
بسم الله الرحمن الرحيم

Postpartum Hemorrhage

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Perinatalogist

- An obstetrical emergency
- One of the top three causes of maternal mortality in both high(1/100000) and low per capita income countries(1/1000)
- 140000 women die of PPH each year- one every 4 min
- Most preventable cause of maternal mortality
- Serious morbidity may follow PPH: ARDS, coagulopathy, shock, loss of fertility, sheehan syn.

Incidence

The incidence varies widely: 1-5% of deliveries

The diagnosis increases over the time

Definition

There is no single, satisfactory definition of PPH.

- PPH is excessive bleeding that makes the patient symptomatic (pallor, lightheadedness, weakness, palpitations, diaphoresis, restlessness, confusion, air hunger, syncope) and/or results in signs of hypovolemia (hypotension, tachycardia, oliguria, low O2 saturation [<95 %])
- Most common definition: Excess blood loss (>500ml in NVD or >1000ml in C/S)
- Decline in Hct of 10%(not a clinically useful definition)

Types of PPH

- Primary PPH (early): in the first 24 hours, 4-6% of pregnancies
- Secondary PPH (late): between 24h & 6-12 weeks , (0.5-2% of pregnancies)

Etiology of PPH:

❑ Primary PPH

- ✓ uterine atony
- ✓ trauma
- ✓ retained placenta
- ✓ defects in coagulation
- ✓ uterine inversion

❑ Secondary PPH

- ✓ subinvolution of placental site
- ✓ retained products of conceptus
- ✓ infection
- ✓ inherited coagulation defects

Etiology of Postpartum Hemorrhage; 4 T

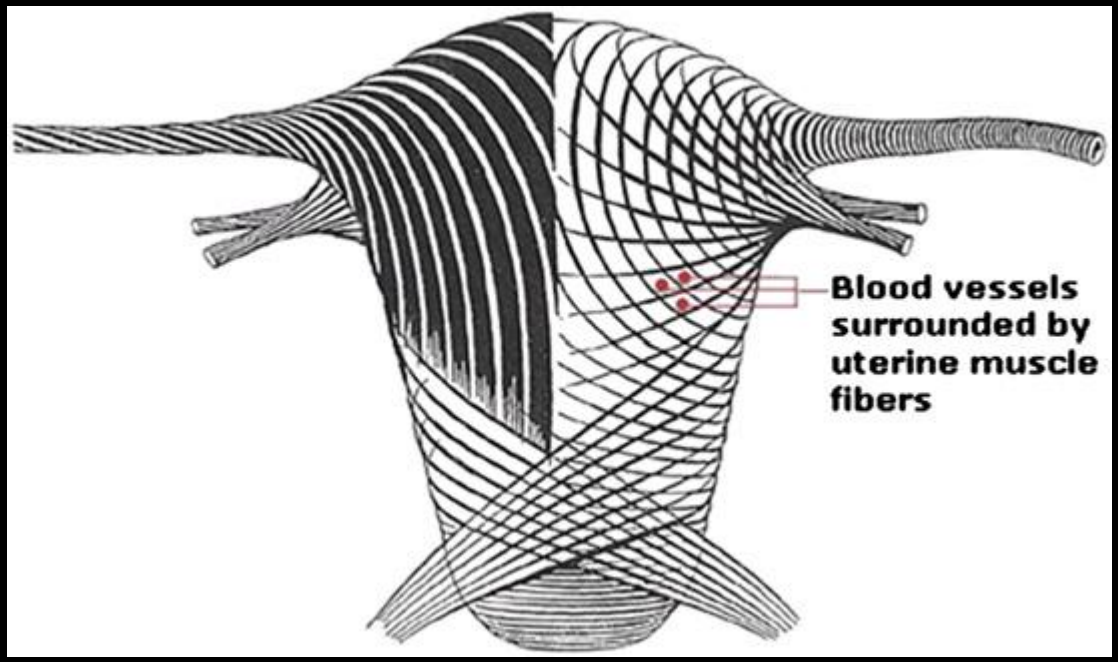
Tone	**Uterine atony 80%**
Tissue	**Retained tissue/clots**
Trauma	**laceration, rupture, inversion**
Thrombin	**coagulopathy**

