An Unusual Cause of Postpartum Hemorrhage

We encountered a case of abdominal pregnancy diagnosed intraoperatively during cesarean delivery. The parturient presented complaining of abdominal pain not associated with labor, preeclampsia or chorioamnionitis. The case represents an unusual but potentially fatal cause of maternal hemorrhage.

Introduction:
Abdominal pregnancy is a rare yet serious type of extrauterine gestation. It accounts for approximately 1.4 percent of all ectopic pregnancies.¹ The clinical presentations described in the literature are variable. A maternal mortality rate greater than seven times that of non-abdominal pregnancies has been reported.¹ Abdominal pregnancies are classified as primary when fertilization takes place outside the uterus, while the more common secondary classification occurs from undetected rupture of a tubal pregnancy.² Abdominal pregnancy has been reported after hysterectomy with placental tissue implanting on the broad ligament and ovary.³ These cases are rare and tend to occur because of preexisting fertilization.⁴

Case Presentation:
The obstetrical anesthesia service was consulted to assist in the care of a 34-year-old, 85 kg, gravida 5 para 2 patient at 35-weeks gestation with a pregnancy complicated by placenta previa and large uterine fibroids. She had previously received a course of betamethasone as corticosteroid therapy for fetal lung maturity because of preterm labor. Her past medical history was significant for non-insulin-dependent diabetes, polysubstance abuse (tobacco, alcohol and cocaine) and anemia. She was referred to our hospital for a fetal echocardiogram because of her large intake of nonsteroidal anti-inflammatory drugs throughout the pregnancy. She complained of abdominal pain.

On physical exam, she was afebrile with a temperature of 36.1 degrees Celsius. Her heart rate was 81 beats per minute, respiratory rate was 22 beats per minute, and blood pressure was 118/66 mmHg. The fetal heart rate was reassuring. Uterine tocography showed no contractions, but the patient appeared uncomfortable in bed. Her airway was clear, patent with a Mallampati 2 score, good mouth opening, normal thyromental distance and good dentition. Her cardiovascular exam revealed a regular rate and rhythm with 2/6 systolic ejection murmur. Her lungs were clear to auscultation bilaterally, and her abdomen was soft, gravid with a moderate degree of tenderness to palpation but no rebound or guarding noted. A sterile vaginal exam by the obstetrician showed the cervix closed, thick and high. There was no blood in the vaginal vault. The extremities revealed no cyanosis, clubbing or edema. The neurologic exam was significant for no sensory or motor deficits.

Her laboratory findings were significant for O positive blood type with antibody negative screen. Her white blood count was 15,000 cells/mm³. Her hemoglobin was 10.8 g/dL, her hematocrit 33 percent, and her platelet count was 252,000/ mm³. Her electrolytes, liver function, urinalysis and coagulation panel were within normal limits. Her urinary drug screen was positive for cocaine.

A previous ultrasound showed evidence of placenta previa with suspected abnormal implantation, probable accreta and multiple leiomyomata. She had previously received weekly biophysical profiles that were reassuring with no score below 8 out of 10, losing points for decreased amniotic fluid. The patient was admitted to the antepartum service for external fetal monitoring. Fetal echocardiography revealed a restricted ductus arteriosus and pericardial effusion. The patient continued to complain of significant abdominal pain with no evidence of contractions.
Magnetic resonance imaging (MRI) of the pelvis, interpreted by a radiologist, revealed complete placenta previa with abnormal implantation not extending into the urinary bladder. The fetus was in transverse position, and large fibroids were evident. The obstetricians diagnosed her with degenerating fibroids causing intractable abdominal pain, placenta previa with abnormal implantation, oligohydramnios and restricted ductus arteriosus in the fetus. Because of the patient’s desire for surgical sterilization and the suspected placenta accreta, the surgical plan was cesarean delivery with hysterectomy. The patient declined regional anesthesia.

