Placenta accreta: successful outcome is all in the planning

On January 26, 2010 the USA Joint Commission issued a sentinel alert entitled, "Preventing maternal death." The Joint Commission highlighted the sobering statistic that maternal mortality almost doubled from 7–8/100000 births in 1996 to 13.3/100000 births in 2010. The etiology of the increase was multifactorial but was related to an increase in postpartum hemorrhage (PPH). The World Health Organization also assessed the etiology of maternal mortality. They reviewed 34 data sets incorporating 35107 maternal deaths and found that PPH was the leading cause of death in developing countries (approaching 30%) and the second leading cause (approximately 13%) in developed countries. Callaghan et al. reported that between 1994 and 2006 the incidence of PPH in the USA increased by 26% from 2.3% in 1994 to 2.9% in 2006.

The major causes of PPH include uterine atony, uterine rupture, placenta previa and accreta, but the incidence of placenta accreta, in particular, is increasing. Warshak et al. found the number of cases of placenta accreta at the University of California, San Diego Medical Center quadrupled between 1990 and 2010 from two per year in 1990 to eight per year in 2010. Meanwhile, Flood et al. assessed the etiology of peripartum hysterectomy in the last four decades at three obstetric hospitals in Dublin. There were 872379 deliveries of which 358 cases underwent hysterectomy. They found that placenta accreta as the etiology increased from 5% of the cases between 1966 and 1975 to 47% between 1996 and 2005.

Placenta accreta occurs when the placental villae invade the uterine wall, causing the placenta to become abnormally adherent. Invasion can vary in depth; into the decidual layer of the uterus (accreta), into the myometrium (increta), or through the uterus to involve adjacent organs (percreta). Greater degrees of invasion are associated with an increased risk of maternal hemorrhage and mortality. Clinical risk factors for placenta accreta include advanced maternal age, placenta previa and repeat cesarean delivery. A patient with a placenta previa and two previous cesarean deliveries has a 40% chance of having a placenta accreta and this approaches 60% with three or more previous cesarean deliveries. The increase in the incidence of placenta accreta is directly related to the increase in rate of cesarean delivery, which currently approaches 33% annually in the USA.

Neuraxial anesthesia is generally the modality of choice for elective cesarean delivery. However, in the presence of massive hemorrhage or surgical complications it may be necessary to convert to general anesthesia during the procedure. At this time the patient may be hemodynamically unstable because of blood loss. Concomitant sympathectomy caused by neuraxial anesthesia may exacerbate this problem and the inability to rapidly reverse the anesthetic makes neuraxial anesthesia a less than optimal technique if massive hemorrhage occurs. Furthermore, the administration of intravenous fluid may increase facial and airway edema, potentially making airway management more difficult.

In cases of placenta accreta it is important to formulate a plan to help minimize bleeding and complications. Guidelines for management have been endorsed by the American College of Obstetricians and Gynecologists and in the UK by the Royal College of Obstetricians and Gynaecologists. Preparation for delivery should begin as soon as the diagnosis of placenta accreta is suspected. Consultation with an anesthesiologist is important to determine whether airway management is likely to be a problem and if other comorbidities are present. At that time, the advantages and disadvantages of anesthetic techniques can be discussed and patient preferences determined. A multidisciplinary case conference is useful for decision making. A radiologist should be involved to help determine the certainty of the diagnosis and extent of placental invasion. The presence of certain ultrasound findings such as anterior position of the placenta, a sponge-like appearance of the cervix and possibly placental lacunae are associated with an increased risk of hemorrhage. Specific vascular patterns on 3D power Doppler may be diagnostic. In cases of uncertainty the radiologist can decide whether or not an magnetic resonance imaging (MRI) scan would add useful information. However, even with both ultrasound and MRI the sensitivity to diagnose accreta is still only 0.88. In addition, the feasibility of controlling hemorrhage using intra-arterial balloons can be discussed with an interventional radiologist.