Atony

- The most common cause of PPH is uterine atony
- Complicates 1 in 20 births
- Responsible for at least 80 % of cases of PPH

- Near term, at least 600 mL/min of blood flows through the intervillous space(15% of cardiac output)
- This flow is carried by spiral arteries and accompanying veins. With separation of the placenta, these vessels are avulsed

- Hemostasis at the placental site:
  - Contraction of the myometrium
  - Subsequent clotting and obliteration of vessels lumens



Muscle fibers of the uterus

Myometrial blood vessels pass between the muscle cells of the uterus; the primary mechanism of immediate hemostasis following delivery is **myometrial contraction** causing occlusion of uterine blood vessels—the so-called “living ligatures” of the uterus

Risk factors:

- Overdistension (multiple gestation, polyhydramnios, macrosomia)
- Uterine infection
- Drugs (uterine relaxants)
- Uterine fatigue" after a prolonged or induced labor
- Uterine inversion
- Retained placenta or placental fragment

Trauma

- Lacerations (perineal, vaginal, cervical, uterine)
- Incisions (hysterotomy, episiotomy)
- Uterine rupture

Coagulation defects

- Acquired

severe preeclampsia, HELLP syndrome, abruptio placentae, fetal demise, amniotic fluid embolism, and sepsis

- Congenital

Von willebrand disease, factor XI deficiency , hemophilia carriers

PPH alone is not a strong indication for screening of these defects

Risk factors for PPH

- Risk factors of atony [Prolonged labor, Augented laobr, Rapid labor, Overdistended uterus (macrosomia, twins, hydramnios)]
- History of PPH
- Episiotomy, especially mediolateral
- Preeclampsia
- Operated delivery
- Asian or Hispanic race
- Chorioamnionitis

only a small proportion of women with any risk factors for PPH develop the disorder and many women without risk factors experience hemorrhage after delivery; thus,

knowledge of risk factors is not very useful clinically

Planning & prevention

- Active management of the third stage of labor
- Patients with risk factors for PPH should be identified and counseled
- Development and consistent application of a comprehensive protocol for management of PPH
- Labor and delivery units compile medications and instruments that may be needed to manage PPH so that this equipment is readily available when needed

Prevention of PPH

Active management of the third stage of labor

AMTSL reduces:

- Incidence of PPH
- Quantity of blood loss
- Need for blood transfusion

The usual components of AMTSL include:

- Administration of oxytocin or another uterotonic drug within 1 minute after birth of the infant.
- Controlled cord traction.
- Uterine massage after delivery of the placenta.

Step 1: How to use uterotonic agents

Within 1 minute of delivery of the infant, palpate the abdomen to rule out the presence of an additional infant(s) and give oxytocin

Oxytocin

- **10 U IM**
- A solution of 10-20 U of oxytocin in 500-1000 mL 0.9 % saline (10CC/min for a few min then 1-2CC/min until the mother transfer then discontinue)

Oxytocin should never be given as an undiluted bolus dose, because serious hypotension or cardiac arrhythmias may occur

Ergot alkaloids

- Can be administered as single agent therapy (most commonly as methylergonovine 0.2 mg IM)
- Contraindicated in heart disease, pre-eclampsia, eclampsia, or high blood pressure.

Prostaglandins

Prostaglandins are less effective than inject able uterotonics for active management of the 3th stage of labor (misoprostol 600 μg orally)

Uterotonics require proper storage:

- Ergometrine or methylergometrine: 2–8 °C and protect from light and from freezing.
- Misoprostol: in aluminum blister pack, room temperature, in a closed container.
- Oxytocin: 15–30 °C, protect from freezing.

Step 2: How to do controlled cord traction

• hold the cord in one hand

• Place the other hand just above the woman's pubic bone and stabilize the uterus by applying counter-pressure during controlled cord traction.

• Keep slight tension on the cord and await a strong uterine contraction (2–3 minutes).

• With the strong uterine contraction, encourage the mother to push and very gently pull downward on the cord to deliver the placenta.