After an eight-hour preoperative fast and premedication with 30 ml of sodium citrate by mouth, rapid sequence induction of anesthesia with cricoid pressure was performed. Propofol 2 mg/kg, succinylcholine 1.5 mg/kg and standard monitors were given, followed by uneventful oral intubation using a Macintosh 3 blade and 6.5 mm endotracheal tube. The anesthetic was maintained with a mixture of oxygen, isoflurane and vecuronium. A diagnosis of abdominal pregnancy was made during surgery when the surgeons noted the amniotic sac intraperitoneal, above the uterine fundus, extending to the stomach covered in infracolic omentum. The surgeons entered the amniotic sac and delivered the infant. The umbilical cord was clamped and cut. The viable female infant was handed to the pediatric team. The newborn received blow-by oxygen for two minutes and was transported to the neonatal intensive care unit for cardiac evaluation. The APGAR scores were 7 at 1 minute (one point off for tone, two points off for color) and 8 at five minutes (one point off for color) and 8 at five minutes (one point off for color) and 8 at five minutes (one point off for color) and 8 at five minutes (one point off for color) and 8 at five minutes. The infant weighed 2445 grams.

Figure 1. Intraoperative gross specimen of placenta attached to fundus of uterus.

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500 ml of hetastarch and four units of packed red blood cells were administered for an estimated blood loss of 2200 ml. Urine output was 4300 ml. At the end of surgery, the patient emerged from anesthesia without event, was extubated and transported to the postanesthesia care unit. The post-transfusion hemoglobin was 7.7 g/dL, hematocrit 23 percent, and platelet count 123,000/ mm³. The vital signs remained stable throughout the perioperative period.

The patient recovered appropriately from surgery, achieving satisfactory postoperative analgesia using intravenous morphine patient-controlled analgesia. After a slow return of bowel function, the patient tolerated a regular diet, her pain controlled with oral analgesics, and she remained afebrile throughout her hospital stay. The patient and her infant were discharged to home on post-operative day five.

Discussion:
Extraterine abdominal pregnancy is uncommon. The diagnosis requires a high degree of suspicion. During the later stages of pregnancy, ultrasound imaging of the fetus, placenta and uterus in the same views can be difficult to see clearly. Teng and colleagues report a 50-90 percent diagnostic error with ultrasound in diagnosing abdominal pregnancy. With a high index of suspicion, an MRI scan can diagnose abdominal pregnancy because of its good soft tissue contrast and non-ionizing property. Postoperative review of the MRI with a senior radiologist reveals the presence of the infant in the abdomen [Figure 2]. Motion artifact obscured many of the MRI views [Figure 3], prompting the radiologist to focus his reading on the pelvis to determine the extent of the abnormal placenta implantation. The team presumed the etiology of the abdominal pain was her degenerating fibroids.

In our patient, placenta abrasion was also high on our differential because of her complaint of pain out of proportion to the clinical setting and her history of cocaine abuse. The physical exam finding of uterine tenderness gave support to this diagnosis. Our patient did not complain of vaginal bleeding, but the uterus can hide significant blood loss before physical signs such as vaginal bleeding, hypotension or anemia manifest. Ultrasonography does not always reveal placenta clot, however, significant placenta bleeding is usually associated with fetal heart rate abnormalities. Our patient had normal, reassuring fetal heart rates throughout her prenatal hospital course.

The laboratory data and vital signs of our patient did not support preeclampsia. The blood pressure remained within normal range as did the bilirubin and liver enzymes. Spontaneous subcapsular hepatic hemorrhage is possible in severe...
vasoactive states, but the patient showed no signs of cardiovascular instability, making this diagnosis unlikely as well.

Chorioamnionitis is a common diagnosis for the parturient with uterine tenderness. This diagnosis however, is usually associated with fever, tachycardia, leukocytosis greater than 15,000 cells/mm$^3$ and fetal tachycardia. Although our patient had a white blood count of 15,000 cells/mm$^3$, she exhibited no fever, no maternal tachycardia and no fetal tachycardia. Surgical causes of abdominal pain such as appendicitis and cholecystitis are not uncommon in pregnancy. Classic localizing symptoms can be distorted because of the gravid uterus masking physical exam signs such as guarding and rebound tenderness. Food intolerance, nausea and vomiting are usually associated with these surgical causes of abdominal pain. Our patient did not experience these symptoms.