The obstetrician may be aware of other factors apart from abnormal placenta that would place the patient at risk for bleeding. The surgical plan to deal with the placenta if it is adherent (conservative vs. immediate hysterectomy) should be formulated at this time. Consultation with a hematologist can help optimize the patient's condition.
preoperatively and alert the blood bank to the need for specific products. Additional personnel may be required to set up cell salvage equipment if necessary. Other surgical specialties such as gynecology-oncology, urology, vascular and general surgery should be available in case of intraoperative complications.

The choice of anesthetic technique for a patient at risk for placenta accreta will depend on many factors, but is primarily related to the probability for massive hemorrhage and the need to convert to general anesthesia if one started with a neuraxial technique. A patient who is morbidly obese or has a perceived difficult airway would be a candidate for general anesthesia from the outset. Otherwise, the findings and discussion during the preoperative assessment are critical. If clinical history and imaging suggest a low risk for accreta then neuraxial anesthesia may be considered.

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The study by Weiniger et al. in this issue of the International Journal of Obstetric Anesthesia is helpful in determining preoperative predictors for the presence of accreta. The authors prospectively identified 92 patients in their institution between 2002 and 2011 who had placenta accreta associated with placenta previa. They found that the most important independent risk factors for prediction of accreta are the presence of placenta previa, the number of previous cesarean deliveries, and ultrasound findings suggestive of an accreta. Using these risk factors they developed a nomogram to define the probability of finding accreta at the time of cesarean delivery. As this was by the authors’ admission a “proof of concept study”, it remains to be seen whether the nomogram will significantly improve the ability to predict placenta accreta thereby influencing anesthetic technique.

Where preoperative assessment is highly suggestive of an accreta the surgical plan becomes more critical because these patients are likely to bleed and require conversion to general anesthesia. Lilker et al. reviewed the anesthetic technique and outcome for all 23 cases of placenta accreta at their institution between 2000 and 2008. Anesthetic technique was selected by the individual anesthesiologist. During the first few years the anesthesiologists primarily chose general anesthesia and in the later years they used neuraxial anesthesia. There were six patients who had a general anesthetic and two of those cases had blood loss in excess of two liters. Seventeen patients had a neuraxial anesthetic. Of these, six had blood loss > two liters (overall rate 39%) and four (29%) required conversion to general anesthesia. Stotler et al. retrospectively studied transfusion requirements in women with placenta accreta at Columbia University Medical Center. Of the 66 women who qualified, 95% required transfusion and 39% required more than 10 units of red blood cells.

Even in the face of placenta accreta it may still be acceptable to proceed with neuraxial anesthesia if the surgical plan is to minimize blood loss. Preoperative elective placement of arterial balloon catheters can limit blood loss during the case. Intraoperative ultrasound can be performed to reduce the chances of disrupting the placenta on entry to the uterus. A planned hysterectomy rather than attempting to remove the placenta and disrupt the placental bed is also associated with less blood loss. Surgical assistance from a gynecology-oncologist may hasten the procedure and limit complications. Under these circumstances the risk of uncontrolled bleeding is minimized and neuraxial anesthesia may be a reasonable option.

If the patient wishes to preserve fertility, the likelihood of bleeding increases. Also, surgical techniques that may cause patient discomfort under neuraxial anesthesia, such as uterine exteriorization, B-Lynch (compression) sutures and ligation of the hypogastric arteries may be required. Other complications, such as injury to blood vessels or other structures, may require intraoperative consultation and additional interventions that increase duration of surgery. In these patients conversion to general anesthesia is more likely and the anesthesiologist must assess the risks of conversion taking into account the availability of resources. If the anesthesiologist is at an institution where assistance is readily available then conversion to general anesthesia is more manageable and safer than if there is no additional anesthesia support.

At this time there is no formula to determine the safest anesthetic technique for a patient with placenta accreta. Only following a careful and thorough evaluation of the patient and assessment of all available resources can a rational decision regarding anesthetic technique be made for the individual patient.

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