

Abnormal Placentation Diagnosis and Management

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DEFINITIONS

PLACENTA ACCRETA SPECTRUM (PAS): abnormal placentation where the trophoblasts adhere to, in, or through the myometrium and can grow into other organs.

PLACENTA ACCRETA: placental villi attach to the uterine myometrium

PLACENTA INCRETA: placental villi attach to and grow through the myometrium

PLACENTA PERCRETA: placental villi grow through the myometrium and extend into the uterine serosa or adjacent pelvic organs

Note: it is helpful for chart review evaluation of maternal morbidity and mortality cases to include the above terminology in EHR documentation.

BACKGROUND

Abnormal placentation, with placental attachment to the myometrium (placenta accreta compromises 82% of cases, with lesser numbers of increta and percreta) is becoming increasingly common, largely because of the increasing cesarean rate. As demonstrated in the table below, placenta accreta is most often seen in the setting of placenta previa in pregnant patients with multiple prior cesareans. Placenta accreta spectrum (PAS) is a morbid condition, and early prenatal detection is essential for appropriate preoperative planning.

TABLE 1: Risk for placenta accreta spectrum

Number of Prior Cesarean Deliveries	Placenta Previa Present in Current Pregnancy	Placenta Previa Absent in Current Pregnancy
None	3%	0.03%
One	11%	0.2%
Two	40%	0.1%
Three	61%	0.8%
Four	67%	0.8%
Five	67%	4.7%

RISK FACTORS

Prior cesarean delivery is the most common risk factor for PAS. Other risk factors include placenta previa, prior myometrial surgery, and unexplained elevation in maternal serum alpha fetoprotein.

MATERNAL COMPLICATIONS

The following complications should be anticipated in pregnant patients with abnormal placentation:

- Life-threatening hemorrhage with need for large volume transfusion
- Hysterectomy
- Intraoperative injury (bladder, ureters, bowel)
- Postoperative bleeding and repeat surgery
- Coagulopathy (dilutional or consumptive)
- Adult respiratory distress syndrome (ARDS)

- Venous thromboembolism
- Amniotic fluid embolism
- Multiorgan failure and maternal death
- Postpartum conditions such as pelvic pain, anxiety, depression, or post-traumatic stress disorder

DIAGNOSIS

Ultrasound is the usual antenatal method by which placenta accreta is diagnosed. While there may be sonographic findings in the first trimester, PAS is most often diagnosed in the second trimester.

Sonographic findings associated with abnormal placentation include:

- Loss of the hypoechoic retroplacental zone and thinning of retroplacental myometrium
- Multiple vascular placental lakes (“Swiss cheese” or “moth-eaten” appearance)
- Numerous coherent “bridging blood vessels” between the placental-myometrial (or serosal), or myometrial-bladder, interface, as seen with color Doppler
- Retroplacental myometrial thickness <1 mm
- Abnormal uterine contour
- Exophytic mass

Two or more of the above criteria are sufficient to raise suspicion for placenta accreta spectrum and MFM should be consulted. The poorest predictive value is associated with loss of the hypoechoic retroplacental zone. The best predictive value is associated with abnormal vasculature at the myometrial-bladder interface, especially when corroborated by 3-D power Doppler. Ultrasound, with color Doppler, has a sensitivity of 89-97% and a specificity of 92-98% for the diagnosis of abnormal placentation. MRI can be useful in specific situations, but ordering should be up to the discretion of MFM. However, up to 50% of PAS cases are not diagnosed until delivery.

In those who have an anterior low-lying placenta or placenta previa with a history of one or more prior cesarean deliveries, an MFM referral should be placed.

PREOPERATIVE MANAGEMENT

Pregnant patients with known abnormal placentation should be transferred to, and remain in, Anchorage as soon as the diagnosis is established. Hospitalization is not necessarily indicated in pregnant patients who are not bleeding if reliable transportation to hospital is assured. Pregnant patients should be aware that the recommended treatment, hysterectomy, will result in permanent sterility. Discussion of conservative management, if desired by the patient, should be documented.

Optimization of hemoglobin levels should occur, and iron deficiency should be repleted through oral and/or intravenous administration (please reference the “Anemia in Pregnancy” Clinical Guideline). Both an OBGYN physician, preferably the physician scheduled to perform the cesarean delivery with hysterectomy, and MFM should be scheduled with the patient routinely in clinic. During these appointments, coordination with other specialties (gynecologic oncology, anesthesiology, interventional radiology, urology, etc) should occur.

