

In the name of god

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Infertility fellowship

Postpartum hemorrhage

- It is an obstetric **emergency**.
- It is one of the top **five causes** of maternal mortality.
- Timely recognition, appropriate resources, and appropriate response are critical for preventing death.

PPH occurring in the **first 24 hours** after delivery may be called primary or early PPH.

PPH occurring **from 24 hours to 12 weeks** after delivery is usually called secondary, late, or delayed PPH.

DEFINITION/DIAGNOSIS

We make the diagnosis of PPH in postpartum women with **bleeding that is greater than expected** and results in signs and/or symptoms of hypovolemia.

Although PPH is classically defined by the volume of blood loss (estimated blood loss **≥ 500 mL after vaginal birth or ≥ 1000 mL after cesarean** delivery).

In 2017, the American College of Obstetricians and Gynecologists revised their definition of PPH from the classic one described above to:

blood loss ≥ 1000 mL or bleeding associated with signs/symptoms of hypovolemia within 24 hours of the birth process regardless of delivery route.

INCIDENCE

The incidence of PPH using estimated blood loss has been reported to be 1 to 3 percent of deliveries.

PHYSIOLOGIC MECHANISMS THAT LIMIT POSTPARTUM BLOOD LOSS

combination of **two** mechanisms:

- ✓ Contraction of the myometrium
- ✓ Local decidual hemostatic factors
- ✓ The pathogenesis of most cases of PPH is a disturbance in one or both of these mechanisms.

CAUSES OF POSTPARTUM HEMORRHAGE

Focal or diffuse atony :The **most common** cause of PPH is uterine atony (80 %).

Atony may or may not be associated with:
retained tissue

Placental disorders

uterine inversion

Prior PPH and **prolonged labor** are the most well-established risk factors for atony-related PPH

CAUSES OF POSTPARTUM HEMORRHAGE

Trauma:

Cervical and vaginal lacerations

hemorrhage from the uterine incision

lateral extension of the incision

Retroperitoneal enlargement and bulging of the broad ligament at cesarean delivery can be signs of retroperitoneal hemorrhage.

Coagulopathy or other bleeding diathesis

responsible for **less than 7percent** of cases of PPH.

platelet dysfunction can contribute to PPH
von Willebrand disease are especially at risk for PPH.

Acute acquired coagulopathies can be caused by amniotic fluid embolism, placental abruption, preeclampsia with severe features.

RISK FACTORS

- Retained placenta/membranes
- Failure to progress the second stage of labor
- Morbidly adherent placenta
- Lacerations
- Instrumental delivery
- Large for gestational age newborn
- Hypertensive disorders
- Induction of labor

Other risk factors

personal or family history of previous PPH ,
obesity, high parity, precipitous labor,
chorioamnionitis, uterine inversion, leiomyoma,
Couvelaire uterus .

assisted reproductive technology, gestational age
41 to 42 weeks, and use of some drugs

(uterine relaxants, antithrombotic drugs,
antidepressants [particularly selective serotonin
reuptake inhibitors and serotonin or epinephrine
reuptake inhibitors])

ASSESSMENT OF SEVERITY OF HEMORRHAGE

A low fibrinogen level (**less than 200 mg/dL**) is predictive of **severe PPH** defined as need for transfusion of multiple units of blood and blood products, need for surgical management of hemorrhage, or maternal death.

stages of PPH

Stage 0 – Every woman in labor/giving birth.

Stage 1 – Blood loss **>500 mL** vaginal delivery or **>1000 mL** cesarean delivery or change in vital signs by heart rate ≥ 110 beats/minute, blood pressure $\leq 85/45$ mmHg, O₂ saturation < 95 percent.

Stage 2 – Continued bleeding with total blood loss < 1500 mL.

Stage 3 – Total **blood loss >1500 mL** or transfusion of more than two units packed red blood cells or unstable vital signs or suspicion of disseminated intravascular coagulation.

