal society. In Hacilar (5700-5600 BC), Goddess figurines were found in every house signifying importance in daily religious and social life. Kybele represents fertility and the multiplication of mankind. Figurines are usually naked and in the birthing process. The photo above is of a 12 cm statue found in an excavated temple. The Goddess is a plump woman sitting on a throne surrounded by leopards. She is giving birth, with the head of the baby just visible. Other artifacts from this period are on display in The Museum of Anatolian Civilizations in Ankara.

Doulas at Cesarean Births

To The Editor —

We are concerned about the policies of many anesthesiologists that allow only one of a laboring woman's support people to attend a cesarean birth. We realize that there may be good reason not to allow more than one loved one, but we want to ask you to allow doulas to attend, because they are so helpful to both the laboring woman and her partner, and sometimes to the medical staff. Doulas are women who are trained, experienced, (and many are certified) to provide continuous emotional support (reassurance for both the woman and her partner, encouragement, help with breathing and relaxation), physical comfort (positioning and movement, hydrotherapy, massage, hot packs, cold packs), and non-clinical advice to laboring women and their partners. They meet with the couples several times before the birth to learn their concerns and wishes for assistance during labor. They join the women in early labor and remain with them until one or two hours after the birth. The continuous support of a doula has been found in numerous scientific trials to positively affect obstetric outcomes and the women's satisfaction with their birth experiences. Many women and couples choose to have a doula because they want and need this extra assistance. During labor, an intense bond develops between the doula and the couple, and if a cesarean becomes necessary, it is very distressing for the woman to have to choose only one person to be with her. Of course, the doula always encourages the woman to choose her partner. Often the woman asks that her doula also come into the delivery room, and is most disappointed when the anesthesiologist denies her request. In some hospitals, the anesthesia department has a flat policy that only one person may go in. Others leave the decision up to the individual anesthesiologist; some are most welcoming and appreciative of doulas, but others make no distinction between a doula and family members. If anesthesiologists consider the following benefits of allowing a trained, knowledgeable doula to continue assisting her client during a cesarean, they may reconsider.

Benefits of a doula during a cesarean:

- Doulas are familiar with cesareans and do not find them upsetting.
- The doula's familiar presence can calm and reassure the mother who is likely to be very frightened and worried.
- The doula can reassure the partner, who is also likely to be worried and frightened.
- The doula can explain what is happening.
- Once the baby is born, the partner usually goes to see the baby, leaving the mother's side. The doula remains with the mother, tells her what the baby is doing, and helping the mother feel less alone.
- The doula goes to recovery with the mother. If the partner has gone to the nursery with the baby, the

mother still has a support person with her.

- The doula does not get in the way or behave inappropriately.

For further information, please visit www.DONA.org, and go to the "Position Paper." If women's satisfaction with their cesarean births can be enhanced by the doula's presence, then everyone wins - the woman, her family, the doula, the staff, and the hospital.

Penny Simkin, PT

Founder of Doulas of North America

Dear Dr. Wlody: During the last 5 years, many parturients with tattoos over the lumbo-sacral region have presented for regional anesthesia. I was concerned with the safety of administering a regional anesthetic that would require the needle to pass through a tattoo. I contacted a colleague, Dr. Kris Sperry, who is a forensic pathologist and Chief Medical Examiner for the State of Georgia, and asked him the following questions:

1. Is the ink used for tattooing allergenic?
2. Is there a danger to the patient receiving an epidural or spinal anesthetic if the needle is inserted through an existing tattoo, i.e., can the ink be introduced into the CNS?
3. Some tattoos appear to stimulate keloid-like reactions, especially in African-Americans. Is this a "normal" outcome to the tattooing process, or a reaction to the ink?

I think the following may be of interest to the membership of The Society for Obstetric Anesthesia and Perinatology.

Vincent Skilling, MD, MB
Director of Obstetric Anesthesia
Medical Center of Central Georgia
Macon, Georgia

Dear Dr. Skilling: Thank you for your inquiry concerning the safety of performing epidural and/or spinal anesthesia through tattooed skin. I understand your concerns completely, and I believe that I may be able to set your mind at ease. The tattoo pigments do not stay "loose" within the dermis or connective tissue, but are rapidly assimilated by macrophages during the healing process. Many of these pigment-laden macrophages stay in the dermis, and the dermis only, for the life of the tattooee. The amount of pigment that is used in the tattoo process is quite miniscule, also. The pigments are made of inert metal salts and different structures of a phenolphthalein base, and allergic problems are nearly nonexistent. You should have no concern whatsoever in placing a needle through a tattoo and into the spinal or epidural space, as the pigment particles are "fixed" and stationary within the dermis, and cannot be mobilized by the needle or migrate along the needle track. There is really no danger at all in inserting a needle through tattooed skin. As far as the African-American women go, the keloid-like process you have observed is a reaction to the tattoo procedure, and not the pigment. Darker skinned people are more prone to excessive scarring, and also because they are dark skinned, the tattoo artist often has to work harder on the skin to insert the pigments, thus inadvertently causing more scarring from the trauma that damages the skin. This is an unfortunate side effect of the tattoo process in dark-skinned people. However, there is still no danger in inserting a needle through such a raised tattoo—it is just more difficult to accomplish, because of the scar formation.

Kris Sperry, M.D.