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## Committee on Obstetric Practice

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## Placenta Accreta

**ABSTRACT:** Placenta accreta is a potentially life-threatening obstetric condition that requires a multidisciplinary approach to management. The incidence of placenta accreta has increased and seems to parallel the increasing cesarean delivery rate. Women at greatest risk of placenta accreta are those who have myometrial damage caused by a previous cesarean delivery with either an anterior or posterior placenta previa overlying the uterine scar. Diagnosis of placenta accreta before delivery allows multidisciplinary planning in an attempt to minimize potential maternal or neonatal morbidity and mortality. Grayscale ultrasonography is sensitive enough and specific enough for the diagnosis of placenta accreta; magnetic resonance imaging may be helpful in ambiguous cases. Although recognized obstetric risk factors allow the identification of most cases during the antepartum period, the diagnosis is occasionally discovered at the time of delivery. In general, the recommended management of suspected placenta accreta is planned preterm cesarean hysterectomy with the placenta left in situ because attempts at removal of the placenta are associated with significant hemorrhagic morbidity. However, surgical management of placenta accreta may be individualized. Although a planned delivery is the goal, a contingency plan for an emergency delivery should be developed for each patient, which may include following an institutional protocol for maternal hemorrhage management.

*Placenta accreta* is a general term used to describe the clinical condition when part of the placenta, or the entire placenta, invades and is inseparable from the uterine wall (1). When the chorionic villi invade only the myometrium, the term *placenta increta* is appropriate; whereas *placenta percreta* describes invasion through the myometrium and serosa, and occasionally into adjacent organs, such as the bladder. Clinically, placenta accreta becomes problematic during delivery when the placenta does not completely separate from the uterus and is followed by massive obstetric hemorrhage, leading to disseminated intravascular coagulopathy; the need for hysterectomy; surgical injury to the ureters, bladder, bowel, or neurovascular structures; adult respiratory distress syndrome; acute transfusion reaction; electrolyte imbalance; and renal failure. The average blood loss at delivery in women with placenta accreta is 3,000–5,000 mL (2). As many as 90% of patients with placenta accreta require blood transfusion, and 40% require more than 10 units of packed red blood cells. Maternal mortality with placenta accreta has been reported to be as high as 7% (3). Maternal death may occur despite optimal planning, transfusion management, and surgical care. From a cohort of 39,244 women

who underwent cesarean delivery, researchers identified 186 that had a cesarean hysterectomy performed (4). The most common indication was placenta accreta (38%).

### Incidence

The incidence of placenta accreta has increased and seems to parallel the increasing cesarean delivery rate. Researchers have reported the incidence of placenta accreta as 1 in 533 pregnancies for the period of 1982–2002 (5). This contrasts sharply with previous reports, which ranged from 1 in 4,027 pregnancies in the 1970s, increasing to 1 in 2,510 pregnancies in the 1980s (6, 7).

### Repeat Cesarean Delivery and Other Risk Factors

Women at greatest risk of placenta accreta are those who have myometrial damage caused by a previous cesarean delivery with either anterior or posterior placenta previa overlying the uterine scar. The authors of one study found that in the presence of a placenta previa, the risk of placenta accreta was 3%, 11%, 40%, 61%, and 67% for the first, second, third, fourth, and fifth or greater repeat cesarean deliveries, respectively (8). Placenta previa with-

out previous uterine surgery is associated with a 1–5% risk of placenta accreta. Besides advanced maternal age and multiparity, reported risk factors include any condition resulting in myometrial tissue damage followed by a secondary collagen repair, such as previous myomectomy, endometrial defects due to vigorous curettage resulting in Asherman syndrome (9), submucous leiomyomas, thermal ablation (10), and uterine artery embolization (11).

## Diagnosis

The value of making the diagnosis of placenta accreta before delivery is that it allows for multidisciplinary planning in an attempt to minimize potential maternal or neonatal morbidity and mortality. The diagnosis is usually established by ultrasonography and occasionally supplemented by magnetic resonance imaging (MRI).