Clinical Staging of Hemorrhagic Shock_(national guideline)

Severity	findings	Volume _(ml)	Volume replacement
mild	HR<100 RR: Normal(14-20/min) Bp: Normal U/O:30-50 ml/h A bit anxious	500-1000	crystalloid
moderate	Tachycardia100-119 RR:20-30/min Bp: Normal± orthostatic change Oliguria:20-30ml/h anxious	1000-1500	crystalloid
sever	Tachycardia 120-130 RR:30-40/min Hypotension Oliguria:5-15ml/h confused	1500-2000	Crystalloid & blood
Fatal	Tachycardia≥ 140 RR>35/min Hypotension Anuria Confused or lethargic	> 2000	Crystalloid & blood

Assessment and management of risk

Low risk:

- Singleton pregnancy
- ≤ 4 previous vaginal deliveries
- No previous uterine surgery
- No history of PPH
- No known bleeding disorder

Medium risk:

- Prior uterine surgery
- >4 previous vaginal deliveries
- Multiple gestation
- Large fibroids
- Chorioamnionitis
- History of PPH

High risk :

- Morbidly adherent placenta or placenta previa or low lying placenta.
- Hematocrit <30 percent and other risk factors.
- Known coagulopathy
- Platelet count <100,000

V/S and check uterus and V/B

1st h after delivery: q 15 min

2nd h after delivery: q 30 min

3rd & 4th h after delivery: q 1 h

Then: q 6h to 24 h

Timely diagnosis and early intervention

Timeliness in recognition of PPH, determining the cause, and initiating treatment is critical.

almost **90** percent of deaths due to PPH occur within **four hours** of giving birth.

several maternal mortality review committees have found that **delayed response** to abnormal vital signs is a **common factor** in preventable mortality.

Teamwork

Obstetricians, midwives, nurses, anesthesiologists, hematologists, blood bank personnel, laboratory medicine, surgical subspecialists (vascular, urology), and interventional radiologists may be involved in managing PPH.

Treatment goals

Restore or maintain adequate circulatory volume to prevent hypoperfusion of vital organs

Restore or maintain adequate tissue oxygenation

Reverse or prevent coagulopathy

Eliminate the obstetric cause of PPH

The most common causes can be considered using **the Four Ts**:

Tone: uterine atony

Trauma: laceration, hematoma, inversion, rupture

Tissue: retained tissue or invasive placenta

Thrombin: coagulopathy



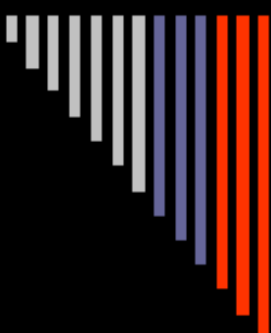
nonpharmacologic management:

- Ask help: midwife obstetrician, anesthesiologist
- Lie down, keep warm and Trendelenburg position
- Etiology?
- Two main iv line
- Blood test & # match



nonpharmacologic management:

- IV volume
- Supplemental oxygen by face mask 10-15L/min.
- Pulse oximetry and V/S
- EKC if needed



Volume replacement therapy

- The best agent is blood, if not available, large IV line and rapid crystalloid(2-3 ml per 1 ml blood loss) up to 3.5 L if the blood is not ready(or colloid fluid 1-2 L or hartmann/lactate ringer).
- FFP should not be used for replacement alone(expensive, needed for specific factors, risk of infection)

