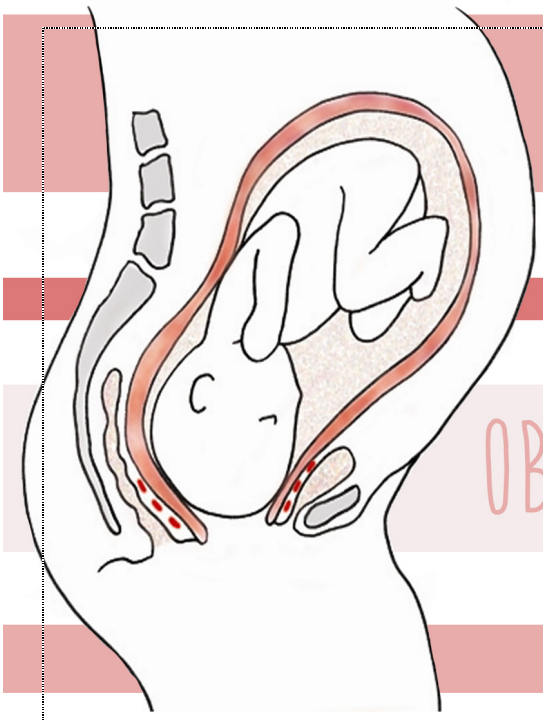

OBSTETRICS AND GYNECOLOGY

# ( 6 ) Postpartum Haemorrhage


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Doctor's note  Team's note  Not important  Important  431 teamwor

## Objectives:

Were not provided.

## Definition

Any blood loss that has potential to produce or produces hemodynamic instability:

- >500ml after completion of the third stage, 5% women loose >1000ml at vag delivery.
- >1000ml after C/S.
- >1400ml for elective Cesarean-hysterectomy.
- >3000-3500ml for emergent Cesarean-hysterectomy.

"The excessive blood loss usually occurs in the immediate postpartum period but can occur slowly over the first 24 hours. Delayed postpartum hemorrhage can occasionally occur, with the excessive bleeding commencing more than 24 hours after delivery. This is usually a result of subinvolution of the uterus and disruption of the placental site "scab" several weeks postpartum, or of the retention of placental fragments that separate several days after delivery." – Hacker & Moore's Essentials of Obstetrics and Gynecology

Classification:

- Early PPH in the first 24 hours
- Late or secondary PPH occurs after 24 h – 6 weeks

*Incidence:

About 5% of all deliveries.

## Etiology of postpartum haemorrhage: (the 4 Ts)

| | |
|---|---|
| **T**one | Uterine atony in 95% of cases. |
| **T**rauma | Laceration, rupture, inversion. |
| **T**issue | Retained tissues\clots. |
| **T**hrombin | Coagulopathy. |

“Most of the blood loss occurs from the myometrial spiral arterioles and decidual veins that previously supplied and drained the intervillous spaces of the placenta. As the contractions of the partially empty uterus cause placental separation, bleeding occurs and continues until the uterine musculature contracts around the blood vessels and acts as a physiologic-anatomic ligature. Failure of the uterus to contract after placental separation (uterine atony) leads to excessive placental site bleeding.” - Hacker & Moore's Essentials of Obstetrics and Gynecology.

***Factors predisposing to uterine atony:**

- Overdistention of the uterus
- Multiple gestations
- Polyhydramnios Fetal macrosomia
- Prolonged labor
- Oxytocic augmentation of labor Grand multiparity (a parity of five or more)
- Precipitous labor (lasting <3 hr)
- Magnesium sulfate treatment of preeclampsia
- Chorioamnionitis
- Halogenated anesthetics
- Uterine leiomyomas

“Trauma during delivery is the second most common cause of postpartum hemorrhage. During vaginal delivery, lacerations of the cervix and vagina may occur spontaneously, but they are more common following the use of forceps or a vacuum extractor” - Hacker & Moore's Essentials of Obstetrics and Gynecology

**“In about half of patients with delayed postpartum hemorrhage, placental fragments are present when uterine curettage is performed with a large curette.** Bleeding occurs as the uterus is unable to maintain a contraction and involute normally around a retained placental tissue mass.” - Hacker & Moore's Essentials of Obstetrics and Gynecology

## Predisposing Factors:

### - Anti partum:

- Previous PPH or manual removal of placenta
- Abruption/previa
- Fetal demise
- Gestational hypertension
- Over distended uterus
- Bleeding disorder

### - Intra partum:

- Operative delivery
- Prolonged or rapid labour
- Induction or agumentation
- Choriomnionitis
- Shoulder dystocia
- Internal podalic version
- coagulopathy

## Diagnoses:

- Assess in the fundus
- Inspect the lower genital tract
- Explore the uterus
    - Retained placental fragments
    - Uterine rupture
    - Uterine inversion
- Assess coagulation

## Management:

### *First Start with ABCs

- talk to and assess patient
- Get HELP from expert!
- Large bore IV access
- Crystalloid- to replace lots!
- CBC/cross-match and type
- Foley catheter for monitoring the fluids volume and readjusting.