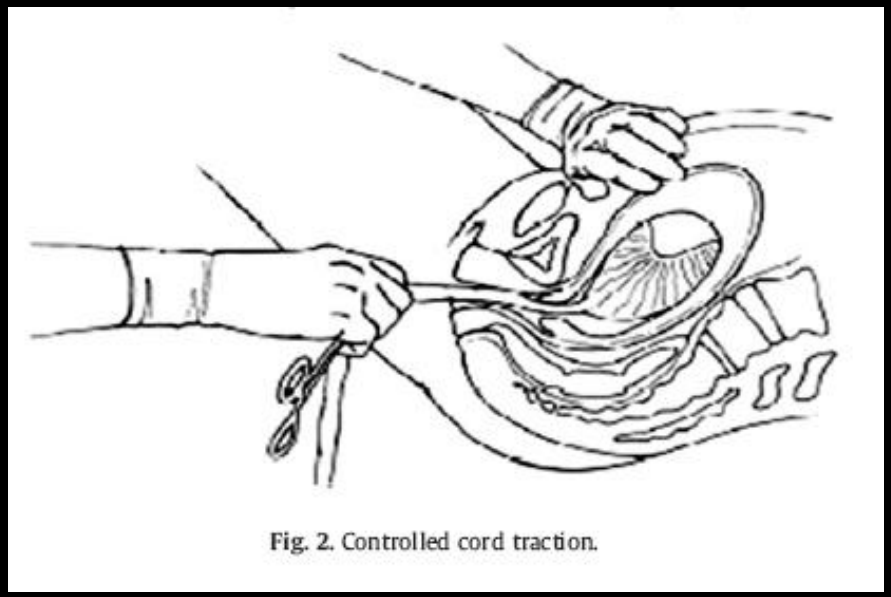


Fig. 2. Controlled cord traction.

Step 3: How to do uterine massage

- Immediately after expulsion of the placenta, massage the fundus of the uterus through the abdomen until the uterus is contracted.
- Palpate for a contracted uterus every 15 minutes and repeat uterine massage as needed during the first 2 hours.
- Ensure that the uterus does not become relaxed (soft) after you stop uterine massage.

Comparison of expectant (physiologic) versus AMTSL[a]

	Physiologic (expectant) management	Active management
Uterotonic	Uterotonic is not given before the placenta delivered	Uterotonic is given within one minute of the baby's birth (after ruling out the presence of a second baby)
Signs of placental separation	Wait for signs of separation: Gush of blood Lengthening of cord Uterus becomes rounder and smaller as the placenta descends	Do not wait for signs of placental separation. Instead: palpate the uterus for a contraction Wait for the uterus to contract Apply CCT with counter traction
Delivery of the placenta	Placenta delivered by gravity assisted by maternal effort	Placenta delivered by CCT while supporting and stabilizing the uterus by applying counter traction
Uterine massage	Massage the uterus after the placenta is delivered	Massage the uterus after the placenta is delivered
Advantages	Does not interfere with normal labor process Does not require special drugs/supplies May be appropriate when immediate care is needed for the baby (such as resuscitation) and no trained assistant is available May not require a birth attendant with injection skills	Decreases length of third stage Decrease likelihood of prolonged third stage Decreases average blood loss Decreases the number of PPH cases Decreases need for blood transfusion
Disadvantages	Length of third stage is longer compared to AMTSL	Requires uterotonic and items needed for injection safety

Management of PPH

- The management of PPH is multifaceted and can involve many teams within the hospital (obstetricians, nurses, anesthesiologists, blood bank personnel, laboratory medicine, surgical subspecialists, interventional radiology).
- These teams are often summoned and required to work together under conditions of great stress and time pressures
- Coordination is essential and can be facilitated by protocols and flow diagrams that anticipate how these teams will communicate and function together.