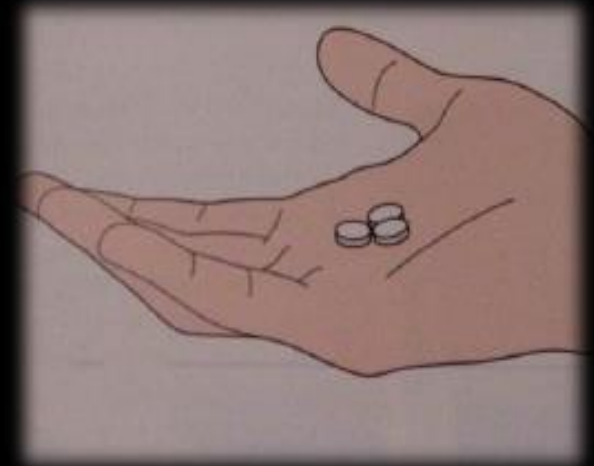
Treatment of atony

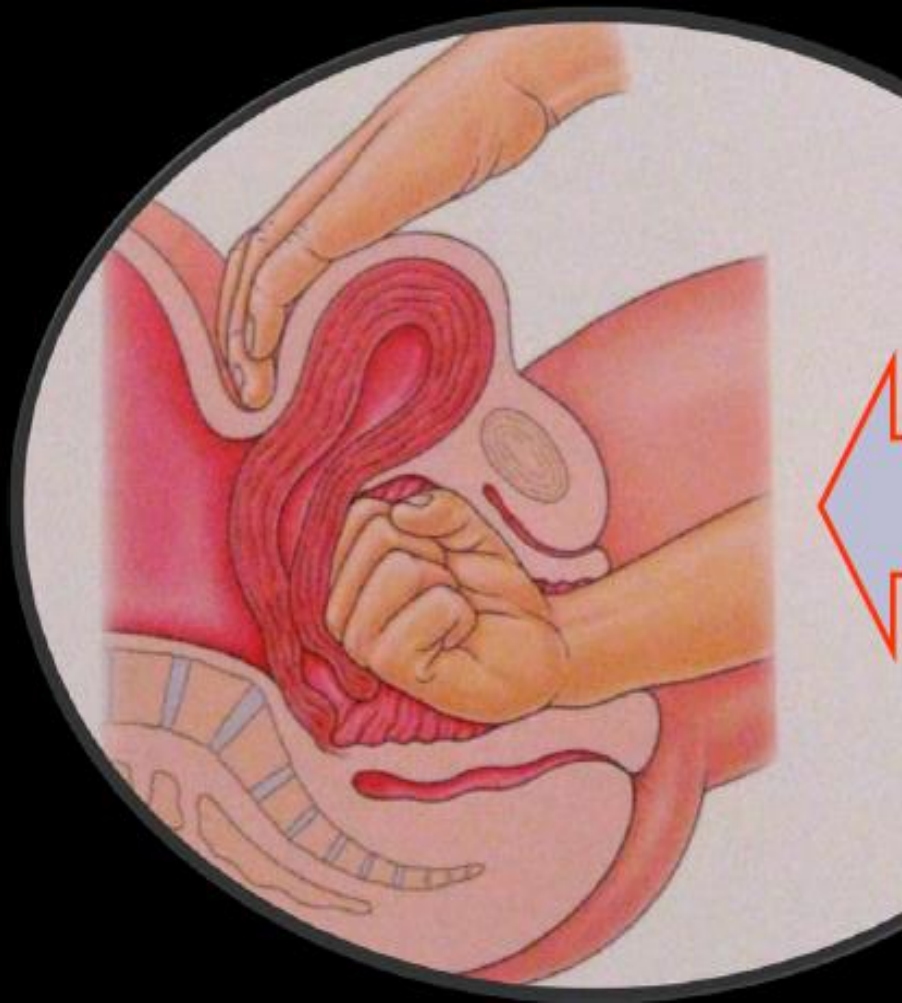
treatment of atony begins with **uterotonic drugs** and minimally invasive procedures (intrauterine balloon tamponade) and progresses to more invasive procedures (uterine artery embolization) until hemorrhage is controlled.

The obstetric provider should initiate a sequence of non operative and operative interventions for control of PPH and promptly assess the success or failure of each measure.

Pharmacologic agents

Agent	Dose	Contraindication
Oxytocin*	20 u/L IV60drip/min up to 3Lor10 u im	No bolos iv
Methyl ergonovin**	0.2 mg IM(q15min to2-4 h up to 5 doses)	HTN Cardiac dis. PET
PG 15Methyl F2α	0.25 mg IM(q15- 90min up to 2 mg) No iv	Asthma, Active cardiac, pulmonary and liver disease
ProstaglandinE2	20 mg PR or Vag.	
Misoprostol*** (PGE1)	800-1000micgr rectal Single dose	
Recombinant FactorVIIα RFVIIα	90micgr/kg	Plate<50000 Fibrinogen<1gr/L Abnormal PT Ph<7.2 BT<35
Tranexamic Acid?		





**B-Lynch C
Keith L. et al
A textbook of
postpartum
hemorrhage**

**Guidelines for
Immediate
action
In postpartum
hemorrhage**

Placental remove



Inflate up to 500 ml

**Remove after
24 hours use**

Following a vaginal delivery and atonic postpartum hemorrhage, unresponsive to uterotonics, and before interventional radiological procedures or surgical interventions, such as the B-Lynch suture, or iliac artery ligation or hysterectomy is considered.

It can be used during or after Cesarean section and in a woman with vaginal birth after previous Cesarean section with postpartum hemorrhage.

A Sengstaken tube, Rüsch balloon, Bakri balloon – or even an inflated condom if nothing else is available – can be used.

3-4 no:16 Folly catheter with 60-80cc inflated bag with normal saline. Deflate balloon 4-24 h later during day time



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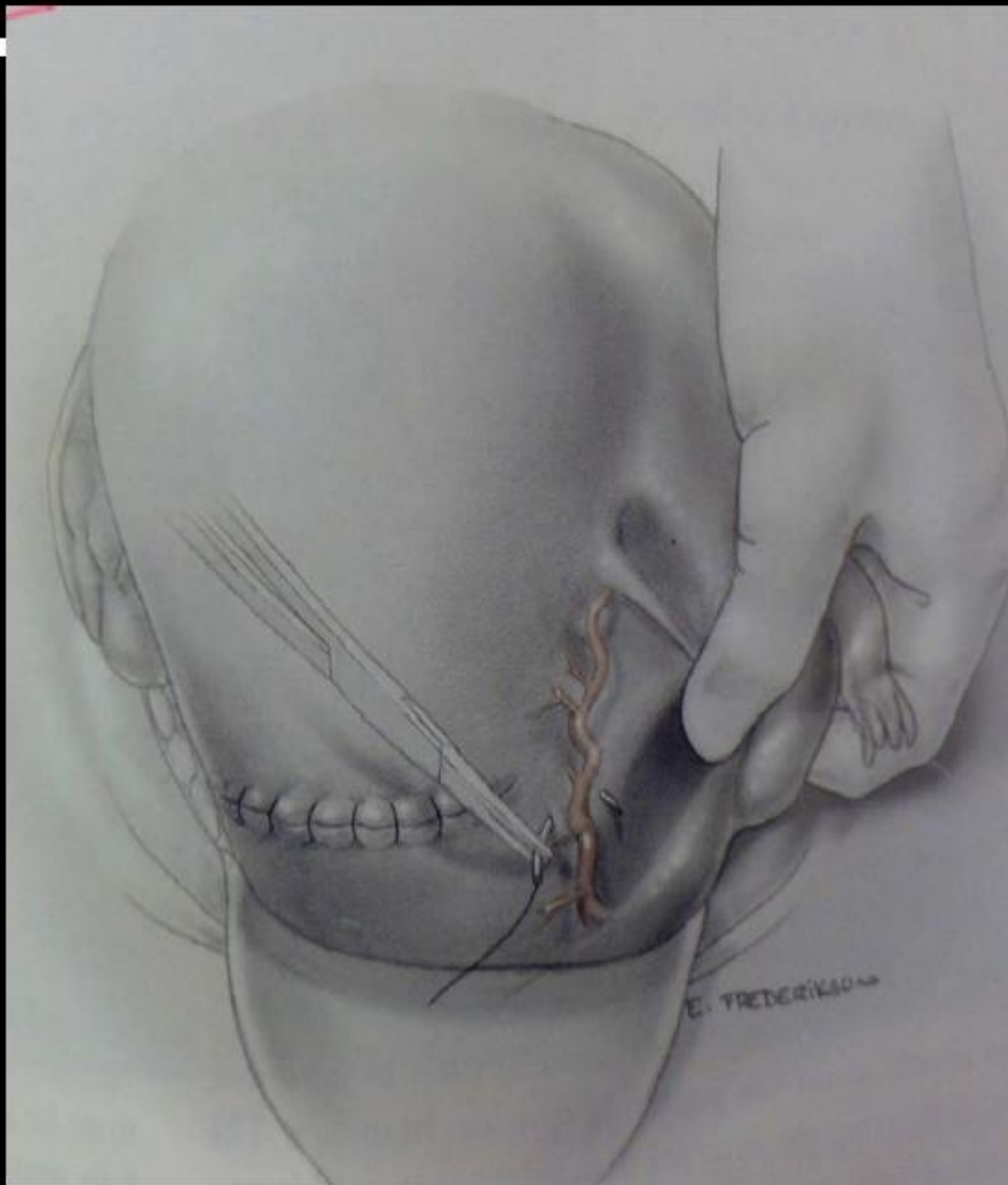
Early administration of tranexamic acid, an antifibrinolytic drug, can reduce death due to bleeding in women with PPH related to atony or trauma.