### *Second step is assessing the fundus:

- Simultaneous with ABC's
- Atony is the leading case of PPH
- Bimanual massage to induce uterine contraction which will help in stopping bleeding
- Rules out uterine inversion
- May feel lower tract injury
- Evacuate clot from vagina and/ or cervix
- May consider manual exploration of the uterus at this time which will:
    - Rule out the uterine inversion
    - Palpate cervical injury
    - Remove retained placenta or clot from uterus
    - Rule out uterine rupture or dehiscence

### *Drug therapy for PPH:

Oxytocin is the main drug used to induce uterine contraction

- 5 units IV bolus
- 20 units per L N/S IV wide open
- 10 units intramyometrial given transabdominally

| Step 2<br>Directed Therapy | | | |
|---|---|---|---|
| *"Tone"*<br>- massage<br>- compress<br>- drugs<br><br>* *See Table III* | *"Tissue"*<br>- manual removal<br>- curettage | *"Trauma"*<br>- correct inversion<br>- repair laceration<br>- identify rupture | *"Thrombin"*<br>- reverse<br>- antiacoagulation<br>- replace factors |

***Additional Uterotonics**: if still there is no uterine contraction after administration of oxytocin then add on of those:

- Ergometrine (caution in hypertension)
  - .25 mg IM 0r .125 mg IV
  - Maximum dose 1.25 mg
- Hemabate (asthma is a relative contraindication)
  - 15 methyl-prostaglandin F2 alfa
  - 0.25mg IM or intramyometrial
  - Maximum dose 2 mg (Q 15 min- total 8 doses)
- Cytotec (misoprostol) PG E1
  - 800-1000 mcg pr

TABLE 3

DRUG THERAPY FOR PPH

| Drug | Dose | Side Effects | Contraindications |
|---|---|---|---|
| Oxytocin | 10 units IM/IMM<br>5 units IV bolus<br>10 to 20 units/litre | Usually none<br>painful contractions<br>nausea, vomiting,<br>(water intoxication) | hypersensitivity to drug |
| Methylergonovine maleate | 0.25mg IM/0.125mg IV<br>repeat every 5 mins as needed<br>maximum 5 doses | peripheral vasospasm<br>hypertension<br>nausea, vomiting | hypertension<br>hypersensitivity to drug |
| Carboprost (15-methyl $PGF_2$ alpha) | 0.25 IM/IMM<br>repeat every 15 mins as needed<br>maximum 8 doses | flushing, diarrhea, nausea, vomiting<br>bronchospasm, flushing,<br>restlessness,<br>oxygen desaturation | active cardiac, pulmonary, renal, or hepatic disease<br>hypersensitivity to drug |
| Vasopressin | 20 units diluted in 100 ml<br>normal saline = (0.2 units/ml)<br>inject 1 ml at bleeding site<br>avoid intravascular injection | acute hypertension, bronchospasm<br>nausea, vomiting, abdominal cramps<br>angina, headache, vertigo<br>death with intravascular injection | coronary artery disease<br>hypersensitivity to drug |

## *Management in case of bleeding with firm uterus:

- Explore the lower genital tract
- Requirements
    - Appropriate analgesia
    - Good exposure and lighting
- Appropriate surgical repair
    - May temporize with packing

## *Management in case of continuous uterine bleeding:

Consider coagulopathy

- Correct coagulopathy
    - FFP, cryoprecipitate, platelets
- If coagulation is normal
    - Consider embolization
    - Prepare for O.R.

