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# ANMC Obstetric Hemorrhage Guidelines

## Epidemiology and Significance

Postpartum hemorrhage (PPH) is an excessive amount of PP bleeding. It is traditionally defined as the loss of more than 500 milliliters of blood following spontaneous vaginal delivery, or greater than 1000 milliliters of blood at Cesarean delivery. PPH is considered severe when blood loss exceeds 1000 milliliters or results in hemodynamic instability. This definition may result in overestimation or underestimation of blood loss. An alternate definition of PPH is a decline of hemoglobin by 10%. This definition may be confounded by other conditions leading to hemodilution or hemoconcentration. PPH may be best defined as excessive, symptomatic PP bleeding.

PPH occurs in up to 18 percent of births. Even with appropriate management, 3 percent of vaginal deliveries will result in severe PPH. The most common cause of PPH is uterine atony.

Complications include orthostatic hypotension, anemia, and fatigue, making maternal care of the newborn more difficult. Postpartum anemia increases the risk for postpartum depression. Transfusion may be necessary and carries associated risks. In the most severe cases, hemorrhagic shock may lead to posterior pituitary ischemia with delay or failure of lactation (Sheehan's Syndrome), occult myocardial ischemia, dilutional coagulopathy, and other significant morbidities can also occur.

PPH is the most common maternal morbidity in developed countries and the most common cause of maternal mortality worldwide.

## Mnemonic for the Specific Causes of PPH – The Four Ts

| | | |
|---|---|---|
| Tone | (Atonic uterus) | 70 percent |
| Trauma | (Lacerations, hematomas, inversion, rupture) | 20 percent |
| Tissue | (Retained tissue, invasive placenta) | 10 percent |
| Thrombin | (Coagulopathies) | 1 percent |

## Prenatal Assessment & Planning

- **Identify and prepare for patients with special considerations:** Placenta Previa/Accreta, Bleeding Disorder, or those who Decline Blood Products
- **Screen and proactively treat severe anemia:** if oral iron fails, initiate IV Iron Sucrose guideline to reach desired Hgb/Hct, especially for at risk mothers.

## Admission Hemorrhage Risk Factor Evaluation

### Low (Clot only)

No previous uterine incision
Singleton pregnancy
≤4 previous vaginal births
No known bleeding disorder
No history of PPH

### Medium (Type and Screen)

Prior cesarean birth(s) or uterine surgery
Multiple gestation
>4 previous vaginal births
Chorioamnionitis
History of previous PPH
Large uterine fibroids
Estimated fetal weight greater than 4 kg
Morbid obesity (BMI >35)
Prolonged labor, 2nd stage
Recent anticoagulation
(Note if patient declines blood products)

### High (Type and Crossmatch)

Placenta previa
Suspected placenta accreta
Hematocrit <30 AND risk factors
Platelets <100,000
Active bleeding on admit
(greater than show)
Known coagulopathy, or current/
active anticoagulation

# Admission Assessment & Planning

**Verify Type & Antibody Screen** from prenatal record
***If not available***,
- Order Type & Screen

***If prenatal or current antibody screen positive (if not low level anti-D from Rho-GAM)***,
- Type & Crossmatch 2 units PRBCs

***All other patients***, Evaluate for ***Risk Factors***
- Send Clot to blood bank

***Identify*** women who may decline transfusion
- Notify OB provider for plan of care
- Early consult with OB anesthesia
- Utilize Blood Product Education Tool

***If medium risk***:
- Order Type & Screen

***If high risk:***
- Order Type & Crossmatch 2 units PRBCs
- Place TWO (2) large-bore (18g) IVs
- Notify OB Anesthesia
- Assess the need to prepare additional resources (OR, Rapid Response, Back-up OB, etc)
- Review ANMC Massive Blood Transfusion Protocol Definitions:

**Massive Blood Transfusion Protocol, "MBT" Immediate, "MBTP":**

The highest level of response to patient condition (e.g. massive blood loss accompanied by hemorrhagic shock and/or metabolic acidosis/base deficit and/or hypothermia).