For those at high risk of an emergency delivery or who have bleeding, delivery may be indicated at or before 34 0/7 weeks of gestation. If life-threatening maternal hemorrhage does not occur prior, late

preterm (34 0/7 – 35 6/7 weeks of gestation) cesarean delivery, with planned hysterectomy with the placenta in situ, has been demonstrated to result in the best maternal and infant outcomes. Antenatal corticosteroid administration at least 48 hours prior to scheduled cesarean delivery should be offered for fetal benefit. Please reference the “Antenatal Corticosteroids for Fetal Benefit in the Preterm Period” Clinical Guideline for additional information on this topic.

Leaving the placenta in situ, with subsequent methotrexate treatment, has been associated with delayed life-threatening hemorrhage, infection, as well as delayed hysterectomy, and is not recommended.

The Blood Bank should be notified as intraoperative blood loss of two to 10 liters may be anticipated, and transfusion of multiple units of packed red blood cells, as well as other blood products, including fresh frozen plasma (FFP) and platelets, is to be anticipated. Blood should ideally be available in the operating suite at the time of incision.

Preoperative ureteral stent placement and intravascular catheter access (for internal femoral artery balloon occlusion or embolization) are not currently routine and should be decided on a case-by-case basis. If there is a high index of suspicion for accreta, consider obtaining a cystoscopy by Urology pre-operatively with or without ureteral stent placement. This can be performed as an out-patient prior to surgery, or in the operating room before the procedure.

If a pregnant patient with PAS declines blood products, then consider pre-operative notification or consultation with Interventional Radiology. Further discussion regarding Cell Saver and non-blood product options should also occur.

There are two proposed examples of preoperative checklists from SMFM: one for management of placenta accreta spectrum when diagnosed by ultrasound during antenatal care and a second that offers a preoperative checklist for management of unexpected placenta accreta spectrum.

INTRAOPERATIVE MANAGEMENT RECOMMENDATIONS

In general, not attempting to remove the placenta, rapid uterine devascularization, and liberal use of FFP, will usually prevent uncontrollable bleeding and coagulopathy, but may not always be possible in the emergent cesarean with an unrecognized abnormal placentation.

1. General anesthesia, not neuraxial anesthesia, is the most appropriate choice. At least two large bore IV lines should be in place, and consideration should be given to central venous pressure and intra-arterial pressure monitoring.
2. Use of compression thromboprophylaxis devices and warming blankets should be routine.
3. Large Zepplin clamps are in a surgical instrument tray separate from the abdominal hysterectomy tray, and need to be requested separately, if desired.
4. A midline vertical incision often facilitates the best exposure, particularly if there is a placenta previa, and is the preferred incision. If a Pfannenstiel incision is used but inadequate intraoperative exposure occurs, Maylard or Cherney incisions may be required for adequate exposure.
5. Dorsal lithotomy position in stirrups, “Yellofin” if available, allows for intraoperative evaluation of vaginal bleeding, cystoscopy, or instrumentation of the vagina.

6. The hysterotomy should be made in the fundus or superior aspect of the uterus, away from the placental insertion in the lower uterine segment. The placental portion of the cord should be ligated, then replaced back into the uterus. The hysterotomy should be quickly closed in a single layer for hemostasis. The surgeons should then proceed with hysterectomy. The major vascular pedicles (adnexal and uterine artery pedicles) should be isolated and cross-clamped as rapidly as possible, without suture ligation, until the uterine blood supply has been interrupted.
7. After uterine devascularization has been accomplished, if bladder involvement is suspected, intentional cystotomy should be considered to evaluate the extent of invasion. This will decrease the risk of incidental bladder injury as the hysterectomy proceeds. Depending on the degree of invasion, significant bleeding can occur with attempts to dissect the bladder, and consideration of leaving a portion of the involved bladder attached to the uterus may be necessary, if the trigone is not involved.
8. Supracervical hysterectomy may be considered, but has been associated with persistent hemorrhage, and, because of placental cervical implantation, is usually precluded.
9. Prompt blood product transfusion is usually needed. In the setting of massive hemorrhage, giving packed red blood cells with fresh frozen plasma and platelets in a 1:1:1 or 1:2:4 red blood cells is associated with less coagulopathy, and the best outcomes. The use of cell-saver autotransfusion can be considered if available. Blood Bank should be notified if a Massive Transfusion Protocol (MTP) is needed.
10. Prepare for possible X-ray guided pelvic artery embolization with on call IR physician. If insufficiently stable to be transported to IR, then pelvic pressure packing is preferred for diffuse non-arterial bleeding that is not amenable to surgical control, at least until hemodynamic stabilization and correction of coagulopathy can be accomplished.
11. Manual aortic compression, aortic cross-clamping, or aortic balloon compression during massive and uncontrolled bleeding can be lifesaving. Trauma surgery, general surgery, and/or vascular surgery intraoperative consults are recommended for this management option.
12. Internal iliac (hypogastric) artery ligation is associated with a high rate of failure to control uterine bleeding, as well as a high incidence of damage to the ureter and nearby vascular structures. Therefore, it is not currently recommended as a primary means of achieving pelvic hemostasis.