### *Surgical approach:

- Uterine vessel ligation
- Internal iliac vessel ligation
- Hysterectomy

## Prevention:

- Be prepared "Patients with any predisposing factors for postpartum hemorrhage, including a history of postpartum hemorrhage, should be screened for anemia and atypical antibodies to ensure that an adequate supply of type-specific blood is available. An intravenous infusion through a large-bore needle or catheter should be started before delivery, and blood should be held in the laboratory for possible crossmatching." - Hacker & Moore's Essentials of Obstetrics and Gynecology
- Active management of third stage
  - Prophylactic oxytocin
  - 10 U IM
  - 5 U IV bolus
  - 10-20 U/L N/S IV @ 100-150 ml/hr
  - Early cord clamping and cutting
  - Gentle cord traction with surapubic countertraction

## Consumptive Coagulopathy (DIC):

A complication of an identifiable, underlying pathological process against which treatment must be directed to the cause

## *pregnancy hypercoagulability:

- ↑ coagulation factors I (fibrinogen), VII, IX, X
- ↑ plasminogen; ↓ plasmin activity
- ↑ fibrinopeptide A, b-thromboglobulin, platelet factor 4, fibrinogen

## *Pathological activation of coagulation mechanism:

- Extrinsic pathway activation by thromboplastin from tissue destruction
- Intrinsic pathway activation by collagen and other tissue components
- Direct activation of factor X by proteases
- Induction of procoagulant activity in lymphocytes, neutrophils or platelets by stimulation with bacterial toxins

## *Significance of Consumptive Coagulopathy

- Bleeding
- Circulatory obstruction→organ hypoperfusion and ischemic tissue damage
- Renal failure, ARDS
- Microangiopathic hemolysis

## *Causes related to pregnancy:

- Abruption placentae (most common cause in obstetrics)
- Sever Hemorrhage (Postpartum hge)
- Fetal Death and Delayed Delivery >2wks
- Amniotic Fluid Embolus
- Septicemia

## *Fetal death and delayed delivery:

- Spontaneous labour usually in 2 weeks post fetal death
- Maternal coagulation problems < 1 month post fetal death
- If retained longer, 25% develop coagulopathy

- Consumptive coagulopathy mediated by thromboplastin from dead fetus
- tx: correct coagulation defects and delivery

***Amniotic fluid embolus:**

- Complex condition characterized by abrupt onset of hypotension, hypoxia and consumptive coagulopathy
- 1 in 8000 to 1 in 30 000 pregnancies
- "anaphylactoid syndrome of pregnancy"

"Amniotic fluid embolus is rare and is associated with an 80% mortality rate. **This syndrome is characterized by a fulminating consumption coagulopathy, intense bronchospasm and vasomotor collapse. It is triggered by an intravascular infusion of a significant amount of amniotic fluid during a tumultuous or rapid labor in the presence of ruptured membranes.** During the process of placental abruption, a small amount of amniotic fluid may leak into the vascular system, and the thromboplastin in the amniotic fluid may trigger a consumption coagulopathy." - Hacker & Moore's Essentials of Obstetrics and Gynecology

***Pathophysiology:**

Brief pulmonary and systemic hypertension→transient, profound oxygen desaturation (neurological injury in survivors) → secondary phase: lung injury and coagulopathy.

***Diagnosis:** is clinical.

***Treatment:** is supportive.

**"The principal objectives of treatment for amniotic fluid embolism are to support the respiratory system, correct the shock, and replace the coagulation factors.** This type of embolism requires immediate cardiopulmonary resuscitation, usually with mechanical ventilation; rapid volume expansion with an electrolyte solution; positive inotropic cardiac support; placement of a bladder catheter to monitor urine output; correction of the red cell deficit by transfusion with packed red blood cells; and reversal of the coagulopathy with the use of platelets, fibrinogen, and other blood components." - Hacker & Moore's Essentials of Obstetrics and Gynecology

## *Prognosis:

- 60% maternal mortality; profound neurological impairment is the rule in survivors.
- fetal: outcome poor; related to arrest-to-delivery time interval; 70% neonatal survival; with half of survivors having neurological impairment.

## *Septicemia:

- Due to septic abortion, antepartum pyelonephritis, puerperal infection and then Endotoxin activates extrinsic clotting mechanism through TNF.
- Treat the cause.

## *Abortion:

Coagulation defects from:

- Sepsis (Clostridium perfringens highest at Parkland) during instrumental termination of pregnancy
- Thromboplastin released from placenta, fetus, decidua or all three (prolonged retention of dead fetus)

**Summary:**

- Blood loss is often underestimated
- Ongoing trickling can lead to significant blood loss
- Blood loss is generally well tolerated to a point

* Postpartum hemorrhage is defined as blood loss in excess of 500 mL at the time of vaginal delivery. There is normally a greater blood loss following cesarean delivery; therefore, blood loss in excess of 1000 mL is considered a postpartum hemorrhage in these patients.

Remember 4 Ts

| | |
|---|---|
| **Tone**<br>Role out uterine atony. | · Palpate fundus.<br>· Massage uterus.<br>· Oxytocin<br>· Methergine<br>· Hemabate |
| **Trauma**<br>r\o vaginal or cervical laceration | · Obtain good exposure.<br>· Inspect cervix and vagina.<br>· Worry about slow bleeders.<br>· Treat hematomas. |
| **Tissue**<br>r\o retained placenta | · Inspect placenta for missing cotyledons.<br>· Explore uterus.<br>· Treat abnormal implantation. |
| **Thrombin** | · Check labs if suspicious. |

- **"Identification of the cause of postpartum hemorrhage requires a systematic approach:**
- The fundus of the uterus should be palpated through the abdominal wall to determine the presence or absence of **uterine atony.**
- Next, inspection of the vagina and cervix should be performed to ascertain whether any **lacerations** might be compounding the bleeding problem.
- Any **uterine inversion** or **pelvic hematoma** should be excluded during the pelvic examination.
- If the cause of bleeding has not been identified, manual exploration of the uterine cavity should be performed, under general anesthesia if necessary. With fingertips together, a gloved hand is slipped through the open cervix, and the hand is inserted into the uterus. The endometrial surface is palpated carefully to identify any **retained products of conception, uterine wall lacerations**, or **partial uterine inversion**. If no cause for the bleeding is found, **a coagulopathy** must be considered." - Hacker & Moore's Essentials of Obstetrics and Gynecology

Management of uterine atony: “From Hacker & Moore's Essentials of Obstetrics and Gynecology”

If uterine atony is determined to be the cause of the postpartum hemorrhage, a rapid continuous intravenous infusion of dilute oxytocin (40 to 80 U in 1 L of normal saline) should be given to increase uterine tone. If the uterus remains atonic and the placental site bleeding continues during the oxytocic infusion, ergonovine maleate or methylergonovine, 0.2 mg, may be given intramuscularly. The ergot drugs are contraindicated in patients with hypertension because the pressor effect of the drug may increase blood pressure to dangerous levels. Analogues of prostaglandin F2α given intramuscularly are quite effective in controlling postpartum hemorrhage caused by uterine atony. The 15-methyl analogue (Hemabate) has a more potent uterotonic effect and longer duration of action than the parent compound. The expected time of onset of the uterotonic effect when the 15-methyl analogue (0.25 mg) is given intramuscularly is 20 minutes, whereas when injected into the myometrium, it may take up to 4 minutes. Failing these pharmacologic treatments, a bimanual compression and massage of the uterine corpus may control the bleeding and cause the uterus to contract. Although packing the uterine cavity is not widely practiced, it may occasionally control postpartum hemorrhage and obviate the need for surgical intervention. Alternatively, a large-volume balloon catheter has been developed that performs a similar function while maintaining a channel into the uterine cavity, allowing further bleeding to be monitored. If uterine bleeding persists in an otherwise stable patient, she can be transported to the angiocatheterization laboratory, where radiologists can place an angiocatheter into the uterine arteries for injection of thrombogenic materials to control blood flow and hemorrhaging. Operative intervention is a last resort. If the patient has completed her childbearing, a supracervical or total abdominal hysterectomy is definitive therapy for intractable postpartum hemorrhage caused by uterine atony. When reproductive potential is important to the patient, ligation of the uterine arteries adjacent to the uterus will lower the pulse pressure. This procedure is more successful in controlling placental site hemorrhage and is easier to perform than bilateral hypogastric artery ligation.

## MSQs

1- A 27-year-old G4P3 at 37 weeks presents to the hospital with heavy vaginal bleeding and painful uterine contracons. Quick bedside ultrasound reveals a fundal placenta. The paent's vital signs are blood pressure 140/92 mm Hg, pulse 118 beats per minute, respiratory rate 20 breaths per minute, and temperature 37°C (98.6°F). The fetal heart rate tracing reveals tachycardia with decreased variability and a few late deceleraons. An emergency cesarean secon delivers a male infant with Apgar scores of 4 and 9. With delivery of the placenta, a large retroplacental clot is noted. The paent becomes hypotensive, and bleeding is noted from the wound edges and her IV catheter sites. Which of the following blood products will most quickly resolve her cause of hemorrhage?

**A. Cryoprecipitate**
**B. Fresh frozen plasma**
**C. Packed red blood cells**
**D. Platelets**
**E. Recombinant Factor VII**

2- A 28-year-old G2P2 presents to the hospital 2 weeks aer vaginal delivery with the complaint of heavy vaginal bleeding that soaks a sanitary napkin every hour. Her pulse is 89 beats per minute, blood pressure 120/76 mm Hg, and temperature 37.1°C (98.9°F). Her abdomen is nontender and her fundus is located above the symphysis pubis. On pelvic examinaon, her vagina contained small blood clots and no acve bleeding is noted from the cervix. Her uterus is about 12 to 14 weeks size and nontender. Her cervix is closed. An ultrasound reveals an 8-mm endometrial stripe. Her hemoglobin is 10.9, unchanged from the one at her vaginal delivery. β-hCG is negave. Which of the following potenal treatments would be contraindicated?

**A. Methylergonovine maleate (Methergine)**
**B. Oxytocin injection (Pitocin)**
**C. Ergonovine maleate (Ergotrate)**
**D. Prostaglandins**
**E. Dilation and curettage**

3) A 22-year-old woman gives birth at 39 weeks 3 days by normal spontaneous vaginal delivery (NSVD) to a 6-lb 12-oz boy. After delivery of the baby, the placenta is delivered within 10 minutes and inspected to determine whether it is intact. After confirmation that the entire placenta has been removed, the uterus is palpated abdominally and noted to be soft and boggy. What is the next step in the management of this patient?

**(A) Manual massage of the uterus**

**(B) Wait 10 minutes and reassess**

**(C) Blood type and screen the patient**

**(D) Apply uterine compression sutures**

4) A 26-year-old G6P5015 has precipitously delivered a 4,520-g male infant via normal spontaneous vaginal delivery (NSVD). Following the delivery, she has a period of uterine atony and the resident estimates that her blood loss was 650 cc. Which most correctly characterizes her postpartum blood loss?

**(A) Less than typical for a vaginal delivery**
**(B) Typical for a vaginal delivery**
**(C) More than normal for a vaginal delivery**
**(D) More than normal for a Cesarean section**

5) A normotensive 28-year-old G2P1001 completes the third stage of labor 27 minutes after delivery of a 3,280-g male infant. The labor was spontaneous and lasted 8 hours. The second stage of labor lasts 35 minutes. The nurse reports that the uterus is boggy and 6 em above the umbilicus. When massaged, a clot of approximately 125 mL is expressed. In the prevention of postpartum hemorrhage :(PPH), the medication employed as the first -line therapy is

**(A) Carboprost tromethamine**
**(B) Methylergonovine**
**(C) Misoprostol**
**(D) Oxytocin**
**(E) Prostaglandin E1**

**Answers:**

1-B 2- E 3-A 4-C 5-D

## Qs 1 and 2 are from Obstetric and Gynecology PreTest Self – Assessment And Review 13 edition and here their explanations:

1) The answer is b. This patient has a large placental abruption which is the most common cause of consumptive coagulopathy in pregnancy. The bleeding described signifies that the patient has a significant coagulopathy with hypofibrinogenemia. Prompt and vigorous transfusion is needed. Packed red blood cells will restore blood volume and increase oxygen carrying capacity. Fresh frozen plasma (FFP) contains about 600-700 mg of fibrinogen and will promote clong. Cryoprecipitate contains clotting factors and fibrinogen but in much less amount (200 mg) than FFP and has no advantage over the use of FFP in this bleeding patient. Recombinant factor VII can be used for the treatment of severe obstetrical hemorrhage but will not be effective if fibrinogen is low. Platelet transfusion is considered in bleeding patients with platelets less than 50,000.

2) The answer is e. Uterine hemorrhage after the first postpartum week is most often the result of retained placental fragments or subinvolution of the placental site. Curettage may do more harm than benefit by stimulating increased bleeding. Initial therapy should be aimed at decreasing the bleeding by stimulating uterine contractions with the use of Pitocin, Methergine, or Ergotrate. Prostaglandins could also be used in this setting.

## Qs 3,4, and 5 are from Shelf-Life Obstetric and Gynecology 2015 and here the explanations for Qs 3 and 5 answers:

3)The answer is A: Manual massage of the uterus. This patient has uterine atony. The first step in management is to begin uterine massage. This should be done while preparing other treatments including uterotonics such as oxytocin, methylergonovine maleate, and misoprostol. Uterine atony should be assessed and managed immediately. By waiting any amount of time and reassessing, one increases the risk of significant postpartum hemorrhage (PPH). The

patient should be typed and screened for blood prior to her delivery in preparation for a potential blood transfusion. Uterine compression sutures should only be employed if initial treatments of uterine atony are unsuccessful.

5) The answer is D: Oxytocin. The choice of other uterotonic agents after uterine massage and oxytocin are not effective including all other medications listed as alternatives. Use depends on patient condition, sensitivities, and in the face of no contraindication for the medication, provider preference.