Upon initiation of protocol, **6 Units of PRBC** will be Emergency Released **and other blood products will be provided according to protocol without requiring specific physician order.**

This is referred to as a **"Push"** system.

**Standby Blood Transfusion:**

Intermediate level of response to patient condition (e.g. need for administration of 2 units estimated blood transfusion, decreasing H&H with continued blood loss, or a coagulopathy.

Blood products will initially be **prepared to issue upon request** by physician or surrogate including: **2 RBC, 2 FFP and 1 pack or platelets.** Then **to be followed with a "Stay Ahead" policy of 2RBC, 2 FFP and 1 pack of platelets**. This may be modified according to orders.

This is referred to as a **"Pull"** system.

The blood bank must be notified for transition between the 2 levels of transfusion. Once deemed appropriate, the MBTP must be discontinued by primary physician.

# Ongoing Risk Assessment

- **Evaluate for development of additional risk factors in labor**:
  - Prolonged 2nd Stage labor
  - Prolonged oxytocin use
  - Active bleeding
  - Chorioamnionitis
  - Magnesium sulfate treatment
- **If increased Risk level, convert Type & Screen to Type & Crossmatch**

# All Births: Prevention & Recognition of OB Hemorrhage

**Active Management of Third Stage**

- Oxytocin infusion: Oxytocin (Pitocin) 30 units in 500 mL NS via infusion pump, titrate infusion rate to uterine tone; or 10 units IM; do not give oxytocin as IV push
- Vigorous **fundal** massage for at least 15 seconds

**Ongoing Quantitative Evaluation of Blood Loss**

- Using formal methods, such as graduated containers, visual comparisons and weight of blood soaked materials (**1gm = 1ml**)

**Ongoing Evaluation of Vital Signs**

**If: Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S –OR**
**Vital signs >15% change or HR ≥110, BP ≥85/45, O2 sat <95% -OR**
**Increased bleeding during recovery or postpartum,**
**proceed to Basic Management of OB PPH**

# OB Post-Partum Hemorrhage, Basic Management

Cumulative Blood Loss >500ml vaginal birth or >1000ml C/S –or
Vital signs >15% change or HR ≥110, BP ≥85/45, O2 sat <95% -or
Increased bleeding during recovery or postpartum
(formerly Level IIa)

**MOBILIZE**

**Primary nurse**, **Physician or Midwife** to:

- Activate OB Hemorrhage Guideline and Checklist (as follows)

**Primary nurse** to:

- Notify in-house obstetrician
- Notify charge nurse
- Assess the need to prepare additional resources (OR, Rapid Response, Back-up OB, etc)

**ACT**

**Primary nurse**:

- Establish IV access if not present, at least 18 gauge
- Increase IV fluids rates (Lactated Ringers preferred) and increase Oxytocin rate (500 mL/hour of 30 units in 500 mL NS via infusion pump); Titrate Oxytocin infusion rate to uterine tone
- Continue vigorous fundal massage
- Administer Methergine 0.2 mg IM per guideline (if not hypertensive); give once, if no response, move to alternate agent (Table 1); if good response, may give additional doses q 2 hr
- Vital Signs, including O2 sat & level of consciousness (LOC) q 5 minutes
- Weigh materials, calculate and **record** cumulative blood loss q 5-15 minutes

- Administer oxygen to maintain O2 sats at >95%
- Empty bladder: straight cath or place Foley with urimeter
- Type and Crossmatch for 2 units Red Blood Cells
- Keep patient warm

**Physician or midwife:**
- Rule out retained Products of Conception, laceration, hematoma (Think 4 Ts)

**Surgeon (if cesarean birth and still open)**
- Inspect for uncontrolled bleeding at all levels (inc broad ligament, posterior uterus, and retained placenta, et al)

**THINK**

Consider potential etiology: 4 T's
- Uterine atony
- Trauma/Laceration
- Retained placenta
- Amniotic Fluid Embolism
- Uterine Inversion
- Coagulopathy
- Placenta Accreta
- Uterine Rupture

**Once stabilized:** Modified Postpartum management with increased surveillance

**If: Continued bleeding or Continued Vital Sign instability, and <1500 mL cumulative blood loss, proceed to OB PPH, Severe**