POSTOPERATIVE MANAGEMENT

Following management of a planned or unexpected placenta accreta spectrum, the following items are recommended. A team debrief with documentation should occur within the same shift, if possible. The team should ensure correct documentation of the extent of the abnormal placentation in the operative note and pathology requisition form. Disposition plans should be made by the surgical and anesthesia teams, and appropriate sign out between physicians should precede patient transport to the PACU, ICU, etc. Plans for appropriate pain management options (TAP blocks, PCA, IV, oral, etc), repeat laboratory analysis, transfusion of blood products, antibiotic re-dosing (if indicated), venous thromboembolism prevention, removal or maintenance of IVs, arterial lines, foley catheters, ureteral stents, or other indwelling devices should be clearly outlined. Lastly, emotional support for the patient, patient's family or friends, and involved medical personnel should be offered.

Postoperative problems that may require ICU admission include:

- Persistent hypotension requiring IV vasopressor support
- Persistent coagulopathy
- Pulmonary edema or ARDS

- Renal dysfunction, particularly acute tubular necrosis (ATN), and unrecognized urinary tract injury
- Sheehan syndrome (hyponatremia is the earliest sign)
- Pulmonary embolism
- Sepsis or severe postoperative infection

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APPENDIX 1

[Antenatal planning worksheet](#) for placenta accreta spectrum disorder in the antenatal period.

Antenatal Planning Worksheet: Interdisciplinary Team Plan (Part 2)

Date of planned admission: _____ Date of planned surgery: _____

EMERGENCY CONTACT LIST

PAS Team Lead:

Anesthesiology:

MFM:

Urology / Urogyn:

Vascular Surgery:

Other:

Gyn Onc / Gyn Surgery:

Operating Room:

Labor and Delivery:

Neonatal / NICU:

Trauma Surgery:

Antenatal Preparation

- ☐ PAS expert imaging complete
- ☐ Interdisciplinary team plan complete
- ☐ Advanced directive signed
- ☐ Blood type & antibody screen
- ☐ Confirm recent pap smear result
- ☐ Recent hemoglobin & platelets
- ☐ Hemoglobin optimization, if indicated
(e.g., IV iron infusion)
- ☐ Other labs, if indicated
(e.g., coagulation panel, creatinine)
- ☐ Psychological counseling arranged
- ☐ Preoperative consultations complete (fill in):
 - ☐
 - ☐
 - ☐
- ☐ Antenatal steroids indicated? Y / N
- ☐ Antenatal steroids administered? Y / N / n/a

Admission

- ☐ Antenatal steroids administered, if indicated
- ☐ Consent forms signed, in chart
- ☐ Preop labs complete, if indicated
- ☐ Active antibody screen
- ☐ Crossmatch of blood, per protocol
(e.g., 6 units PRBC and FFP)
- ☐ All preoperative consultations complete
- ☐ Preop fetal monitoring completed
- ☐ Preop infection prevention
(e.g., chlorhexidine wipe / bath)

Version Date November 2, 2023

Society for Maternal-Fetal Medicine. Updated placenta accreta checklist. Am J Obstet Gynecol 2024.

PAS-Specific Operating Room Equipment

- ☐ Fetal monitor, if viable
- ☐ NICU resuscitation equipment
- ☐ Neuraxial anesthesia tray, if planned
- ☐ Video laryngoscope
- ☐ Blood bank cooler
- ☐ Blood & IV fluid rapid infuser
- ☐ Cell saver
- ☐ Arterial line and central line kits
- ☐ Cesarean tray, with cord blood tubes & clips
- ☐ Cystoscopy tray, stents, and tower
- ☐ Self-retaining or table-mounted retractors
- ☐ Hysterectomy tray, with surgeon preferences
- ☐ Hemorrhage control devices
(e.g., surgical clips, bipolar device, linear stapler-cutter)
- ☐ Interv. Radiology equipment
(e.g., C-arm, endovascular catheters)
- ☐ Table-mounted leg stirrups

