



# POSTPARTUM HEMORRHAGE MANAGEMENT

FLAME LECTURE: 131A

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# LEARNING OBJECTIVES



- ▶ Identify the risk factors for postpartum hemorrhage
- ▶ Develop an evaluation and management plan for the patient with postpartum hemorrhage, including consideration of various resource settings
- ▶ Prerequisites:
  - ▶ FLAME LECTURE 131A: PPH – Evaluation
- ▶ See also – for closely related topics
  - ▶ FLAME LECTURE 131B: PPH – Massive Transfusion Protocol

# STAGING PPH

Postpartum hemorrhage management is dependent on the stage a patient falls into:

<b>STAGE 0</b>
EBL is <500mL after vaginal delivery or 1000mL after C-section
<b>STAGE 1</b>
EBL is >500mL after SVD or 1000mL after C/S w/ continued bleeding
Vital Signs: HR $\geq$ 100bpm, BP $\leq$ 85/45, O <sub>2</sub> sat <95%
Symptomatic: pallor, delayed cap refill, decreased urine output
<b>STAGE 2</b>
EBL is 1000-1500mL with continued bleeding
<b>STAGE 3</b>
EBL is >1500mL with continued bleeding

# INITIAL EVALUATION

- ▶ You are called to a post-partum hemorrhage! Many hospitals have a protocol set up for these scenarios to refer to, however there are common steps:
  - ▶ 1. Physician should introduce oneself upon entering the room and find the patient's nurse
  - ▶ 2. The primary nurse provides a SBAR on the patient and scenario. This should include who the patient is, pertinent positives in her past medical, surgical, and obstetric history as well as details of her delivery including EBL and complications. Important allergies, blood consent status, review of vital signs and CABs, and pre-examination assessment of bleeding should be immediately discussed as you are preparing to start your full examination for the bleeding source
  - ▶ 3. Most places will have a hemorrhage cart ready for these scenarios. Ask for the hemorrhage cart, more nurses and an anesthesiologist to be in the room, and assign roles:
    - ▶ Patient's primary nurse should stay with the patient, be the physician's primary assistant with interventions (ex. preparing Bakri), and be performing and calling out serial vital signs
    - ▶ Another nurse/anesthesiologist should be in charge of drawing meds and having them ready
    - ▶ Another nurse should be in charge of ensuring there are two working IVs and drawing labs
    - ▶ Another nurse or tech should be in charge of recording the blood loss quantitatively
    - ▶ The charge nurse should be clearing future barriers such as opening an operating room, calling the blood bank to apprise them of the situation, and recruiting further staff as needed

# INITIAL EVALUATION

- ▶ Examine perineum, vagina, and peri-urethral area for lacerations
- ▶ Bimanual massage & palpation of uterus
  - ▶ If soft, enlarged, and boggy → likely uterine atony
  - ▶ If firm uterus → more likely cervical/vaginal laceration
- ▶ If source of bleeding still unclear:
  - ▶ Optimize visual field
    - ▶ Patient positioning, adequate operative assistance, good lighting, appropriate instrumentation, and adequate anesthesia
  - ▶ Manual examination of uterus for retained POC (+/- bedside sono)
  - ▶ Re-exploration for deeper lacerations / hematoma
    - ▶ Hematomas are most commonly in vaginal wall, however, retroperitoneal hematomas can bleed excessively without blood loss being visualized and may not be able to be diagnosed without diagnostic imaging

# POSTPARTUM HEMORRHAGE MGMT

## STAGE 0 MANAGEMENT

- ▶ Immediately after delivery, all women should have received active management preventative measures, including:
  - ▶ Oxytocin (10 units IV or IM)
  - ▶ Vigorous fundal massage for 15 seconds minimum
    - ▶ Some studies suggest this reduced PPH but research is inconclusive
    - ▶ However, it is common practice following every delivery because can also assess uterine tone during massage
  - ▶ Examination of placenta to ensure that it was delivered intact, no retained POCs
    - ▶ Quantify blood loss for all stages
    - ▶ This ensures that next stage in management is not delayed