Abdominal pregnancy poses significant clinical challenges. Near exsanguination has been reported.\(^2\) The partial or total separation of the placenta can produce massive hemorrhage. Because of abnormal attachment to sites such as the uterine wall, bowel, mesentery, liver, spleen and bladder, the placenta can detach at any time. After delivery, removal of the placenta is desired to avoid the risks of secondary hemorrhage. When placental implantation occurs on vascular immobile surfaces or unremovable surfaces, methotrexate can effect rapid placental degeneration.\(^3\) However, the cumulative necrotic tissue from the degeneration increases the risk of infection.\(^4\) Although the diagnosis of abdominal pregnancy was unexpected in our patient, the diagnosis of placenta previa and suspected accreta had the team prepared for hysterectomy to minimize blood loss. Blood products for transfusion were obtained preoperatively. Large-bore intravenous lines were already in place.

Maternal hemorrhage can result in disastrous outcomes. It is important to have adequate resources for fluid resuscitation, blood transfusion and surgical expertise. Packing the abdomen, direct pressure to bleeding surfaces, uterine and hypogastric artery occlusion with ligation or radiologic embolization are techniques to consider besides hysterectomy. While many obstetrical patients are young with excellent physiological reserve, a multidisciplinary team approach facilitates care when faced with unanticipated crisis.

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**Announcement of SOAP/Gertie Marx Research Grant**

Thanks to the forward-thinking nature of our founding members and the generosity of Dr Gertie Marx, SOAP is proud to announce the initiation of the SOAP/Gertie Marx Research Grant. This grant is intended for initiating research at the early part of an investigator’s career. The intent is to provide “seed money” for preliminary or pilot investigations leading to continued work supported by other sources such as FAER, IARS or the federal government. This award is not intended to supplement ongoing projects or to provide additional funding to partially funded projects.

The SOAP/Gertie Marx Research Grant will provide up to $50,000 over two years to support research in any area specifically concerning or related to obstetric anesthesia, including basic physiology, clinical practice or teaching/training methods. The specifics of this program will be detailed at the Annual Meeting business session at the Washington, D.C. meeting and can be accessed on the Web site thereafter. The application deadline will be September 1, 2009, with expected funding of the grant in early 2010. It is anticipated that this grant will be awarded on an annual basis starting in 2010.
Is Airway, Airway, Airway Enough?

Any junior trainee can tell you the three keys to safety in obstetrics: Airway, Airway, Airway: examine it, avoid it, secure it awake.

Residency training in obstetric anesthesiology traditionally emphasizes regional anesthesia to avoid intubation. In fact, we have done such a good job of establishing regional anesthesia as our first line of defense against airway catastrophes that graduating residents may administer only one or two general anesthetics for cesarean delivery during all three years of clinical training. Traditional teaching includes endotracheal intubation to avoid pulmonary aspiration and advanced airway techniques that allow us to secure the difficult airway while the patient is awake or, in the event of failed airway establishment, create a pathway for oxygenation and ventilation.

Two recent publications indicate that the timing of anesthesia-related maternal mortality is changing, with profound implications for patient safety...the critical incidents occurred after the procedure was completed.

What do we do next? Both of the above-referenced publications emphasize the need for “anesthetic involvement” in the immediate postoperative period. Many obstetric patients are not recovered in the areas used by other surgical patients, but are recovered on the labor and delivery ward or in an obstetric post-anesthesia care unit (PACU) staffed by perinatal nurses. We can requisition the appropriate monitors and equipment and hand the peripartum nurses the same orders and protocols used in the general PACU and say we have done our bit — we have been “involved.” However, ensuring that obstetric patients receive the same quality of post-anesthetic care as do other surgical patients is not straightforward. Often, postoperative care of obstetric patients is provided by labor and delivery/perinatal nurses who are very skilled in newborn care, institution of breast-feeding, assessment of the postpartum uterus and supportive care of the new mother and family, areas in which PACU nurses are far less comfortable. At the same time, the obstetric nurses may not have seen a cardiac arrest in years, and never in an obstetric patient. Airway skills are understandably minimal. Though advanced cardiac life support certification can be required of obstetric nurses, how much understanding and retention can occur when the skills are rarely used?

The shift of anesthesia-related maternal mortality to the post-anesthetic period means we must improve the systems within which we work. It’s not enough to be an excellent anesthesiologist — you can be no better than the system in which you work.

What challenges have you encountered in ensuring safe post-partum care in your hospital? What solutions have you found? We would be interested in hearing from you! E-mail correspondence to pc6104@gmail.com.

References: