Obstetric Hemorrhage

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Disclosures

* I have nothing to disclose

Background- Definition

* The American College of Obstetricians and Gynecologists' (ACOG) defines postpartum hemorrhage as:
  * Cumulative blood loss greater than or equal to 1,000 mL
  * or
  * Blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after the birth process (includes intrapartum loss) regardless of route of delivery
Background

- Despite this definition, a blood loss greater than 500 mL in a vaginal delivery should be considered abnormal and should serve as an indication for the health care provider to investigate the increased blood deficit.

- In postpartum women, it is important to recognize that the signs or symptoms of considerable blood loss (e.g., tachycardia and hypotension) often do not present or do not present until blood loss is substantial.

  - In a patient with tachycardia and hypotension, the provider should be concerned that considerable blood loss, usually representing 25% of the woman’s total blood volume (or approximately 1,500 mL or more), has occurred.

  - Early recognition of postpartum hemorrhage (e.g., before deterioration in vital signs) should be the goal in order to improve outcomes.

Differential diagnosis (DDx)

- The initial management of any patient with obstetric hemorrhage requires that the provider identify the source of bleeding (uterine, cervical, vaginal, perirectal, perineal, perianal, or rectal).

  - After the anatomic site is identified, it is important to identify the cause because treatment may vary.

- The most common etiologies are broken into primary or secondary causes:

  - Primary postpartum hemorrhage occurs within the first 24 hours of birth.

  - Secondary postpartum hemorrhage is defined as excessive bleeding that occurs more than 24 hours after delivery and up to 12 weeks postpartum.

DDx

- Box 1: Etiology of Postpartum Hemorrhage:

  - Primary:
    - Uterine artery
    - Lacerations
    - Retained placenta
    - Abnormally adherent placenta (acccreta)
    - Defects of coagulation (e.g., disseminated intravascular coagulation)
    - Uterine inversion

  - Secondary:
    - Stimulation of the placental site
    - Retained products of conception
    - Infection
    - Inherited coagulation defects (e.g., factor deficiency such as von Willebrand)

- These include inherited coagulopathy defects as well as acute complications that may result from causes such as amniotic fluid embolism, placenta previa, or severe preeclampsia.
**Risk Factors**

**Medical management**

- Uterotonic agents should be the first-line treatment for postpartum hemorrhage caused by uterine atony
  - The specific agent selected, outside of recognized contraindications, is at the healthcare provider's discretion because none has been shown to have greater efficacy than others for the treatment of uterine atony
  - Common medical agents (e.g., oxytocin, methylergonovine, 15-methyl prostaglandin F2α, and misoprostol)
  
- It is common for multiple uterotonic agents to be used, assuming there are no contraindications, and without adequate uterine response and ongoing hemorrhage, they should be used in rapid succession

| Table 1. Anesthetist and Intrepuctance Risk factors for Postpartum Hemorrhage: |
|---------------------------|-----------------------------|-----------------------------|
| Biological                | Primary, Relative           | Risk Factor, Sign |
| Uterine atony             | Tocolitic drugs             | Tocolitic drugs            |
| Uterine atony             | Oxytocin                    | Oxytocin                   |
| Uterine atony             | Methylergonovine            | Methylergonovine           |
| Uterine atony             | Misoprostol                 | Misoprostol                |
| Uterine atony             | prostaglandin F2α           | prostaglandin F2α          |
| Uterine atony             | Mifepristone                | Mifepristone               |
| Uterine atony             | Hydromorphone               | Hydromorphone              |
| Uterine atony             | Oxytocin                    | Oxytocin                   |
| Uterine atony             | Methylergonovine            | Methylergonovine           |
| Uterine atony             | Misoprostol                 | Misoprostol                |
| Uterine atony             | prostaglandin F2α           | prostaglandin F2α          |
| Uterine atony             | Mifepristone                | Mifepristone               |
| Uterine atony             | Hydromorphone               | Hydromorphone              |

| Table 2. Acute Medical Management of Postpartum Hemorrhage: |
|---------------------------|-----------------------------|-----------------------------|
| Drug                      | Dose and Route              | Frequency                  | Contraindication | Adverse Effects |
| Mifepristone h             | 150 mg                      | IM                        | Pain, headache   | Nausea, vomiting, diarrhea, abdominal pain, uterine cramps |
| Mifepristone h             | 300 mg                      | IM                        | Pain, headache   | Nausea, vomiting, diarrhea, abdominal pain, uterine cramps |
| Mifepristone h             | 500 mg                      | IM                        | Pain, headache   | Nausea, vomiting, diarrhea, abdominal pain, uterine cramps |
| Mifepristone h             | 750 mg                      | IM                        | Pain, headache   | Nausea, vomiting, diarrhea, abdominal pain, uterine cramps |
| Mifepristone h             | 1000 mg                     | IM                        | Pain, headache   | Nausea, vomiting, diarrhea, abdominal pain, uterine cramps |

**Notes:**
- IM: intramuscular
- IV: intravenous
Tranexamic acid

- Antifibrinolytic agent that can be given intravenously or orally
- Should be considered in the setting of obstetric hemorrhage when initial medical therapy fails
  - Earlier use is likely to be superior to delayed treatment, given that the benefit is primarily in women treated sooner than 3 hours from the time of delivery
- For those clinicians unfamiliar with tranexamic acid, it should be used in consultation with a local or regional expert in massive hemorrhage and specifically incorporated into management guidelines
- At this time, data are insufficient to recommend the use of tranexamic acid as prophylaxis against postpartum hemorrhage outside of the context of research