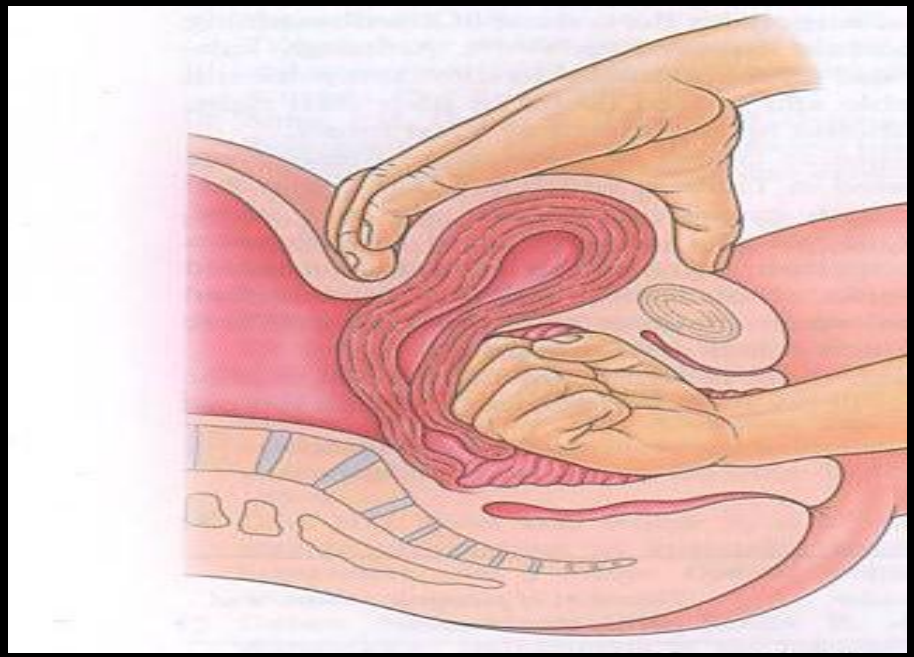
Remember!

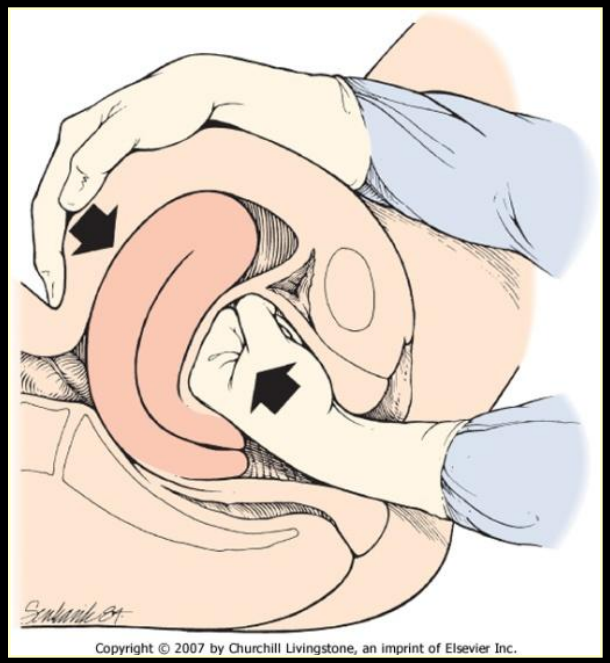
- Blood loss is generally well tolerated to a point
- Blood loss is often underestimated
- Ongoing trickling can lead to significant blood loss