Operating Room**Pre-operation**

- ☐ Surgical consultants contacted
- ☐ NICU staff and equipment ready
- ☐ Surgical equipment ready (see sample on right)
- ☐ Pre-/Intra-operative fetal monitoring ready
- ☐ Umbilical cord clamping protocol reviewed
- ☐ Cell saver prepared, if indicated
- ☐ Blood cooler in room, verified and checked
- ☐ Interdisciplinary timeout performed

Post-operation

- ☐ Determine surgical grade (eg, FIGO grade 1)
- ☐ Quantify / estimate blood loss
- ☐ Decide on postoperative disposition
(e.g., ICU, PACU, surgical or postpartum floor)
- ☐ Re-dose antibiotics, if indicated
- ☐ Urinary catheter & stent plan
- ☐ Endovascular intervention plan, if indicated
- ☐ Lab testing plan
- ☐ Specimen labeled and sent to pathology
- ☐ Pain management plan
- ☐ VTE prevention plan, first timed dose

APPENDIX 2

[Preoperative checklist](#) for management of unexpected placenta accreta spectrum.

Checklist: Management of Unexpected or Undiagnosed Placenta Accreta Spectrum

Component 1: Management to Prevent & Reduce Morbidity

CRITICAL QUESTIONS

1. Does this hospital have the resources to manage PAS? (Section 3) and if not;
2. Can transport to a PAS referral center be safely arranged?

IF PROCEEDING WITH DELIVERY

- ☐ Mobilize resources & team (**Component 2**)
- ☐ Determine placental location (before or during surgery)
- ☐ Consider midline vertical incision
- ☐ Deliver neonate away from the placenta, may be fundal
- ☐ Avoid placental delivery and cord traction if PAS is evident

AFTER DELIVERY OF NEONATE

- ☐ In stable delivered patient, consider temporizing & transport
- ☐ In unstable or hemorrhaging patient, proceed to hysterectomy

IF PROCEEDING WITH HYSTERECTOMY

- ☐ Communicate change plan to patient/family, OR staff, & consultants
- ☐ Obtain equipment and resources (**Component 3**)
- ☐ Consider lithotomy to assess blood loss and assist vaginally
- ☐ Consider use of: ureteral stents, vessel sealing device, supracervical hysterectomy, vaginal instrumentation to define colpotomy
- ☐ TXA for active hemorrhage
- ☐ Balanced transfusion of blood products
- ☐ Perform periodic evaluation of case status (**Component 4**)

FOR UNCONTROLLED HEMORRHAGE

- ☐ Call for additional help: e.g., trauma surgery, anesthesia, OR staff
- ☐ Consider aortic compression (manual or IR)
- ☐ Consider abdomino-pelvic packing if uncontrolled DIC

Component 2: Mobilize resources & team

- ☐ Obtain two large bore peripheral IVs and arterial access
- ☐ Prepare for massive transfusion protocol
- ☐ Notify available subspecialties: anesthesia, OB/GYN, pelvic surgeon, trauma/vascular surgeon, NICU, blood bank
- ☐ Determine optimal operating theater (e.g., Main OR)
- ☐ Update procedural consents
- ☐ Identify Health Care Proxy

Component 3: Suggested procedural equipment

A detailed list of PAS OR equipment is in Section 2

- ☐ Anesthesia: airway, arterial & venous line kits
- ☐ Blood products in the room and checked
- ☐ Blood warmer / rapid infuser
- ☐ Hysterectomy kit, with abdominal wall retractor
- ☐ Cesarean kit
- ☐ Ultrasound with sterile probe cover
- ☐ Cystoscopy tower, tray, and ureteral stents
- ☐ Newborn resuscitation equipment, warmer
- ☐ Arterial occlusive balloon kit, if available

Component 4: Periodic Reevaluation

Every 15-30 minutes

- ☐ Evaluate vaginal blood loss and total blood loss
- ☐ Consider lab work or point-of care coagulation testing
- ☐ Anticipate additional blood product needs
- ☐ Avoid and correct hypothermia and hypocalcemia
- ☐ Re-dose surgical antibiotics, if indicated
- ☐ Update patient support persons, when appropriate
- ☐ Inform ICU of admission, if applicable

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DIC, disseminated intravascular coagulation; ICU, intensive care unit; IR, interventional radiology; NICU, neonatal intensive care unit; OR, operating room; PAS, placenta accreta spectrum; TXA, tranexamic acid.

Society for Maternal-Fetal Medicine. Updated placenta accreta checklist. Am J Obstet Gynecol 2024.