PPH

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- PPH==➔ obstetric emergency

- one of the top five causes of maternal mortality

- first 24 hours after delivery ➔primary or early PPH

- from 24 hours to 12 weeks after delivery ➔secondary, late, or delayed PPH

- World Health Organization:
- Blood loss ≥500 mL within 24 hours after birth.
- Severe PPH: Blood loss ≥1000 mL within the same time frame.

- American College of Obstetricians and Gynecologists

- Cumulative blood loss ≥1000 mL
- blood loss accompanied by signs,symptoms of hypovolemia within 24 hours regardless of route of delivery

- Royal College of Obstetricians and Gynaecologists
- Minor PPH (500 to 1000 mL)
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- major PPH (>1000 mL) :
- moderate (1001 to 2000 mL)
- severe (>2000 mL).

PHYSIOLOGIC MECHANISMS THAT LIMIT POSTPARTUM BLOOD LOSS

- • mechanical : Contraction of the myometrium

- • clotting: Local decidual hemostatic factors,systemic coagulation factors

CAUSES OF POSTPARTUM HEMORRHAGE

- **Focal or diffuse atony**

- The most common cause of PPH is uterine atony

- diffuse atony→greater than observed because a flaccid and dilated uterus may contain a significant amount of blood

- focal localized atony→difficult to appreciate on abdominal examination, but may be detected on vaginal examination.

Coagulopathy or other bleeding diathesis

- inherited or acquired bleeding diathesis

- result of PPH → severe reduction of clotting factors due to persistent heavy bleeding

- **Trauma** :
- Lacerations
- including uterine rupture
- surgical incisions

- VON Willebrand disease ➔typically increase during pregnancy, decline rapidly after delivery

- Acute acquired coagulopathies ➔amniotic fluid embolism
- placental abruption
- preeclampsia with severe features
- HELLP syndrome

ASSESSMENT OF SEVERITY OF HEMORRHAGE

Symptoms related to blood loss with postpartum hemorrhage

Blood loss, % (mL)	Blood pressure, mmHg	Signs and symptoms
10 to 15 (500 to 1000)	Normal	Palpitations, lightheadedness, mild increase in heart rate
15 to 25 (1000 to 1500)	Slightly low	Weakness, sweating, tachycardia (100 to 120 beats/minute)
25 to 35 (1500 to 2000)	70 to 80	Restlessness, confusion, pallor, oliguria, tachycardia (120 to 140 beats/minute)
35 to 45 (2000 to 3000)	50 to 70	Lethargy, air hunger, anuria, collapse, tachycardia (>140 beats/minute)

- A low fibrinogen level (less than 200 mg/dL)➔predictive of severe PPH ➔transfusion of multiple units of blood and blood products➔ angiographic embolization
- surgical management of hemorrhage
- maternal death.

- reduction in blood pressure → late sign of severe PPH → up to 25 percent of a patient's blood volume (≥1500 mL in pregnancy)

- Hemoglobin and hematocrit → poor indicators of acute blood loss → not decline immediately after an acute bleed

Assessment and management of riskAssessment

- hospitals use an evidence-based assessment tool :

- determining maternal hemorrhage risk:
- on admission to the labor and delivery unit
- on admission to the postpartum unit

- many women without risk factors → severe PPH (40 percent in one study
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- high-risk women do not →hemorrhage

risk classification for patients admitted to the labor unit

- ·**Low risk** (transfusion preparation: clot only)

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

- **Medium risk** (transfusion preparation: type and screen)
- -Prior uterine surgery
- ->4 previous vaginal deliveries
- -Multiple gestation
- -Large fibroids
- -Chorioamnionitis
- -History of PPH

- **High risk** (transfusion preparation: type and crossmatch)
- -Morbidly adherent placenta or placenta previa or low lying placenta
- -Hematocrit <30 percent and other risk factors
- -Active bleeding (greater than show) at admission
- -Known coagulopathy
- -Platelet count <100,000

increased risk for PPH

- prolonged second stage of labor, prolonged oxytocin administration for induction or augmentation of labor
- active bleeding
- chorioamnionitis
- assisted vaginal delivery (vacuum or forceps), emergency cesarean birth
- retained placenta.

Management

- ensuring availability of resources :

- Personnel
- uterotonic and other medications
- equipment for control of bleeding
- adequate intravenous access
- topical hemostatic agents
- blood products.

- Routine prophylactic use of uterotonic drugs :
- oxytocin alone or in combination with misoprostol, reduces the risk of PPH by at least 30 percent in the overall obstetric population

- Prophylactic administration of tranexamic acid is under investigation

PPH protocols and algorithms

- Each hospital labor and delivery unit should have a PPH protocol
- The protocol :
- evaluating and monitoring the patient with PPH
- multidisciplinary team
- treatment

- Massive transfusion (MT) ➔severe PPH and can be facilitated by use of an algorithm specific to the hospital.
- MT protocols should include specific recommendations for empiric calcium replacement, potassium monitoring (hyperkalemia), and core body temperature management. Calcium is often necessary in severe PPH due to the citrate used for anticoagulation in blood products

- Rapid infusion is important to manage hypovolemia, which will hamper efforts to reverse coagulopathy, but rapid infusion of cold fluids can lead to substantial heat loss
- Direct warming of fluids should occur during resuscitation

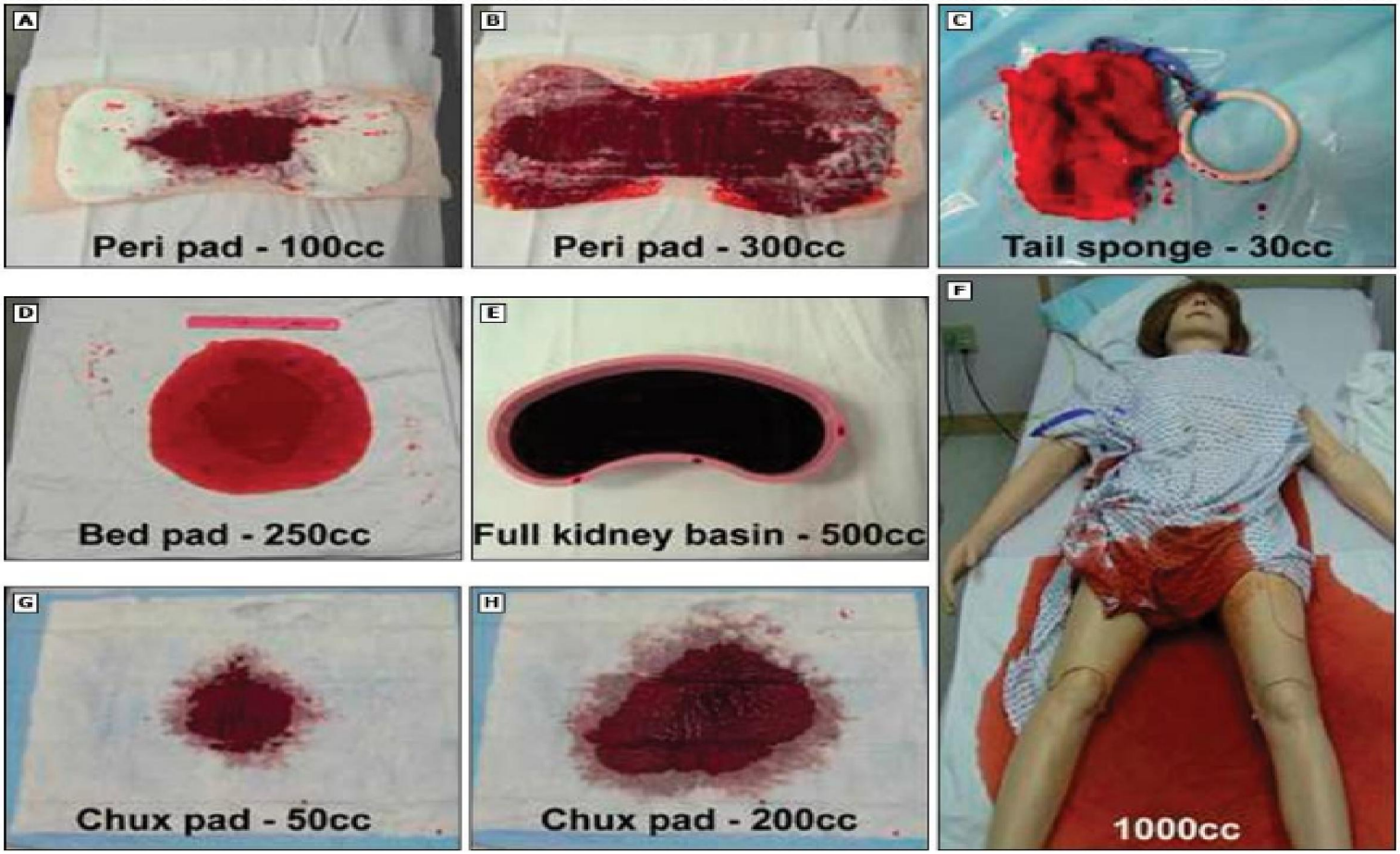
Quantify blood loss

- Recommended for all births:

- Delay in the recognition of significant blood loss is a common finding in cases of maternal morbidity and mortality from hemorrhage

- **Volumetric measurement**

- ●**Visual aids** the size and appearance of blood on specific surfaces (maternity pad, bed sheet, lap sponge)


A
Peri pad - 100cc
B
Peri pad - 300cc
C
Tail sponge - 30cc
D
Bed pad - 250cc
E
Full kidney basin - 500cc
F
1000cc
G
Chux pad - 50cc
H
Chux pad - 200cc

Gravimetry

- Measure the total weight of bloody materials and subtract the known weight of the same materials when dry. The difference in weight between wet and dry in grams approximates the volume of blood in milliliters.

Timely diagnosis and early intervention

- Determining the cause
- Initiating treatment
- as almost 90 percent of deaths due to PPH occur within four hours of giving birth

Teamwork

- Obstetricians
- midwives
- nurses
- anesthesiologists
- hematologists,
- blood bank personnel
- laboratory medicine
- surgical subspecialists (eg, vascular, urology
- interventional radiologists

Monitor bleeding, vital signs, and laboratory results

- Close maternal monitoring
- bedside evaluation
- Laboratory evaluation :
- complete blood count, coagulation studies, potassium and ionized calcium levels

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

- coagulopathic =extremely low fibrinogen level (50 to 100 mg/dL):
- cryoprecipitate
- fibrinogen products
- fresh frozen plasma alone will not increase the fibrinogen level to the normal range

control bleeding based on severity of obstetric hemorrhage

- Get help and notify obstetric hemorrhage team.
- Continue to monitor vital signs and quantify blood loss.
- Ensure intravenous access with a large gauge catheter

- bimanual uterine massage
- Increase oxytocin flow rate (avoid direct intravenous injection of undiluted oxytocin).
- Volume resuscitation, preferably with blood and blood products if bleeding is heavy and coagulopathy is imminent.
- Give a second uterotonic (eg, methylergonovine, carboprost tromethamine).

- Examine for lacerations, retained products of conception, uterine inversion
- Consider bedside ultrasound of uterus
- If cesarean delivery: Apply conservative surgical interventions to control bleeding (eg, uterine artery/ovarian artery ligation, uterine compression sutures)

- Insert intrauterine balloon for tamponade.
- Transfuse two units packed red cells and one to two units fresh frozen plasma
- Activate a massive transfusion protocol if bleeding is heavy and transfusion of four or more units of blood is likely

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- If vaginal delivery→to an operating room
- selective arterial embolization only if patient is hemodynamically stable.
- If cesarean delivery: Continue to apply conservative surgical interventions to control bleeding (eg, uterine artery/ovarian artery ligation, uterine compression sutures)

- Oxytocin10 to 40 units in 500 to 1000 mL normal saline infused at a rate sufficient to control atony or 10 units IM

- Tranexamic acid1 g (10 mL of a 100 mg/mL solution) is infused over 10 to 20 minutes; if bleeding persists after 30 minutes, a second

- ErgotsMethylergonovine 0.2 mg IM every two to four hours or ergometrine 0.5 mg IV or IM or ergonovine 0.25 mg IM or IV every two hours
- Carboprosto0.25 mg IM every 15 to 90 minutes up to eight doses or 500 mcg IM incrementally up to 3 mg or 0.5 mg intramyometrial

- Misoprostol800 to 1000 mcg rectallyDinoprostone20 mg vaginally or rectally every two hours
- Recombinant human Factor VIIa50 to 100 mcg/kg every two hours

- **Surgical interventions**
- Repair lacerations
- Curettage
- Uterine compression suture (eg, B-Lynch suture)
- Uterine artery ligation
- Utero-ovarian artery

- Internal iliac artery (hypogastric artery) ligation
- Aortic/iliac artery compression
- Hysterectomy,supracervical,total

- **Blood bank**
- Packed red blood cells
- Platelets
- Fresh frozen plasma
- Cryoprecipitate


THANK
YOU