### Ultrasonography

Transvaginal and transabdominal ultrasonography are complementary diagnostic techniques and should be used as needed. Transvaginal ultrasound is safe for patients with placenta previa and allows a more complete examination of the lower uterine segment. A normal placental attachment site is characterized by a hypoechoic boundary between the placenta and the bladder. The ultrasonographic features suggestive of placenta accreta include irregularly shaped placental lacunae (vascular spaces) within the placenta, thinning of the myometrium overlying the placenta, loss of the retroplacental “clear space,” protrusion of the placenta into the bladder, increased vascularity of the uterine serosa–bladder interface, and turbulent blood flow through the lacunae on Doppler ultrasonography (12, 13). The presence and increasing number of lacunae within the placenta at 15–20 weeks of gestation have been shown to be the most predictive ultrasonographic signs of placenta accreta, with a sensitivity of 79% and a positive predictive value of 92% (14). These lacunae may result in the placenta having a “moth-eaten” or “Swiss cheese” appearance.

Overall, grayscale ultrasonography is sufficient to diagnose placenta accreta, with a sensitivity of 77–87%, specificity of 96–98%, a positive predictive value of 65–93%, and a negative predictive value of 98 (13, 14). The use of power Doppler, color Doppler, or three-dimensional imaging does not significantly improve the diagnostic sensitivity compared with that achieved by grayscale ultrasonography alone (15).

### Magnetic Resonance Imaging

Magnetic resonance imaging is more costly than ultrasonography and requires both experience and expertise in the evaluation of abnormal placental invasion. Although most studies have suggested comparable diagnostic accuracy of MRI and ultrasonography for placenta accreta, MRI is considered an adjunctive modality and adds little to the diagnostic accuracy of ultrasonography. However, when there are ambiguous ultrasound findings or a suspicion of a posterior placenta accreta, with or without

placenta previa, ultrasonography may be insufficient. A prospective series of 300 cases published in 2005 showed that MRI was able to outline the anatomy of the invasion and relate it to the regional anastomotic vascular system (16). In addition, this study showed that using axial MRI slices enabled confirmation of parametrial invasion and possible ureteral involvement.

Controversy surrounds the use of gadolinium-based contrast enhancement even though it adds to specificity of the placenta accreta diagnosis by MRI. The use of gadolinium contrast enables MRI to more clearly delineate the outer placental surface relative to the myometrium and differentiate between the heterogeneous vascular signals within the placenta from those caused by maternal blood vessels. The uncertainty surrounds the risk of possible fetal effects because it is able to cross the placenta and readily enters the fetal circulatory system. The Contrast Media Safety Committee of the European Society of Urogenital Radiology reviewed the literature and determined that no effect on the fetus has been reported following the use of gadolinium contrast media (17). However, the American College of Radiology guidance document for safe MRI practices recommends that intravenous gadolinium should be avoided during pregnancy and should be used only if absolutely essential (18).

## Management

### General Considerations

It is critically important that obstetricians and radiologists are familiar with the risk factors and diagnostic modalities for placenta accreta because of its potential emergent nature and the associated risk of life-threatening hemorrhage. If there is a strong suggestion for the presence of abnormal placental invasion, health care providers practicing at small hospitals or institutions with insufficient blood bank supply or inadequate availability of subspecialty and support personnel should consider patient transfer to a tertiary perinatal care center. Improved outcomes have been demonstrated when these patients give birth in specialized tertiary centers (19).

Delivery planning may involve an anesthesiologist, obstetrician, pelvic surgeon such as a gynecologic oncologist, intensivist, maternal–fetal medicine specialist, neonatologist, urologist, hematologist, and interventional radiologist to optimize the patient’s outcome (19). To enhance patient safety, it is important that the delivery be performed by an experienced obstetric team that includes an obstetric surgeon, with other surgical specialists, such as urologists, general surgeons, and gynecologic oncologists, available if necessary. Because of the risk of massive blood loss, attention should be paid to maternal hemoglobin levels in advance of surgery, if possible (20). Many patients with placenta accreta require emergency preterm delivery because of the sudden onset of massive hemorrhage. Autologous blood salvage devices have proved safe, and the use of these devices may be a valuable adjunct during the surgery (21).