# OB Post-Partum Hemorrhage, Severe

Continued bleeding or Vital Sign instability, and <1500 mL cumulative blood loss
(formerly Level IIb)

**MOBILIZE**

**Primary nurse (or charge nurse):**
- Call in house obstetrician to bedside
- Initiate OB Hemorrhage Record

**Charge nurse:** (in consultation with in house OB)
- Notify nursing house supervisor who assists charge nurse and clerk/tech with calls/organization
- Notify Anesthesia team
- Notify OR if appropriate
- Prepare to activate L+D STAT Team as needed
- Notify 2nd/back up OB
- Assign single person to communicate with blood bank
- Call medical social worker or assign other family support person

**ACT**

**Team leader** (OB physician):
- Additional uterotonic medication (see Table 1):

Hemabate 250 mcg IM [if not contraindicated]
**OR**
Misoprostol 400-1000 mcg sublingual, oral, buccal, or rectal (or combination)*

o Can repeat Hemabate up to 3 times every 20 min; (note-75% respond to first dose)

*__Misoprostol Pharmacokinetics__
Sublingual or Buccal: Preferred for acute bleeding - rapid onset of effect, prolonged duration of action, and the greatest total bioavailability; additionally, 400mcg dosage has been shown in RCT to have fewer side effects with equivalent efficacy to higher doses and alternate dosing routes. WHO recommends 800mcg sublingual dose and route
Oral: Next line agent for acute bleeding – slower onset than sublingual
Rectal*/ buccal: Helpful in prevention, or for anticipated delayed PPH

*Rectal misoprostol not effective with copious diarrhea from Hemabate

**Do not delay other interventions while waiting for response to medications**
- Bimanual uterine massage
- Pulse Oximetry
- Move to OR in coordination with #2200 (if on postpartum unit, move to L&D or OR)
- **Order Massive Transfusion Labs "MBT Labs"**

(CBC, CMP, PT/PTT, fibrinogen, CMP; type and screen if not already done)
- **Transfuse PRBCs by either:**

**2 Units PRBCs ONLY**
**Or**
initiation of "**Standby Blood Transfusion"**
**including 2 RBC, 2 FFP and 1 pack or platelets**
("PULL" system, intermediate level of response) **based on clinical signs** and response; **do not wait** for lab results

**Primary nurse**:
- Establish 2nd large bore IV, at least 18 gauge. Maintain adequate fluid volume with Lactated Ringers and adequate uterine tone with oxytocin infusion
- Assess and announce Vital Signs and cumulative blood loss q 5-10 minutes
- Set up blood administration set and blood warmer for transfusion
- Administer meds, blood products and draw labs, as ordered
- Keep patient warm

**Second nurse** (or charge nurse):
- Place Foley with urimeter (if not already done)
- Obtain portable light, PPH cart, and PPH Medication Kit
- Obtain blood products from the Blood Bank
- Assist with move to OR in coordination with #2200 (if indicated)

**Blood Bank:**
- Send PRBCs, possibly initiate **Standby Blood Transfusion** ("PULL" system, intermediate level of response)
- Prepare for possibility need of ANMC Massive Blood Transfusion Protocol

**THINK**
**Sequentially advance through procedures** and other interventions based on etiology: 4 Ts

**Vaginal birth**
If **trauma (vaginal, cervical or uterine):**
- Visualize and repair

If **retained placenta**:
- Manual removal and D&C

If unresponsive **uterine atony** or lower uterine segment bleeding:
- Intrauterine Balloon

If **Uterine Inversion**:
- Anesthesia and uterine relaxation drugs for manual reduction
  Nitroglycerin lingual aerosol (1.2%): 2 squirts (0.4 mg per one pump)

**If cesarean delivery**:
- Uterine hemostatic sutures, e.g., B-Lynch Suture, O'Leary, Multiple Squares, etc…
- Intrauterine Balloon

If **Amniotic Fluid Embolism**:
- Maximize respiratory, vasopressor and blood product support

If **vital signs are worse than estimated or measured blood loss**: possible uterine rupture or broad ligament tear with internal bleeding; **move to laparotomy**

