Placental abruption: Management

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INTRODUCTION — This topic will discuss the management of pregnancies complicated by placental abruption. The clinical features, diagnosis, and potential consequences of abruption are reviewed separately. (See "Placental abruption: Clinical features and diagnosis".)

INITIAL APPROACH FOR ALL PATIENTS — Pregnant women with symptoms of abruption should be evaluated promptly on a labor and delivery unit to establish the diagnosis, assess maternal and fetal status, and initiate appropriate management. Patients who have an apparently small abruption and are initially stable may deteriorate rapidly if placental separation progresses. They may also deteriorate from sequelae of potential comorbidities, such as preeclampsia, cocaine use, or trauma.

The following actions are reasonable initial interventions:

- Initiate continuous fetal heart rate monitoring, since the fetus is at risk of becoming hypoxemic and developing acidosis.
- Secure intravenous access. Place one wide-bore intravenous line; two if the patient presents with signs of moderate or severe abruption, such as moderate to heavy bleeding, hypotension, tachysystole, uterine hypertonicity and tenderness, coagulopathy, or an abnormal fetal heart rate. Administer crystalloid, preferably Lactated Ringer's, to maintain urine output above 30 mL/hour.
- Closely monitor the mother's hemodynamic status (heart rate, blood pressure, urine output, blood loss). Assessment of multiple parameters is important because normal blood pressure may mask hypovolemia if the mother has chronic hypertension or pregnancy-associated hypertension, which are risk factors for abruption. In patients who may have a severe abruption, urine output should be monitored closely, but a bladder catheter is not necessary unless the patient is hemodynamically unstable or having a cesarean delivery.
- Quantify blood loss. Moderate and heavy bleeding can be quantitated by:
  - Collecting blood in graduated measurement containers, including drapes with calibrated pockets.
  - Using visual aids (eg, posters, pocket cards [1]) that correlate the size and appearance of blood on specific surfaces (eg, maternity pad, bed sheet, lap sponge) with the volume of blood absorbed by that surface (picture 1).
  - Measuring the total weight of bloody materials and subtracting the known weight of the same materials when dry. The difference in weight between wet and dry in grams approximates the volume of blood in milliliters.

  Actual blood loss may be far in excess of what is observed due to retained retroplacental, retrochorionic, or intraamniotic bleeding, or clot formation.
- Draw blood for a complete blood count including platelet count, blood type and screen (cross-match if transfusion is likely), and coagulation studies (fibrinogen concentration, prothrombin time, activated partial thromboplastin time). A baseline complete metabolic panel, including creatinine, is prudent, since women with severe abruption often develop renal dysfunction. In addition, check liver function tests in women with preeclampsia or HELLP syndrome (ie, Hemolysis, Elevated Liver enzymes, Low Platelet count). Urine toxicology is appropriate if substance abuse is suspected.

  A quick and crude clotting test (Lee White test) can be performed at the bedside by placing 5 mL of the patient's blood in a tube with no anticoagulant for 10 minutes [2-4]. Failure to clot within this time or dissolution of an initial clot implies impairment of coagulation and is suggestive of a low fibrinogen level. Prolonged oozing from needle puncture sites also suggests coagulopathy.
  - Patients with initially normal coagulation results may develop coagulopathy over time. In women who continue to have (or develop) signs of moderate or severe abruption, notify the blood bank so blood replacement products (red cells, fresh frozen plasma, cryoprecipitate, platelets) will be readily available, if needed, and repeat the blood count and coagulation studies.
  - Replace blood and blood products, as required. If bleeding continues and the estimated blood loss has exceeded 500 to 1000 mL, we transfuse blood and initiate a massive transfusion protocol when ≥4 units of blood are transfused (sample protocol: 6 units packed red blood cells, 6 units of fresh frozen plasma, 1 or 2 cryoprecipitate pools [each pool is composed of 5 individual units], and 1 dose of platelets [either a pool of 4 to 6 whole blood-derived platelet concentrates or a single apheresis platelet unit]. (See "Massive blood transfusion".)

Transfusion goals are:

- Maintain hematocrit at 25 to 30 percent or greater
- Maintain platelet count ≥75,000/microL
- Maintain fibrinogen ≥100 mg/dL.
- Maintain a prothrombin and partial thromboplastin time less than 1.5 times control

A detailed description of the management of pregnant women with disseminated intravascular coagulation can be found separately. (See "Disseminated intravascular coagulation during pregnancy".)

- Notify the anesthesia team. Anesthesia-related issues in patients with moderate or severe abruption include management of hemodynamic instability, technical issues related to bleeding diathesis, and the potential need for emergency cesarean delivery.
- Administer standard medications to women likely to deliver: magnesium sulfate for neuroprotection for pregnancies <32 weeks of gestation, antenatal corticosteroids for pregnancies <34 weeks of gestation, and group B streptococcus prophylaxis according to local guidelines. (See "Neuroprotective effects of in utero exposure to magnesium sulfate" and "Antenatal corticosteroid therapy for reduction of neonatal respiratory morbidity and mortality from preterm delivery" and "Neonatal group B streptococcal disease: Prevention".)
- Keep the patient warm and provide supplemental oxygen, as needed.

SUBSEQUENT MANAGEMENT BASED ON THE CLINICAL SETTING — The most important factors impacting the decision to deliver a patient with placental abruption versus expectant management are:

- Gestational age
- Fetal and maternal status, which reflect the severity of the abruption. We consider an abruption severe if accompanied by ≥1 of the following [5]:
  - Maternal: disseminated intravascular coagulation, hypovolemic shock, need for blood transfusion or hysterectomy, renal failure, death
  - Fetal: nonreassuring fetal status, intrauterine growth restriction, need for preterm birth, death

Our general approach to managing the most common clinical scenarios in patients with abruption is described below. In individual patients, some modification may be needed for patient-specific factors. No randomized trials and few observational studies have examined the management of pregnancies complicated by this disorder [6]. Therefore, our recommendations are based on case series and reports, personal experience, and good clinical sense.

Dead fetus — The optimal route of delivery in these cases minimizes the risk of maternal morbidity or mortality, since fetal well-being is no longer a factor. Blood and blood product replacement is often necessary and expeditious delivery is desirable because the frequency of coagulopathy and continuous heavy bleeding is much higher in abruptions in which fetal death has occurred. Placental separation is often greater than 50 percent.

Unstable mother — Cesarean delivery is often the best option when vaginal delivery is not imminent and rapid control of bleeding is required because of maternal hemodynamic instability or significant coagulopathy, or the mother is unwilling to accept adequate blood replacement therapy and is therefore likely to develop hemodynamic instability or coagulopathy during labor. Blood and blood products for correction of coagulopathy should be replaced prior to and during the cesarean delivery. (See "Disseminated intravascular coagulation during pregnancy", section on 'Transfusion'.)

Stable mother — Vaginal delivery is preferable. These patients are often contracting vigorously, so amniotomy may be all that is required to expedite delivery. Oxytocin is administered, if needed to induce or augment labor.

A previous classical hysterotomy is a relative contraindication to vaginal birth. Although these patients are at increased risk of uterine rupture during labor, a 4 to 9 percent risk of rupture may be acceptable since cesarean delivery has no benefit for the demised fetus. This decision should be individualized, taking into account factors such as gestational age and cervical status. (See "Uterine rupture after previous cesarean delivery".)

Live fetus

Nonreassuring fetal status

- **Category III tracing** – Expeditious delivery is indicated if the fetal heart rate pattern suggests an increased risk of fetal acidemia (ie, category III tracing). A biophysical profile score of 0 to 4 also suggests an increased risk of fetal acidemia and the need for expeditious delivery. (See "Intrapartum fetal heart rate assessment", section on 'Physiologic significance of selected FHR characteristics' and "Management of intrapartum category I, II, and III fetal heart rate tracings".)

If vaginal delivery is imminent, then a spontaneous or instrument-assisted vaginal birth is likely the least morbid route of delivery for the mother, whether or not she is hemodynamically stable. Otherwise, cesarean delivery is indicated. Blood and blood products should be replaced prior to and during delivery, when indicated because of hemodynamic instability and coagulopathy.

In one of the only studies that evaluated cesarean delivery for severe abruption with fetal bradycardia, a decision-to-delivery interval of less than 20 minutes was associated with better outcomes than a 30-minute interval [7]. Although this was a small case-control study of 31 cases, it underscores the principle that minimizing the duration of prolonged bradycardia before birth impacts outcome when the abruption is severe.

- **Category II tracing** – Although a category II tracing may be managed expectantly in patients without abruption, it is ominous in the setting of a probable abruption because of the high risk for sudden fetal deterioration to a category III tracing and fetal death. Delivery management depends on gestational age, cervical dilation, and whether there is progressive deterioration in either the tracing or maternal condition. Close monitoring is essential and preparations for urgent delivery should be made in expectantly managed cases.

Reassuring fetal status — If the fetal heart rate pattern (category I tracing) or biophysical profile score is reassuring, then the decision to deliver versus expectant management depends on both maternal hemodynamic status and gestational age.

Unstable mother — As discussed above, cesarean delivery is the best option when vaginal delivery is not imminent and rapid control of bleeding is required because of maternal hemodynamic instability or significant coagulopathy, or the mother is unwilling to accept adequate blood replacement therapy and is therefore likely to develop hemodynamic instability during labor. Blood and blood products for correction of hypovolemia and coagulopathy should be replaced prior to and during the cesarean delivery. (See "Disseminated intravascular coagulation during pregnancy", section on 'Transfusion'.)

Stable mother — When the fetus and mother are both stable, the decision to deliver depends primarily on gestational age, with consideration of ongoing maternal symptoms.

Less than 34 weeks of gestation — When the fetus and mother are both stable and there is no evidence of ongoing major blood loss or coagulopathy, conservative management with the aim of delivering a more mature fetus is the main goal before 34 weeks of gestation [8-11]. We take the following approach:

- **Administer corticosteroids** – Corticosteroids to promote fetal lung maturation and reduce complications of prematurity are administered to pregnancies at 23 to 34 weeks of gestation, given the increased risk of need for preterm delivery. (See "Antenatal corticosteroid therapy for reduction of neonatal respiratory morbidity and mortality from preterm delivery".)

- **Tocolysis** – For women in preterm labor, we administer a 48-hour course of nifedipine to enable administration of a full course of corticosteroids. Contractions may be caused by the direct or indirect effect of thrombin and may lead to further placental separation, which may, in turn, cause further bleeding, creating a cycle of bleeding and contractions [12,13]. Administration of tocolytics may prevent further contractions, in theory breaking this cycle. However, tocolytics may cause cardiovascular symptoms (tachycardia, hypotension), which may worsen any hemodynamic instability resulting from abruption, and also may make it difficult to recognize signs of worsening hypovolemia. For these reasons, several authorities have argued against their use in this setting.

  A few small, retrospective, uncontrolled studies have examined tocolytic use in management of abruption in hemodynamically stable pregnant women with reassuring fetal heart rate tracings [11,14,15]. These studies have not demonstrated harm and have suggested a potential benefit; however, given the limitations of these data, the results of these studies need to be interpreted with caution. Indomethacin is probably best avoided in the setting of abruption as it has been associated with increased risks for severe intraventricular hemorrhage, necrotizing enterocolitis, and periventricular leukomalacia in the neonate.

- **Antenatal fetal assessment** – We perform fetal assessment with a nonstress test or biophysical profile at least weekly. We also perform serial sonographic estimation of fetal weight to assess growth since these fetuses are at risk of developing growth restriction over time [16].

- **Hospitalization** – There are no compelling data to guide the length of a hospital stay for these women. A reasonable approach is to monitor the patient in the hospital until the bleeding has subsided for at least 48 hours, fetal heart rate tracings and ultrasound examinations are reassuring, and the patient is asymptomatic. At that point, discharge may be considered. Importantly, the patient should be counseled to return immediately if she has further bleeding, contractions, decreased fetal movement, or abdominal pain. In patients with sonographic evidence of a large hematoma, we believe it is prudent to keep the patient in the hospital for a longer period for close monitoring.

- **Delivery** – For patients managed conservatively and without any further symptoms, we schedule delivery at 37 to 38 weeks because of the increased risk of stillbirth [8]. We do not perform amniocentesis to document fetal lung maturity prior to delivery. For each patient, the potential risk of neonatal respiratory problems, which is low at this gestational age, should be balanced against the potential risk that a serious abruption will occur while awaiting development of fetal pulmonary maturity.

  Delivery before 37 weeks is indicated if additional complications arise (eg, fetal growth restriction, preeclampsia, premature rupture of membranes, nonreassuring fetal assessment, recurrent abruption with maternal instability). Placental abruption occurring in the second trimester carries an especially poor prognosis when accompanied by oligohydramnios.

We routinely send placentas of patients with abruption for examination by a pathologist. While an acute abruption is a clinical diagnosis, pathology will often show evidence of long-standing placental changes.

We also routinely send umbilical cord gases for analysis of acid-base status.

34 to 36 weeks of gestation — We deliver most patients with acute abruption at 34 to 36 weeks of gestation, since these patients remain at risk of maternal or fetal compromise from progressive or recurrent placental separation and neonatal morbidity is relatively low at this gestational age. Partial abruption can progress to total abruption suddenly and without warning. Thus, the fetus should be continuously monitored and preparations must be made in case urgent operative delivery is required.

For the subgroup of patients at 34 to 36 weeks who present with minimal signs and symptoms of abruption (light bleeding, normal vital signs and laboratory results, uterine quiescence or mild irritability without tenderness, normal fetal heart rate pattern/biophysical profile score), and then stop bleeding, expectant management is a reasonable approach as long as they remain asymptomatic. Decision-making in these cases is based on patient-specific factors, balancing the estimated risk of progression/recurrence against the relatively small risk of prematurity in the late preterm infant. (See "Late preterm infants".)

36 weeks to term gestation — We deliver all pregnancies with acute abruption at ≥36 weeks of gestation [8]. This approach balances the relatively low neonatal morbidity of the near-term newborn in pregnancies with the risk of serious maternal-fetal morbidity or mortality from progressive or recurrent abruption during expectant management.

Vaginal delivery is preferable, if there are no obstetrical indications for cesarean delivery (eg, malpresentation, prior cesarean). With a clinically significant abruption, the patient is often contracting vigorously, but if she is not in active labor, then amniotomy and administration of oxytocin frequently result in rapid delivery.

COUVELAIRE UTERUS — In severe abruptions, blood may extravasate into the myometrium (called a Couvelaire uterus), and this can be seen at cesarean. The Couvelaire uterus is atonic and prone to postpartum hemorrhage. Aggressive management of atony is needed to prevent disseminated intravascular coagulation and exsanguination; however, atony in this setting is less likely to respond to standard therapies for postpartum hemorrhage than atony from other causes; thus, these women are at high risk for requiring hysterectomy. (See "Management of postpartum hemorrhage at cesarean delivery" and "Management of postpartum hemorrhage at vaginal delivery".)

POSTPARTUM CARE — Postpartum, we administer an intravenous oxytocin infusion as the first-line uterotonic agent. Maternal vital signs, blood loss, urine output, uterine size and consistency, and laboratory results (hemoglobin/hematocrit, coagulation studies) are monitored closely to ensure that bleeding has been controlled and that coagulopathy (if present) is resolving, and to guide replacement of fluids and blood products, as needed.

Women who developed shock and disseminated intravascular coagulation are at risk of multiorgan failure, especially acute renal insufficiency. After delivery, organ function usually improves with aggressive supportive care and treatment of complications, as appropriate. (See "Clinical features, diagnosis, and treatment of disseminated intravascular coagulation in adults" and "Treatment of severe hypovolemia or hypovolemic shock in adults" and "Acute kidney injury (acute renal failure) in pregnancy", section on 'Renal cortical necrosis'.)

MANAGEMENT OF FUTURE PREGNANCIES

Recurrence risk — Women with placental abruption are at severalfold higher risk of abruption in a subsequent pregnancy [17-23]. Three to 15 percent of women have a recurrence, compared with a baseline incidence of 0.4 to 1.3 percent in the general population [18,24-26]. In one longitudinal population-based study, the risk of placental abruption in a subsequent pregnancy was about 6 percent in women with an abruption in their first pregnancy versus 0.06 percent in women without an abruption [23]. In this study, women with a placental abruption at term were at higher risk for recurrence than those with preterm abruption.

After two consecutive abruptions, the risk of a third rises to 20 to 25 percent [22,27]. The risk of recurrence is higher after a severe abruption than after a mild abruption. When the abruption is severe enough to kill the fetus, there is a 7 percent incidence of abruption with fetal demise in a future pregnancy [28].

Placental abruption resulting from trauma is not likely to recur in the absence of recurrent trauma, so these women can be reassured. No intervention has been proven to lower the risk of abruption from other causes. Nonetheless, it is reasonable to identify modifiable risk factors for abruption and address these factors. Women who smoke cigarettes or use cocaine should be encouraged to stop, and poorly controlled hypertension should be controlled. These changes have proven health benefits, even in the absence of pregnancy. Submucosal myomas may be associated with placental abruption. When a patient with a submucosal myoma has an abruption, we consider hysteroscopic resection/removal of the myoma prior to the next pregnancy; the decision depends on patient-specific factors (eg, severity of abruption, size and location of the myoma with respect to the placenta).

There are no laboratory screening tests that predict a patient's risk for abruption. Testing women with a history of abruption for antiphospholipid antibodies or an inherited thrombophilia is not indicated. (See "Pregnancy in women with antiphospholipid syndrome" and "Inherited thrombophilias in pregnancy".)

Other risks — Placental abruption, preeclampsia, and intrauterine growth restriction appear to be variable clinical manifestations of uteroplacental underperfusion, chronic hypoxia, and uteroplacental ischemia [21,29-35]. These disorders often coexist in a pregnancy, or one may occur in one pregnancy while another occurs in a subsequent pregnancy. For example, in large retrospective cohort studies, women who delivered a growth-restricted infant in their first pregnancy were at increased risk of experiencing

placental abruption in the subsequent pregnancy [29], and women with preeclampsia in the first pregnancy carried an increased risk of developing placental abruption in the subsequent pregnancy [31,36].

For this reason, in our practice, in subsequent pregnancies, we perform an ultrasound examination to screen for growth restriction approximately every four weeks starting at 24 to 28 weeks and continuing until delivery. If fetal growth restriction is detected, we manage these pregnancies accordingly. Monitoring for preeclampsia is already a standard focus of routine antenatal care. (See "Fetal growth restriction: Evaluation and management" and "Preeclampsia: Management and prognosis".)

Antenatal fetal surveillance — Routine periodic fetal antepartum surveillance (eg, nonstress test, biophysical profile score) is not helpful, as fetuses at risk of death from a sudden unpredictable insult, such as complete placental abruption, are rarely identified and thus there is no opportunity for intervention to prevent fetal death or neurologic disability. Antenatal fetal testing is performed for standard obstetrical indications. (See "Overview of antepartum fetal surveillance".)

Timing of delivery — For most patients with an abruption in a prior pregnancy who have no bleeding, growth restriction, or preeclampsia, we provide routine prenatal care until spontaneous labor ensues or perform a repeat cesarean delivery at 39 to 40 weeks of gestation. We deliver all patients with a history of abruption by $40^{0/7ths}$ weeks.

For patients who have had a prior perinatal death or more than one prior abruption, we offer late preterm or early term delivery at 36 to 37 weeks after documentation of fetal lung maturity. We perform a lamellar body count, and deliver if the count is above 50,000 per microliter; alternatively, a lecithin/sphingomyelin ratio may be performed. If fetal lung maturity tests indicate immaturity, we delay delivery until 39 weeks as long as the patient is stable.

There are limited data on which to base timing of delivery in these patients. A cohort study using data from the Medical Birth Registry of Norway estimated that women with a history of a complicated abruption are at highest risk of recurrence during the six weeks prior to the gestational age of the initial abruption [26]. Since most women do not have a recurrence and most recurrences do not result in fetal death, a policy of delivery six weeks prior to the gestational age of the previous abruption would result in substantial morbidity from prematurity, with minimal reduction in abruption-related perinatal death.

INFORMATION FOR PATIENTS — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5^{th} to 6^{th} grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10^{th} to 12^{th} grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topic (see "Patient education: Placental abruption (The Basics)")

SUMMARY AND RECOMMENDATIONS

- Pregnant women with abruption should be evaluated promptly on a labor and delivery unit to establish the diagnosis, assess maternal and fetal status, and initiate appropriate management. A patient who is initially stable may deteriorate rapidly if placental separation progresses. (See 'Initial approach for all patients' above.)
- The initial approach includes continuous fetal heart rate monitoring, placement of large bore intravenous lines, assessment of blood loss and maternal hemodynamic status, and evaluation for coagulopathy. Blood and blood products should be replaced aggressively, when indicated. (See 'Initial approach for all patients' above.)
- After initial evaluation and stabilization, the management of pregnancies complicated by clinically significant abruption depends on whether the fetus is alive or dead, maternal hemodynamic stability, and, if the fetus is alive, the fetal heart rate pattern and gestational age. (See 'Subsequent management based on the clinical setting' above.)
- Blood and blood products should be replaced prior to and during delivery, when indicated, because of hemodynamic instability and coagulopathy. (See 'Initial approach for all patients' above.)
- If the fetus is dead, the mode of delivery should minimize the risk of maternal morbidity or mortality. For most hemodynamically stable patients without coagulopathy, vaginal delivery is preferable. Cesarean delivery is preferable when vaginal delivery is not imminent and rapid control of bleeding is required because of maternal hemodynamic instability or significant coagulopathy, or the mother is unwilling to accept adequate blood replacement therapy and is therefore likely to develop hemodynamic instability or coagulopathy during labor. (See 'Dead fetus' above.)
- When the fetal heart rate pattern is nonreassuring (category III), expeditious delivery is indicated. If vaginal delivery is imminent, then a spontaneous or instrument-assisted vaginal birth is preferable, whether or not the mother is hemodynamically stable. Otherwise, cesarean delivery is indicated. (See 'Nonreassuring fetal status' above.)

- A category II tracing is ominous in the setting of a probable abruption because of the high risk for sudden fetal deterioration to a category III tracing and fetal death. Close monitoring is essential and preparations for urgent delivery should be made in expectantly managed cases. (See 'Nonreassuring fetal status' above.)

- When the fetal heart rate pattern is reassuring (category I), management depends on the maternal status and gestational age. For pregnancies where the mother is unstable at any gestational age, we deliver the patient expeditiously. If vaginal delivery is imminent, then a spontaneous or instrument-assisted vaginal birth is preferable. Otherwise, cesarean delivery is indicated. (See 'Unstable mother' above.)

- When the fetus and mother are both stable, the decision to deliver depends primarily on gestational age, with consideration of ongoing maternal symptoms.

  - For pregnancies less than 34 weeks of gestation with no evidence of ongoing major blood loss or coagulopathy, we suggest conservative management until 37 to 38 weeks. We administer a course of antenatal corticosteroids. (See 'Less than 34 weeks of gestation' above.)

  - For most pregnancies at 34 to 36 weeks of gestation, we suggest delivery because these patients remain at risk of maternal or fetal compromise from progressive or recurrent placental separation. For the subgroup of patients at 34 to 36 weeks who present with minimal signs and symptoms of abruption (light bleeding, normal vital signs and laboratory results, uterine quiescence or mild irritability without tenderness, normal fetal heart rate pattern/biophysical profile score) and then stop bleeding, expectant management is a reasonable approach as long as they remain asymptomatic. (See '34 to 36 weeks of gestation' above.)

  - We deliver all pregnancies with acute abruption at ≥36 weeks of gestation. (See '36 weeks to term gestation' above.)

- The Couvelaire uterus is atonic and prone to postpartum hemorrhage. Aggressive management of atony is needed to prevent disseminated intravascular coagulation and exsanguination; however, atony in this setting is less likely to respond to standard therapies for postpartum hemorrhage than atony from other causes. These women are at high risk for requiring hysterectomy. (See 'Couvelaire uterus' above.)

- The risk of recurrent abruption is 3 to 15 percent, compared with a baseline incidence of 0.4 to 1.3 percent in the general population. No intervention has been proven to lower the risk of recurrent abruption and no tests are available that identify pregnancies at risk of recurrence or fetuses at risk of harm. (See 'Recurrence risk' above.)

- For most patients with a past history of abruption, we provide routine prenatal care until spontaneous labor ensues or perform a repeat cesarean delivery at 39 to 40 weeks of gestation. We deliver all such patients by $40^{0/7ths}$ weeks. For patients who have had a prior perinatal death or more than one prior abruption, we offer late preterm or early term delivery after documentation of fetal lung maturity. (See 'Timing of delivery' above.)

- A past history of placental abruption predicts a greater likelihood of a small for gestational age infant, preeclampsia, and spontaneous preterm birth in future pregnancies, even in the absence of recurrent abruption. We monitor patients for these complications. (See 'Other risks' above.)

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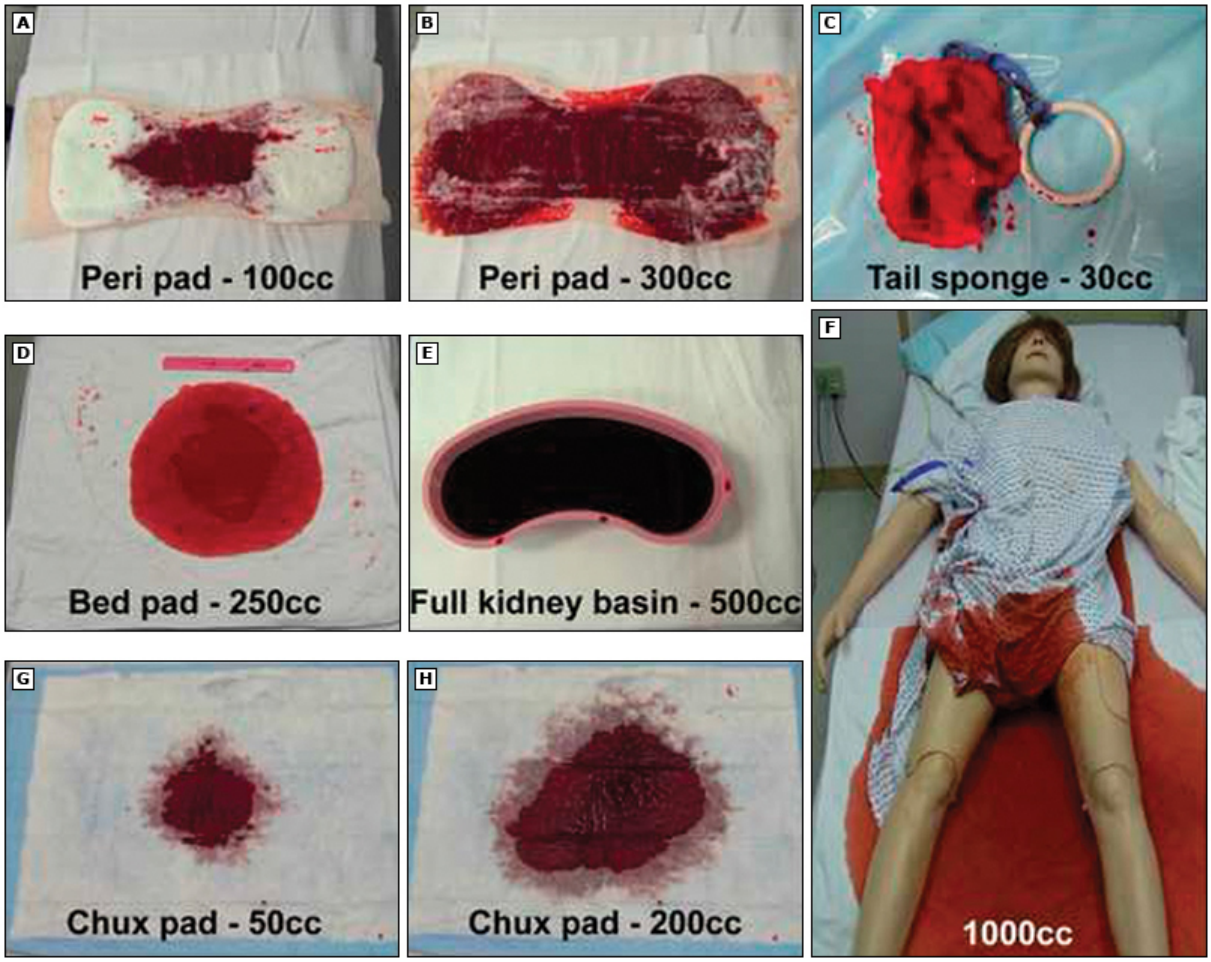
GRAPHICS

Visual aid for estimating intrapartum blood loss



Visual aid. Pocket card with images of measured volumes of artificial blood.

Graphic 103418 Version 1.0

Contributor Disclosures

Yinka Oyelese, MD Nothing to disclose **Cande V Ananth, PhD, MPH** Nothing to disclose **Charles J Lockwood, MD, MHCM** Consultant/Advisory Boards: Celula [Aneuploidy screening (No current products or drugs in the US)]. **Vanessa A Barss, MD, FACOG** Nothing to disclose

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

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