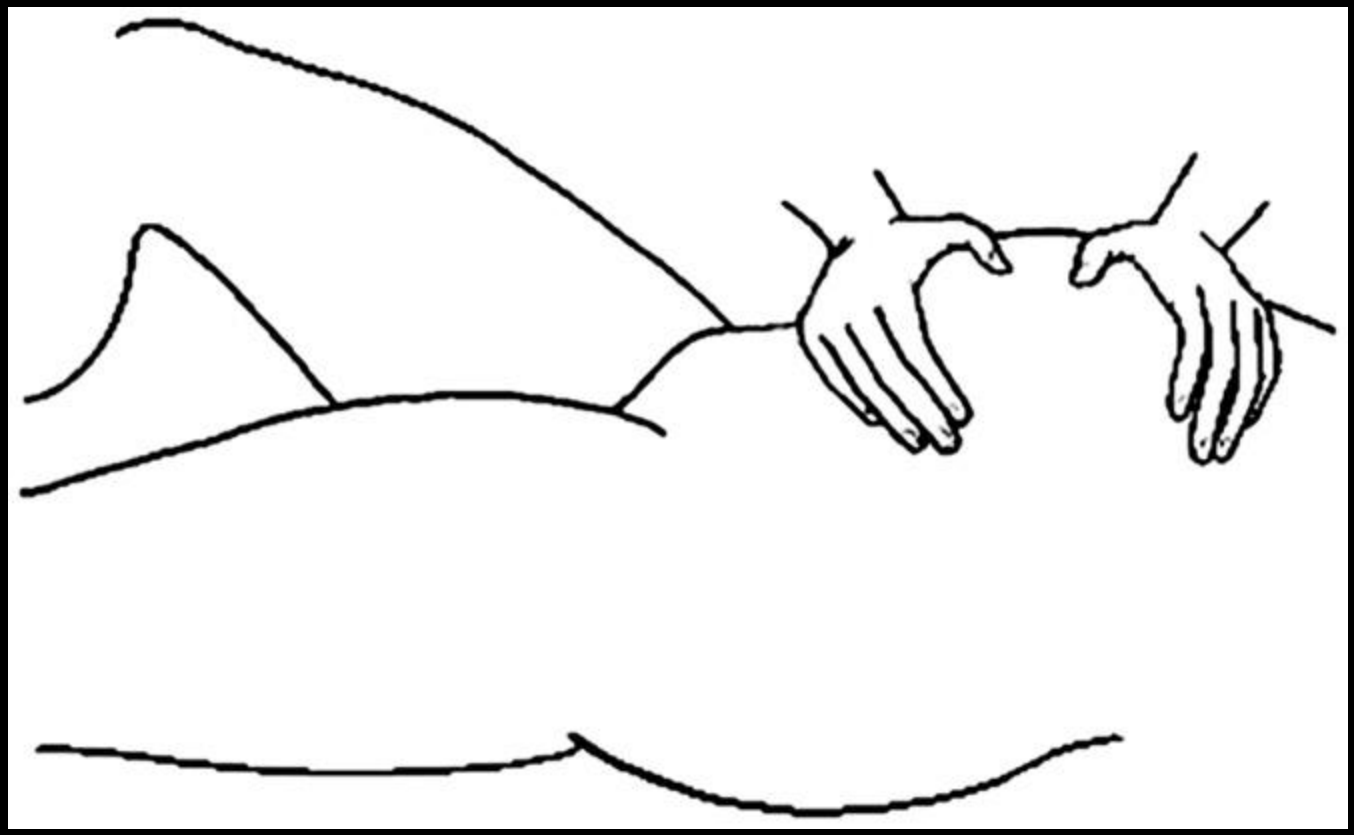
Initial Interventions

- Fundal massage

Massage should be maintained while other interventions are being initiated







Bimanual external massage

- Intravenous access

Preferably two large bore catheters(at least 18gauge)

- Laboratory tests

CBC, fibrinogen concentration , platelet count, PT, activated PTT, typed and crossed for multiple units of packed red blood cells.

Uterotonic drugs

Oxytocin

• The preferred uterotonic (first choice for PPH)

• rhythmic contraction

• Uterine response subsides within 1h of cessation of IV administration

• 40 units in 1 liter of normal saline

• 10 units IM (including directly into the myometrium).

• Higher doses of oxytocin (up to 80 units in 1000 mL) for a short duration (eg, over 30 minutes)

Methylergonovine or ***ergometrine***

- Tethanic contraction
- 0.2 mg IM (or directly into the myometrium) (never IV).
- May repeat at 2-4h intervals, as needed, max 5 doses in 24h
- Ergot alkaloids are contraindicated in women with hypertension, cardiac disease, or pre-eclampsia
- Contraindicated with concomitant use of certain drugs used to treat HIV (HIV protease inhibitor, efavirenz, or delavirdine)

If there has not been a good response to the first dose, quickly move on to a different uterotonic agent.