### **Delivery Planning**

The timing of delivery in cases of suspected placenta accreta must be individualized. This decision should be made jointly with the patient, obstetrician, and neonatologist. Patient counseling should include discussion of the potential need for hysterectomy, the risks of profuse hemorrhage, and possible maternal death. A guiding principle in management is to achieve a planned delivery because data suggest greater blood loss and complications in emergent cesarean hysterectomy versus planned cesarean hysterectomy (22). Although a planned delivery is the goal, a contingency plan for emergency delivery should be developed for each patient, which may include following an institutional protocol for maternal hemorrhage management.

The timing of delivery should be individualized, depending on patient circumstances and preferences. One option is to perform delivery after fetal pulmonary maturity has been demonstrated by amniocentesis. However, the results of a recent decision analysis suggested that combined maternal and neonatal outcomes are optimized in stable patients with delivery at 34 weeks of gestation without amniocentesis (23). The decision to administer antenatal corticosteroids and the timing of administration should be individualized.

The delivery should be performed in an operating room with the personnel and support services needed to manage potential complications. Assessment by the anesthesiologist should occur as early as possible before surgery. Both general and regional anesthetic techniques have been shown to be safe in these clinical situations; the judgment of which type of technique to be used should be made on an individual basis. Pneumatic compression stockings should be placed preoperatively and maintained until the patient is fully ambulatory. Prophylactic antibiotics are indicated, with repeat doses after 2–3 hours of surgery or 1,500 mL of estimated blood loss. Preoperative cystoscopy with placement of ureteral stents may help prevent inadvertent urinary tract injury. Some advise that a three-way Foley catheter be placed in the bladder through the urethra to allow irrigation, drainage, and distension of the bladder, as necessary, during dissection. Preoperatively, the blood bank should be placed on alert for a potential massive hemorrhage. Current recommendations for blood replacement in trauma situations suggest a 1:1 ratio of packed cells to fresh frozen plasma. Institutionally established massive transfusion protocols should be followed. Packed red blood cells and thawed fresh frozen plasma should be available in the operating room. Additional units of blood and coagulation factors should be infused quickly and as necessitated by the patient's vital signs and hemodynamic stability.

### **Surgical Approach**

Generally, the recommended management of suspected placenta accreta is planned preterm cesarean hysterectomy with the placenta left in situ because removal of the

placenta is associated with significant hemorrhagic morbidity. However, this approach might not be considered first-line treatment for women who have a strong desire for future fertility. Therefore, surgical management of placenta accreta may be individualized.

Consideration should be given to placing the patient on the operating table in specialized stirrups in a modified dorsal lithotomy position with left lateral tilt to allow for direct assessment of vaginal bleeding, provide access for placement of a vaginal pack, and allow additional space for a surgical assistant. Because the procedure is anticipated to be prolonged, padding and positioning to prevent nerve compression and the prevention and treatment of hypothermia are important (24). Minimizing blood loss is critical. The choice of incision should be made based on the patient's body habitus and history of surgery. The use of a midline vertical incision may be considered because it provides sufficient exposure if hysterectomy becomes necessary. A classic uterine incision, often transfundal, may be necessary to avoid the placenta and allow delivery of the infant. Ultrasound mapping of the placental attachment site, either preoperatively or intraoperatively, may be helpful. Because the positive predictive value of ultrasonography for placenta accreta ranges from 65% to 93% (12, 13), it is reasonable to await spontaneous placental separation to confirm placenta accreta clinically.

Generally, planned attempts at manual placental removal should be avoided. If hysterectomy becomes necessary, the standard approach is to leave the placenta in situ, quickly use a "whip stitch" to close the hysterotomy incision, and proceed with hysterectomy. Whereas hysterectomy is performed in the usual fashion, dissection of the bladder flap may be performed relatively late, after vascular control of the uterine arteries is achieved, in cases of anterior accreta, depending on intraoperative findings. Occasionally, a subtotal hysterectomy can be safely performed, but persistent bleeding from the cervix may preclude this approach and make total hysterectomy necessary.