# POSTPARTUM HEMORRHAGE MGMT

## STAGE 1 MANAGEMENT

- ▶ Stage 1 means that active management measures have failed, the patient has lost at least 500cc of blood loss, and is still bleeding
- ▶ Activate hemorrhage protocol, call for help, and start with CAB's!
  - ▶ Circulation: Place 2 large-bore IVs
  - ▶ Airway: evaluate airway competence, provide airway protection as necessary
  - ▶ Breathing: evaluate ventilation status (especially if O<sub>2</sub> sat decreased), provide adequate ventilation
    - ▶ Supplemental O<sub>2</sub> 5-7 L/min by tight face mask
- ▶ Clear barriers for transfusion (because preparing products takes time!)
  - ▶ Ensure at least 2 units of pRBCs are type and crossed, and are being prepared
- ▶ Empty the bladder
- ▶ Ensure adequate anesthesia
- ▶ Etiology-specific management

# POSTPARTUM HEMORRHAGE MGMT

## STAGE 2 MANAGEMENT

- ▶ We will discuss etiology specific management to follow, however Stage 2 means these measures are failing, she has 1000-1500 EBL now, and is still bleeding
- ▶ Move to operating room
- ▶ Ensure anesthesia is now present with you if they weren't already
- ▶ Transfuse 2 Units PRBCs per clinical signs
- ▶ Consider thawing 2 Units FFP
- ▶ Order CBC, PT/INR/PTT, Fibrinogen\*\*\* *These werent done already?*
- ▶ Warm blood products and infusions to prevent hypothermia, coagulopathy and arrhythmias
- ▶ Continue medical management PRN and start performing mechanical or surgical measures like *intrauterine tamponade*, and early use of B-lynch sutures to try prevent escalation to hysterectomy

# POSTPARTUM HEMORRHAGE MGMT

## STAGE 3 MANAGEMENT

- ▶ We have reached >1500cc of blood loss, and are still bleeding!
- ▶ Activate massive transfusion protocol (MTP): Standard pack includes:
  - ▶ Packed Red Blood Cells
  - ▶ Fresh Frozen Plasma
  - ▶ Platelets
- ▶ Obtain CBC, PT/INR/PTT, and fibrinogen every 4 hours after the standard MTP "Pack" is given. Laboratory studies should be monitored for at least 24 hours after discontinuing the protocol.
- ▶ 10 units cryoprecipitate should be given for fibrinogen <100mg/dl
- ▶ If bleeding continues after 2 MTP packs have been administered, or women is refusing transfusions (e.g. Jehovah's Witness), consider recombinant factor VII - 60 mcg/kg (though high risk of thrombosis)
- ▶ Surgical intervention or Interventional radiology if stable enough. If unstable, and no hope of becoming stable with surgical management, patient should be managed in ICU with continued massive transfusion protocol

# ETIOLOGY SPECIFIC INTERVENTIONS

## UTERINE ATONY

- ▶ Stage 1 = Medical management:
  - ▶ Increase Oxytocin drip and give extra 1L NS or LR. Up to 25% of patients will need a supplemental uterotonic agent
  - ▶ Methylergonovine (Methergine): 0.2mg given IM q2-4hrs
    - ▶ Contraindicated in *hypertensive* pts
  - ▶ Prostaglandin F2 (Carboprost/Hemabate): 250 mcg IM or intramyometrial q15-90min
    - ▶ Contraindicated in *asthmatic* pts
  - ▶ Prostaglandin E2 suppositories (Misoprostol/Cytotec): 1000mcg per rectum
    - ▶ Onset of action ~30 minutes
- ▶ Stage 2-3 = Surgical interventions:
  - ▶ Intrauterine balloon (Bakri balloon)
  - ▶ B-lynch suture
  - ▶ Embolization of pelvic arteries
  - ▶ Hysterectomy

# ETIOLOGY SPECIFIC INTERVENTIONS

## ▶ RETAINED PRODUCTS OF CONCEPTION:

- ▶ Manual evacuation of uterus +/- bedside ultrasound
- ▶ Bedside dilation & curettage (i.e with Banjo curette or large oval forceps)
- ▶ If placental tissue is adherent or difficult to extract, suspect accreta
- ▶ No clear evidence in support of antibiotic coverage, however can be considered

## ▶ HEMATOMA:

- ▶ Most common symptoms: rectal/pelvic pain and pressure
- ▶ If patient is hemodynamically stable, hematomas can be managed expectantly
- ▶ Suturing or attempting to drain every hematoma is risky as source of bleeding is often not always identifiable beforehand
- ▶ Packing the vagina for tamponade can be a temporizing measure
- ▶ However if patient becomes unstable, surgical management is necessary
  - ▶ Uterine artery embolization or drainage and packing
  - ▶ Patients can often become unstable hours after delivery as bleeding may not be immediately visualized so they will lose a lot of blood internally before becoming symptomatic

# ETIOLOGY SPECIFIC INTERVENTIONS

## ▶ PLACENTA ACCRETA

- ▶ If accreta suspected (placenta does not detach easily or completely), do not attempt further manual removal
- ▶ Move to OR, consent & plan for hysterectomy
- ▶ Mobilize all teams necessary including anesthesia, gynecologic oncology if needed for surgical assistance, and active massive transfusion protocol

## ▶ UTERINE RUPTURE:

- ▶ Move to OR if not there already
- ▶ Surgical repair of rupture if contained
- ▶ If patient is unstable or bleeding uncontrolled → hysterectomy

# ETIOLOGY SPECIFIC INTERVENTIONS



## ▶ PLACENTAL ABRUPTION:

- ▶ Though we think of this more during the antepartum and partum periods, it can still complicate a postpartum hemorrhage
- ▶ During an abruption, there can be extravasation of blood into the myometrium (Couvelaire uterus) leading to atony as well as causing hypofibrinogenemia and IDC

## ▶ AMNIOTIC FLUID EMBOLISM

- ▶ Very rare, but very dangerous leading to sudden hemodynamic instability, respiratory instability, and DIC
- ▶ This is an all-hands-on-deck emergency requiring immediate activation of massive transfusion protocol, and mobilization of anesthesia and critical care teams

# ETIOLOGY SPECIFIC INTERVENTIONS

## COAGULOPATHY

- ▶ When evaluating the CBC, PT, aPTT, and fibrinogen, clinicians should remember that the results should be interpreted through the filter of the scenario at hand
  - ▶ In the setting of active bleeding or transfusion, equilibrium may not have been reached at the time of evaluation of the results
  - ▶ Thus, these labs should be run serially during and after a hemorrhage
- ▶ Clot observation test
  - ▶ Not typically performed with current lab resources, however is a simple modality that should be remembered and considered
  - ▶ Collect 5mL of patient's blood and place it in a simple tube. Normally, blood will clot within 8-10 minutes and remain intact
  - ▶ If fibrinogen is low (<150 mg/dL), it will either not clot at all, or if it does, it will undergo dissolution in 30-60 minutes
- ▶ While conditions such as vWF or hemophilias can increase risk of postpartum hemorrhage, DIC, TTP, and HUS should all be considered during continues and catastrophic hemorrhages

# ETIOLOGY SPECIFIC INTERVENTIONS

## UTERINE INVERSION

- ▶ When the uterine corpus descends to or through the cervix
- ▶ Risk Factors: Fundal placenta, Uterine Atony, Placenta Accreta, Excessive traction on cord during placental delivery
- ▶ Prevention: continuous suprapubic pressure during placental delivery
- ▶ Management:
  - ▶ Immediately attempt manual replacement of uterus (even if placenta still attached)
  - ▶ Uterine relaxants (nitroglycerin, halogenated general anesthetics, magnesium sulfate, terbutaline) to aid uterine replacement
  - ▶ If unsuccessful then laparotomy indicated to assist in replacing uterus
  - ▶ After replacement, uterotonic agents (oxytocin) or intrauterine balloons can be used to prevent reinversion and slow down bleeding

# NON-SPECIFIC PPH MANAGEMENT

## ▶ Medical management

- ▶ Tranexamic acid (TXA): antifibrinolytic, prevents clots from breaking down
- ▶ Has been shown to reduce mortality from postpartum hemorrhage
- ▶ Should be considered with EVERY postpartum hemorrhage. 1-2g IV over 10 minutes.