Approach to hemodynamically unstable patients

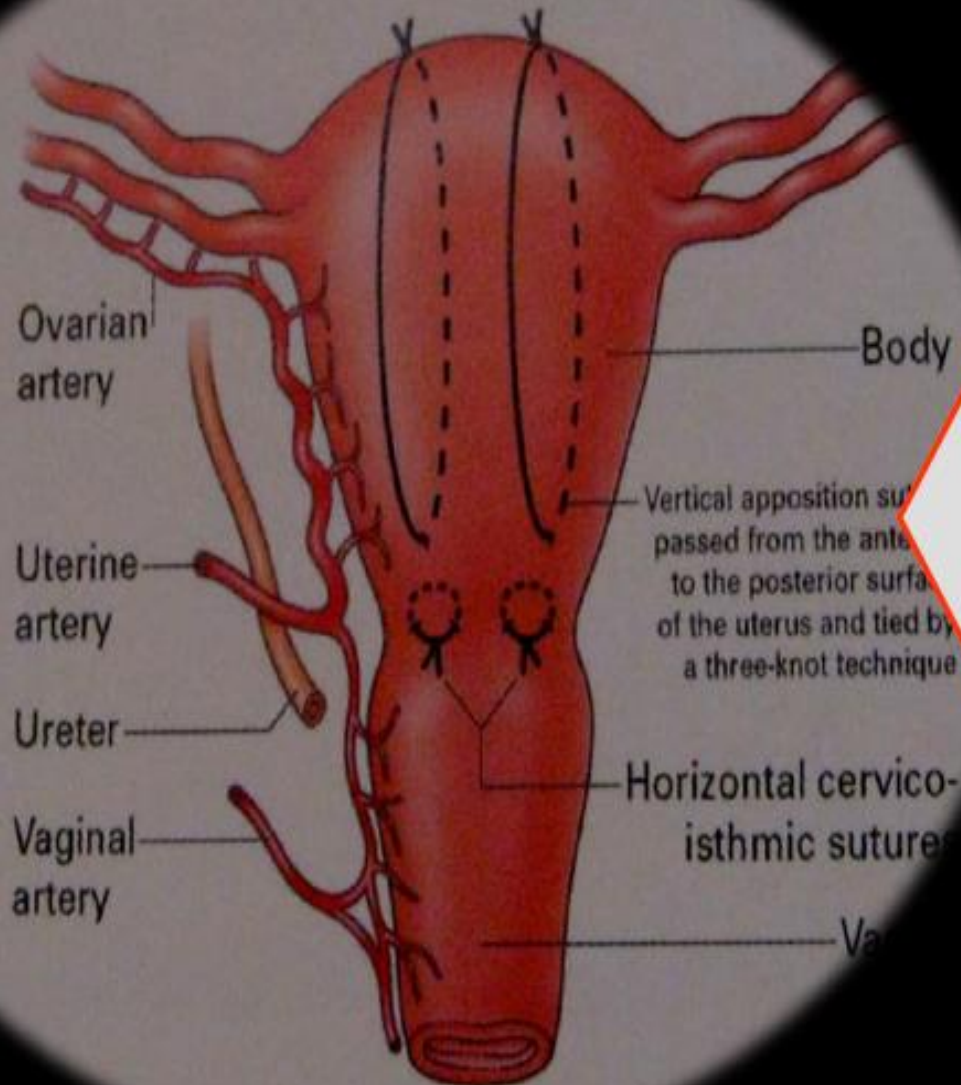
Hypovolemic hemorrhagic shock is treated with aggressive volume resuscitation with **packed red cells** and other appropriate blood products. Transfusion should keep up with blood loss, with early activation of a protocol for large volume transfusion in those patients with heavy bleeding.

early recourse to **intrauterine balloon tamponade** can be useful to decrease ongoing uterine blood loss following vaginal delivery or after the abdomen is closed following cesarean delivery.

In those women who continue to bleed at the time of cesarean and the abdomen is still open, compression sutures and devascularization are more easily accomplished than placing a tamponade balloon, and if all else fails **hysterectomy** remains the definitive treatment.