There are reports of an alternative approach to the management of placenta accreta that includes ligating the cord close to the fetal surface, removing the cord, and leaving the placenta in situ, potentially with partial placental resection to minimize its size. However, this approach should be considered only when the patient has a strong desire for future fertility as well as hemodynamic stability, normal coagulation status, and is willing to accept the risks involved in this conservative approach. The patient should be counseled that the outcome of this approach is unpredictable and that there is an increased risk of significant complications as well as the need for later hysterectomy. Reported cases of subsequent successful pregnancy in patients treated with this approach are rare. This approach should be abandoned and hysterectomy performed if excessive bleeding is noted. Of the 26 patients treated with this approach,

21 (80.7%) successfully avoided hysterectomy, whereas 5 (19.3%) eventually required it. However, the majority of the 21 patients who avoided hysterectomy did require additional treatment, including hypogastric artery ligation, arterial embolization, methotrexate, blood product transfusion, antibiotics, or curettage (25). Except in specific cases, hysterectomy remains the treatment of choice for patients with placenta accreta.

### **Interventional Radiologic Procedures**

Current evidence is insufficient to make a firm recommendation on the use of balloon catheter occlusion or embolization to reduce blood loss and improve surgical outcome, but individual situations may warrant their use. Despite initial enthusiasm about the utility of balloon catheter occlusion, available data are unclear regarding its efficacy. Although some investigators have reported reduced blood loss (26), there have been other reports of no benefits (27) and even of significant complications (28).

### **Methotrexate**

The folate antagonist methotrexate has been proposed as an adjunctive treatment for placenta accreta. Some have opined that after delivery, the trophoblasts are no longer dividing, thereby rendering methotrexate ineffective. Small studies have reported mixed results (29, 30). Although uterine conservation was achieved in one study, most of the patients subsequently developed postpartum hemorrhage that required hysterectomy. Other reports documented failure of treatment with methotrexate (30). Thus, there are no convincing data for the use of methotrexate for postpartum management of placenta accreta.

### **Retained Placenta After Vaginal Delivery**

Occasionally, a retained placenta or persistent postpartum bleeding develops after vaginal delivery. After reassessment of the risk factors for placenta accreta, the possibility of abnormal placental invasion must be considered before proceeding with additional attempts at manual or surgical removal because these may only worsen the hemorrhage and increase the risk of maternal morbidity and mortality. When the diagnosis of placenta accreta is suspected, management options might include intrauterine balloon tamponade, selective pelvic embolization in stable cases, and emergency surgery.

### **Recommendations and Conclusions**

- Women at greatest risk of placenta accreta are those who have myometrial damage caused by an earlier cesarean delivery with either an anterior or posterior placenta previa overlying the uterine scar.
- Grayscale ultrasonography is sensitive (77–87%) and specific (96–98%) for the diagnosis of placenta accreta.
- If there is a strong suggestion of the presence of abnormal placental invasion, health care providers practicing at small hospitals or at institutions with

insufficient blood bank supply or inadequate availability of subspecialty and support personnel should consider patient transfer to a tertiary perinatal care center.

- To enhance patient safety, it is important that the delivery be performed in an operating room by an experienced obstetric team that includes an obstetric surgeon, with other surgical specialists, such as urologists, general surgeons, and gynecologic oncologists, available if necessary. Improved outcomes have been demonstrated when women with placenta accreta give birth in specialized tertiary centers.
- Preoperative patient counseling should include discussion of the potential need for hysterectomy, the risks of profuse hemorrhage, and possible maternal death.
- Although a planned delivery is the goal, a contingency plan for emergency delivery should be developed for each patient, which may include following an institutional protocol for maternal hemorrhage management.
- The timing of delivery should be individualized, depending on patient circumstances. Combined maternal and neonatal outcome is optimized in stable patients with a planned delivery at 34 weeks of gestation without amniocentesis.
- The decision to administer antenatal corticosteroids and the timing of administration should be individualized.
- Generally, the recommended management of suspected placenta accreta is planned preterm cesarean hysterectomy with the placenta left in situ because removal of the placenta is associated with significant hemorrhagic morbidity. However, surgical management of placenta accreta may be individualized.

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