Carboprost tromethamine

- (15 methyl-PGF2α)(Hemabate) 250 μg IM (or directly into the myometrium) every 15-90 min, [a total dose of 2 mg (8 doses)]
- No asthma
- 75 % respond to a single dose

move on to a different uterotonic agent if no response after one or two doses

Misoprostol (PGE1)

- Is most useful for reducing blood loss in settings where injectable uterotonics are unavailable.
- The optimum dose and route of administration are unclear. A dose of 800 mcg with the sublingual route is probably the optimal route of administration
- Can be given to women with hypertension or asthma.
- Maternal temperature should be monitored closely

Dinoprostone (PGE2)

- 20 mg vaginal or rectal suppository is an alternative PGE to misoprostol (PGE1).
- Can be repeated at 2-4h intervals

Fluid resuscitation and transfusion

Monitoring vital signs

Bladder catheter

A large volume of crystalloid is infused

Replacement of blood components

- When laboratory data are available: transfuse patients with Hb values <7.5-8 g/dL.
- Before laboratory studies are available: transfuse of 2 units of (pRBCs) if hemodynamic do not improve after the administration of 2-3 liters of normal saline and continued bleeding is likely.
- Aggressive use of plasma replacement is important to reverse dilutional coagulopathy

- Estimate blood loss ever 30 min to guide blood product replacement
- Continue to transfuse RBCs, platelets, cryoprecipitante, FFP to achieve the following targets:
  - Hb>7g/Dl
  - Plt>50000/ul
  - Fibrinogen>100mg/dl
  - PT& PTT<1.5 times control

Secondary Interventions

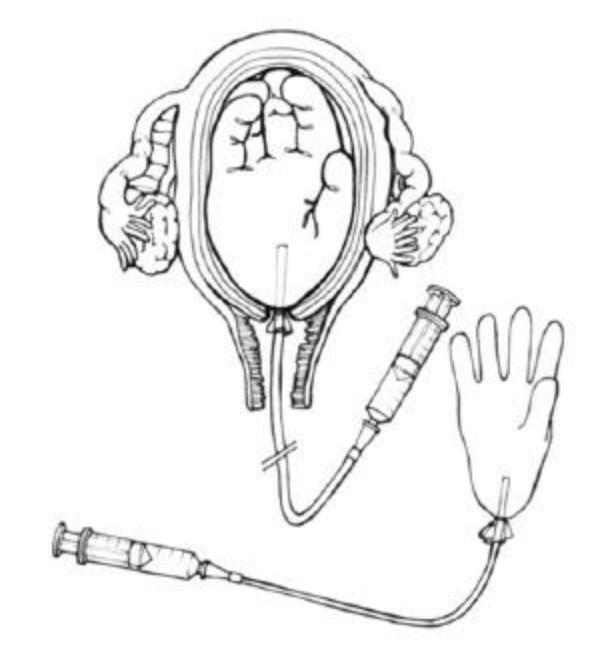
At the same time

- Provide adequate anesthesia
- Inspect for and repair cervical and vaginal lacerations
- Exclude uterine rupture
- Remove retained products of conception
- Uterine tamponade

Uterine tamponade

Uterine tamponade is effective in many patients with atony or lower segment bleeding

- Balloons
- Packs



INDICATIONS FOR LAPAROTOMY

- If vital signs are worse than expected for the estimated blood loss, the possibility of internal hemorrhage should be considered
- When a vaginal laceration has extended above the fornix
- Management of uterine atony unresponsive to the conservative interventions described

summery

Management of postpartum hemorrhage

- Definition of postpartum hemorrhage:

• Blood loss is more than 500 mL or 2 cups after a vaginal delivery, or

in excess of 1 L after a cesarean delivery.

- Maternal signs and symptoms of hypovolemia:

• A rising pulse rate is an early indicator, followed later by a drop in blood pressure, pallor, sweating, poor capillary refill, and cold extremities.

• Symptoms may include faintness/dizziness, nausea, and thirst

If excessive blood loss occurs:

• Call for help and set up an IV infusion using a large-bore cannula, and consider opening a second IV infusion.

• Place the woman on a flat surface with her feet higher than her head.

• The birth attendant places a hand on the fundus of the uterus and gently massages until it is firm and contracted.

• Empty the bladder• Start oxygen, if available.

• Give uterotonic as soon as possible:

For management of PPH, oxytocin should be preferred to others

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

If bleeding persists after administration of uterotonics, consider these potentially life-saving procedures:

- Bimanual compression of the uterus (external or internal)
- Aortic compression.
- Hydrostatic intrauterine balloon tamponade.
- Laparotomy to apply compression sutures using B-Lynch or Cho techniques.


Thank you for
saving my MOM


Thanks for
Your attention