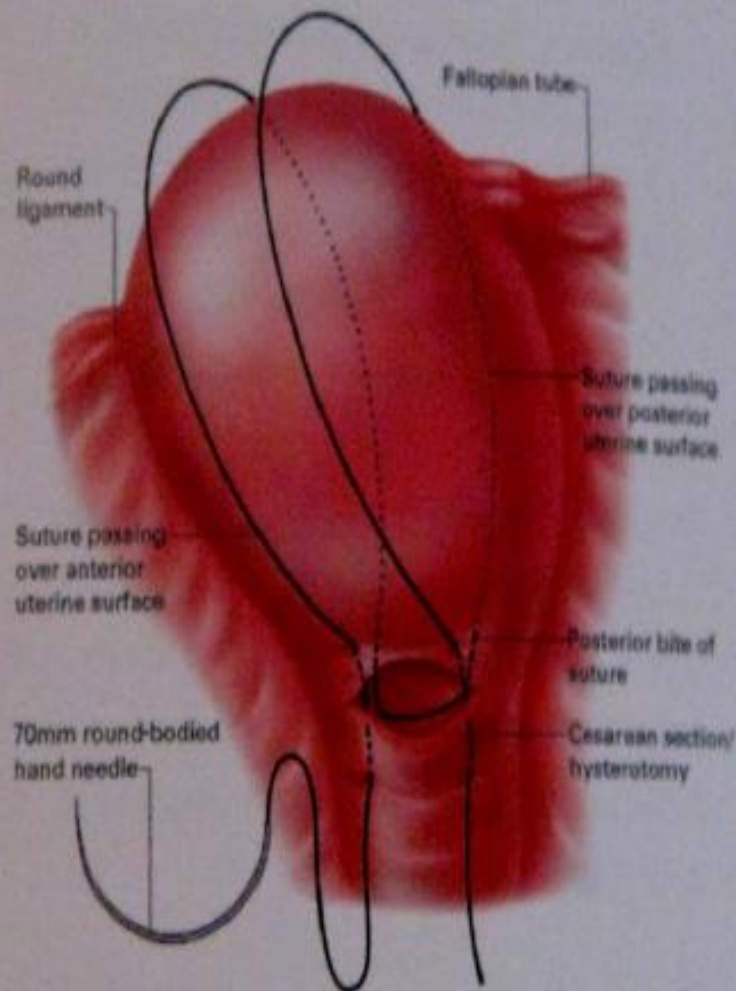


without opening the uterus.



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If the patient is coagulopathic with an extremely low fibrinogen level (50 to 100 mg/dL), cryoprecipitate and/or other high-concentration fibrinogen products (fibrinogen concentrate) are indicated.

MORBIDITY AND MORTALITY

Maternal mortality after PPH averages approximately 2 percent.

Death rates vary from 0.6 percent in the United Kingdom to 20 percent in parts of Africa.

from 1 in 100,000 deliveries in the United Kingdom versus 1 in 1000 deliveries in parts of the developing world.

the frequency of **transfusion** in PPH deliveries was **16** percent in 2014.

3.5 percent of women underwent peripartum **hysterectomy** because of PPH.

0.3 percent of women with PPH had **thromboembolic event** (deep vein thrombosis, pulmonary embolus, stroke, myocardial infarction) within 42 days of delivery.

Thromboembolism prophylaxis

transfusion is an independent risk factor for development of thromboembolism.

women who have been transfused for PPH should receive mechanical thromboprophylaxis.

Twelve to 24 hours after bleeding has been controlled, pharmacologic thromboprophylaxis should be added.

Sheehan syndrome

Sheehan syndrome (postpartum hypopituitarism) is a **rare** but potentially life-threatening complication. The pituitary gland is enlarged in pregnancy and prone to infarction from hypovolemic shock.

Damage to the pituitary can be mild or severe, and can affect the secretion of one, several, or all of its hormones.

A **common presentation** is a **combination of failure to lactate post delivery and amenorrhea or oligomenorrhea**, but any of the manifestations of:

hypopituitarism (hypotension, hyponatremia, hypothyroidism) can occur any time from the immediate postpartum period to years after delivery.

Asherman syndrome

Development of intrauterine adhesions (termed Asherman syndrome) can lead to **menstrual** abnormalities and **infertility**. Approximately **90** percent of cases of severe intrauterine adhesive disease are related to **uterine curettage** for pregnancy complications, such as PPH .

Uterine compression sutures used to treat PPH have also been associated with the development of intrauterine adhesions.

Postpartum anemia

Postpartum anemia can also be defined as a hemoglobin level of <11 g/dL at one week postpartum and <12 g/dL at eight weeks postpartum.

RECURRENCE

Women with a prior PPH have as much as an **18 percent** risk of recurrence in a subsequent pregnancy.

PPH alone is not a strong indication for screening for inherited bleeding diatheses.

unexplained PPH that does not respond to general measures should alert clinicians to the possibility of a **bleeding disorder** as a causative factor.

THANK YOU FOR YOUR ATTENTION

