

Postpartum Hemorrhage Guideline

Evaluation of Excessive Bleeding

Initial Oxytocin Regimen: All patients should receive IV oxytocin following placental delivery.

- 10-40 units of oxytocin in 500-1,000 mL of LR or NS infused over 2-6 hours.
- If bleeding persists, administer oxytocin alternative.

Drug*	Dose/Route	Frequency	Comment
Oxytocin (Pitocin)	IV: 10-40 units in 1 liter normal saline or lactated Ringer's solution IM: 10 units	Continuous	Avoid undiluted rapid IV infusion, which causes hypotension.
Methylergonovine (Methergine)	IM: 0.2 mg	Every 2-4 hours	Avoid if patient is hypertensive.
15-methyl PGF₂α (Carboprost) (Hemabate)	IM: 0.25 mg	Every 15-90 min, 8 doses maximum	Avoid in asthmatic patients; relative contraindication if hepatic, renal, and cardiac disease. Diarrhea, fever, tachycardia can occur.
Dinoprotone (Prostin E₂)	Suppository: vaginal or rectal 20 mg	Every 2 hours	Avoid if patient is hypotensive. Fever is common. Stored frozen, it must be thawed to room temperature.
Misoprostol (Cytotec, PEG₁)	800-1,000 mcg rectally		Onset of action can be delayed so utility for acute bleeding is limited.

If bleeding persists, the following steps should occur rapidly and simultaneously:

- Empty the bladder and perform a bimanual pelvic exam. If the uterus is soft and poorly contracted ("boggy"), initiate bimanual uterine compression by massaging the posterior aspect of the uterus with a hand on the abdomen and massage the anterior uterine wall with the other hand through the vagina.
- Call for help!
- Add a second large-bore intravenous catheter site for blood transfusion.
- Prepare for potential blood transfusion. See Table 2 Blood Component Therapy.
- Inspect the cervix and vagina for lacerations.
- Explore the uterine cavity manually for retained placental fragments or lacerations.
- Insert Foley catheter to monitor urine output and assessment of renal function.
- Begin volume resuscitation.

Blood Transfusion

- Blood transfusion should be considered with significant ongoing blood loss, particularly if vital signs are unstable. In the setting of ongoing massive hemorrhage, do not await Hgb result.
- A ratio of 1-2 units PRBC : 1 unit FFP : 1 unit platelets produces more favorable outcomes.

Product	Volume (mL)	Contents	Effect (per unit)
Packed red cells	240	Red blood cells, white blood cells, plasma	↑ hct 3% points, ↑ hgb 1 g/dL
Platelets	50	Platelets, red blood cells, plasma	↑ platelet ct 5,000-10,000/mm ³ per unit
Fresh frozen plasma	250	Fibrinogen, antithrombin III, factor V and VIII	↑ fibrinogen by 10 mg/dL
Cryoprecipitate	40	Fibrinogen, factors VIII and XIII, van Willebrand factor	↑ fibrinogen by 10 mg/dL

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Delayed Postpartum Hemorrhage

Uterine atony- Ultrasound can help identify retained products of conception or large intrauterine clots that require extraction. Treatment includes uterotonic agents, antibiotics, and curettage. Use of ultrasound during curettage can help avoid uterine perforation if infection or subinvolution is suspected. Subinvolution of the placental site typically presents with significant blood 5-10 days post-delivery. It is often associated with endometritis. Because subinvolution is due to failed healing of the endometrium, curettage should be avoided unless the uterus is enlarged and filled with clots preventing contraction. Once bleeding is controlled in patients with subinvolution, a brief course of estrogen may be considered to hasten endometrial healing.

Uterine Tamponade or Packing

Uterine tamponade Technique	Comment
Packing	4 inch gauze; can soak with 5,000 units of thrombin in 5 mL of sterile saline
SOS Bakri tamponade balloon	Insert balloon; instill 300-500 mL of saline.

Surgical Management

Exploratory laparotomy is indicated when intractable atony is unresponsive to the above therapy. Midline vertical abdominal incision provides optimal exposure. Surgical techniques include:

- Uterine artery ligation-bilateral; also can ligate uteroovarian vessels.
- B-Lynch suture.
- Hypogastric artery ligation should generally not be performed as it is associated with increased complications and is less successful than previously thought. Its use should be reserved for providers with experience in its performance.
- Repair of uterine rupture.
- Hysterectomy.

Arterial Embolization

Arterial embolization can be considered in patients with stable vital signs with persistent but not excessive bleeding. Techniques include: Radiographic identification of bleeding vessels with embolization via, coils, glue, or balloons. Since this typically requires transport of the patient to a radiology suite, it should be reserved only for patients who have been adequately resuscitated and have stable vital signs.

Uterine Rupture

Uterine rupture can occur at the site of a prior surgical procedure involving the uterine wall, congenital malformation, or spontaneously. While not all areas of rupture are associated hemorrhage, surgical repair is required. Rupture of a previous cesarean delivery scar can be managed by revision of the edges of the prior incision followed by primary closure. In the setting of large defect or massive hemorrhage, hysterectomy may be life-saving and its performance should not be delayed.

Inverted Uterus

Uterine inversion occurs when the uterine corpus descends to, and sometimes through, the uterine cervix. Uterine inversion is associated with immediate life-threatening hemorrhage. The following steps should occur rapidly and simultaneously:

- Summon help from anesthesia, nursing, and other physicians.
- If the placenta has already delivered, replace the inverted uterus by pushing up on the fundus with the palm of the hand and fingers in the direction of the long axis of the vagina.
- Establish second large-bore IV access and initiate transfusion to treat hypovolemia.
- Medications may be needed to relax the uterus and restore normal anatomy. Such medications include terbutaline, magnesium sulfate, halogenated general anesthetics, or nitroglycerin.
- If uterine inversion occurs before placental separation, Do NOT deliver the placenta until infusion systems are operational, fluids are being given, a uterine-relaxing anesthetic has been administered, and the uterine fundus has been replaced.

If manual replacement is not successful, a laparotomy is required with the use of two possible procedures. The Huntington procedure involves progressive upward traction on the inverted corpus using Babcock or Allis forceps. The Haultain procedure involves incising the cervical ring posteriorly, allowing for digital repositioning of the inverted corpus with subsequent repair of the incision.