## ▶ Tamponade:

### ▶ Foley catheter:

- ▶ Insert into uterus and fill bulb with a max of 60mL of saline (can place multiple catheters)
- ▶ Advantage: Readily available due to common use as urine catheter and in labor induction

### ▶ Bakri balloon:

- ▶ Insert into uterus and fill with 300-500mL of saline
- ▶ Advantage: can hold much more saline than foley, better tamponade

### ▶ Uterine packing:

- ▶ Typically layered into the cornu of the uterus via ringed forceps, can be soaked in thrombin

# NON-SPECIFIC PPH MANAGEMENT

## ▶ Surgical management:

### ▶ Uterine artery embolization

- ▶ Stable patient w/ continued bleeding unresponsive to medical management or tamponade
- ▶ Method: Interventional Radiology uses fluoroscopy to visualize bleeding source and coagulates vessel with gels or coils
  - ▶ Absorbable gel is reduces risk of infertility
- ▶ Median success rate of 80-89%; 15 % of patients go on to need hysterectomy
- ▶ Complication rate (DVT, uterine necrosis, peripheral neuropathy) < 5%
- ▶ Future complications (Preterm birth, IUGR) appear to be similar to that of the general population

# NON-SPECIFIC PPH MANAGEMENT

## ▶ Surgical management:

### ▶ Vascular ligation

- ▶ Goal is to decrease pulse pressure of blood flowing to the uterus
- ▶ If after a vaginal delivery, a vertical midline skin incision will provide better visualization
- ▶ First goal is ligate uterine arteries (O'Leary sutures) or place suture around the vessels of the utero-ovarian ligaments
- ▶ Next, internal iliac/hypogastric arteries can be ligated via a retroperitoneal approach
  - ▶ Notably, the more distal the artery, the less side effects or complications
  - ▶ With the success and safety profile of UAE, as well as decreasing physician comfort with these techniques, they are becoming less commonly used

# NON-SPECIFIC PPH MANAGEMENT

## ▶ Surgical Management:

### ▶ Uterine compression sutures

- ▶ B-Lynch is the most common (other modalities include Cho and Hayman)
- ▶ Using 1 Chromic gut, the uterine fundus is anchored to cervix and then “folded” to provide further compression in the setting of atony
- ▶ 60-75% success rate

### ▶ Hysterectomy

- ▶ Last resort as it leads to sterility and has complications (bladder/ureter injury risk)
- ▶ In emergent setting, on hysterectomy approach is not preferred over others

# COMPLICATIONS

- ▶ Hypovolemic shock and organ failure
- ▶ Sheehan Syndrome (postpartum hypopituitarism)
  - ▶ Commonly presents as failure to lactate, amenorrhea/oligomenorrhea postpartum; can also have hypotension, hyponatremia, hypothyroidism
  - ▶ Due to hypoperfusion of pituitary gland
- ▶ Abdominal Compartment Syndrome
  - ▶ Organ dysfunction caused by intraabdominal HTN
  - ▶ Will present as tensely distended abdomen with progressive oliguria
- ▶ Acute blood loss anemia
  - ▶ After stabilization and resolution of hemorrhage, general rules for mgmt are:
    - ▶ Hgb <7 + symptoms: transfuse 1u PRBCs
    - ▶ Hgb <7 + asymptomatic or >7 + symptoms: IV Iron supplementation
    - ▶ Hgb >7 + asymptomatic: PO Iron supplementation

# IMPORTANT LINKS & REFERENCES

1. ACOG Practice Bulletin 183: *Postpartum Hemorrhage* 2017
2. California Maternal Quality Care Collaborative (CMQCC): Obstetric Hemorrhage Version 2.0 Task Force *Planning for and Responding to Obstetric Hemorrhage*. 2015
3. Callahan T, Caughey A. (2013). Postpartum Care and Complications. In *Blueprints obstetrics & gynecology* (6th ed., pp. 162-165). Philadelphia: Wolters Kluwer Health/Lippincott William & Wilkins.
4. Toy EC, Baker B, Ross PJ, Jennings JC. (2009). Postpartum Hemorrhage. In *Case Files Obstetrics and Gynecology* (4th ed., pp. 66-68). McGraw-Hill Publishing.
5. UpToDate:
  - ▶ Overview of postpartum hemorrhage.
  - ▶ Management of postpartum hemorrhage at vaginal delivery.
  - ▶ Management of postpartum hemorrhage at cesarean delivery.