Management

- When uterotonics fail to adequately control postpartum hemorrhage, prompt escalation to other interventions (such as tamponade or surgical techniques) and escalation of intensity of care and support personnel are indicated

Tamponade techniques

<table>
<thead>
<tr>
<th>Technique</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercially available vacuum uterine balloon tamponade device</td>
<td>Inserted transvaginally or through low transabdominal incision. Inflated with 300-500 ml of saline.</td>
</tr>
<tr>
<td>- Balloon</td>
<td></td>
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<tr>
<td>- static tamponade system</td>
<td></td>
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<tr>
<td>Foley catheter</td>
<td>Insert one or more 18 Fr. Foley catheters and fill with 50-100 ml of saline.</td>
</tr>
<tr>
<td>Uterine packing</td>
<td>4-inch grasps can be soaked with 500 ml of saline or inserted into the uterine cavity with ring forceps.</td>
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Uterine Artery Embolization (UAE)

- Candidates for UAE typically are hemodynamically stable, appear to have persistent slow bleeding and have failed less invasive therapy (uterotonic agents, uterine massage, uterine compression, and manual removal of any clots)
- Fluoroscopic identification of bleeding vessels allows embolization with absorbable gelatin sponges, coils, or microparticles

UAE

- When successful, UAE also has the benefit of a woman retaining her uterus and, potentially, future fertility
- After UAE, infertility has been reported in up to 43% of women
- Studies have reported that in women who have had a UAE, subsequent pregnancy complications such as preterm birth (5–15%) and fetal growth restriction (7%) appear to be similar to the general obstetric population
Surgical management

• When less invasive approaches such as uterotonic agents (with or without tamponade measures) or UAE fail to control bleeding in the setting of postpartum hemorrhage, exploratory laparotomy is indicated
  • In the setting of a vaginal delivery, it is common to use a midline vertical abdominal incision to optimize exposure and reduce risk of surgical bleeding

Surgical management

• A common first approach is bilateral uterine artery ligation (O’Leary sutures), which commonly accomplishes this goal of reducing blood flow to the uterus, and is quickly and easily performed
  • Similarly, to further diminish blood flow to the uterus, sutures also can be placed across the vessels within the utero–ovarian ligaments

• Internal iliac (hypogastric) artery ligation is performed less frequently than in the past
  • The procedure has been found to be considerably less successful than originally thought and because practitioners have become less familiar with this technique (which requires a retroperitoneal approach) it is rarely used today

Uterine Compression Sutures

• B-Lynch technique
  • B-lynch sutures are placed from the cervix to fundus and provide physical compression of the uterus
  • A large suture (eg, a number 1 chromic suture) should be used to prevent breaking and the suture should be rapidly absorbed to prevent risk of bowel herniation through a persistent loop of suture after uterine involution
Hysterectomy

• When more conservative therapies have failed, hysterectomy is considered the definitive treatment

Other things to consider ...
Approach to an inverted uterus

- Upon bimanual examination, the finding of a firm mass at or below the cervix, coupled with the absence of identification of the uterine corpus on abdominal examination, suggests inversion.

- Manual replacement of the uterine corpus involves placing the palm of the hand or a closed fist against the fundus (now inverted and lowermost at or through the cervix), as if holding a tennis ball, with the fingertips exerting upward pressure circumferentially.

Blood transfusion

- Maternal vital signs typically do not change drastically until significant blood loss has occurred.

- Inadequate early resuscitation and hypoperfusion may lead to lactic acidosis, systemic inflammatory response syndrome with accompanying multiorgan dysfunction, and coagulopathy.

- In women with ongoing bleeding that equates to the blood loss of 1,500 mL or more or in women with abnormal vital signs (tachycardia and hypotension), immediate preparation for transfusion should be made.

- Because such a large blood loss includes depletion of coagulation factors, it is common for such patients to develop a consumptive coagulopathy, commonly labeled as disseminated intravascular coagulation (DIC), and the patients will require platelets and coagulation factors in addition to packed red blood cells.
Massive transfusion

- Defined as a transfusion of 10 or more units of packed red blood cells within 24 hours, transfusion of 4 units of packed red blood cells within 1 hour when ongoing need for more blood is anticipated, or replacement of a complete blood volume

Massive transfusion

- When a massive transfusion protocol is needed, fixed ratios of packed red blood cells, fresh frozen plasma, and platelets should be used
- The recommended initial transfusion ratio for packed red blood cells-fresh frozen plasma-platelets has been in the range of 1:1:1 and is designed to mimic replacement of whole blood
- In women with suspected disseminated intravascular coagulation (ie, consumptive coagulopathy, or low fibrinogen, or both) administration of cryoprecipitate also should be considered

What is the best approach to managing anemia in the nonacute postpartum period once the postpartum hemorrhage has been treated?

- It is common practice to offer a transfusion of PRBCs to symptomatic women with a hemoglobin value less than 7 g/dL (hematocrit less than 20%)
- Although transfusions historically were initiated with 2 units of PRBCs, the most recent recommendation from the American Association of Blood Banks for a stable patient is to begin with 1 unit and reassess
What is the best approach to managing anemia in the nonacute postpartum period once the postpartum hemorrhage has been treated?

- The management of women with hemoglobin values less than 7 g/dL who are asymptomatic and hemodynamically stable should be individualized between transfusion, oral iron supplementation, or intravenous iron therapy.
- Each is designed to replace red cell mass, but at differing rates.

The end!

- Questions?