If **above measures unproductive:**
**Consider interventional radiology if stable for transfer**

**Once stabilized:** Modified Postpartum management with increased surveillance

**Re-Evaluate Bleeding and Vital Signs**
**If cumulative blood loss >1500ml, >2 units PRBCs given, VS unstable, or suspicion for DIC, proceed to OB PPH, Severe OB Vascular Emergency**

# OB Post-Partum Hemorrhage, Severe OB Vascular Emergency

**Cumulative blood loss >1500ml, >2 units PRBCs given, VS unstable or suspicion for DIC (formerly Level I OB Hemorrhage)**

**MOBILIZE**
**Nurse or Physician:**
- **Activate ANMC Massive Blood Transfusion Protocol**

**("MBT Immediate" is an immediate response from Blood Bank with "PUSH" system)**
- 2nd/Back up OB readily available (in consultation with in house OB)

**Charge Nurse or designee:**
- **Activation of L+D STAT Team for OB Vascular Emergency**
- **Rapid Response called**
- **Anesthesia team notified**
- **Operating Room staff notified**
- **2nd/back up OB called to present L+D**
- **Notify nursing house supervisor notified, present to L+D to assist charge nurse**
- Reassign staff as needed
- Continue OB Hemorrhage Record
  (In OR, anesthesia will assess and document VS)
- If transfer considered, notify ICU

**Blood Bank:**
- Activate ANMC Massive Blood Transfusion Protocol

("MBT Immediate" with "PUSH" system)
- Prepare to issue additional blood products as needed – **stay ahead**

**ACT**

**Establish team leadership and assign roles**

**Team leader** (OB physician + anesthesia)

- **Order Massive Transfusion Pack "MBT Pack"**
(RBCs + FFP + 1 pheresis pack PLTS)
- **Order repeat Massive Transfusion Labs "MBT Labs"**
(CBC, CMP, PT/PTT, fibrinogen, CMP; type and screen if not already done)

- **Move to OR** in coordination with #2200, if not already there
- Pulse Oximetry

**Anesthesiology** (as indicated):
- Pulse Oximetry vs Arterial blood gases
- Central hemodynamic monitoring
- CVP or PA line
- Arterial line
- Vasopressor support
- Intubation

**Primary nurse and Transfusionist:**
- Announce VS and cumulative measured blood loss q 5-10 minutes
- Apply upper body warming blanket if feasible
- Use fluid warmer and/or rapid infuser for fluid & blood product administration with assistance from Transfusionist activated from MBTP (ICU, ER, and/or OR nursing staff)
- Apply sequential compression stockings to lower extremities
- Circulate in OR

**Second nurse and/or anesthesia:**
- Continue to administer meds, blood products and draw labs, as ordered

**Third Nurse (or charge nurse):**
- Recorder

**THINK**
- **Interventions based on etiology not yet completed, (Think 4 Ts)**
- **Prevent hypothermia, Acidemia**

**Conservative or Definitive Surgery:**
- Uterine Artery Ligation
- B-Lynch Suture
- Multiple Squares, or other hemostatic suture techniques
- Hypogastric Artery Ligation
- Hysterectomy

**Unresponsive Coagulopathy:**
- After 8-10 units PRBCs and coagulation factor replacement may consider risk/benefit of **rFactor VIIa**

- **Selective Embolization if stable for transfer**

**Once Stabilized:**
- Modified Postpartum Management
- Consider notification of/transfer to ICU
- Cessation of Massive Transfusion Protocol: Once deemed appropriate, the MBTP must be discontinued by primary physician

**Table 1**

## UTEROTONIC AGENTS for POSTPARTUM HEMORRHAGE

| Drug | Dose | Route | Frequency | Side Effects | Contraindic. |
|---|---|---|---|---|---|
| Pitoci□ (Oxytocin) 10 units/ml | 30 units per 500 ml NS, rate titrated to uterine tone | IV infusion | Continuous | Usually none<br>Nausea, vomiting, hyponatremia "water intoxication" with prolonged IV admin. decr BP and incr HR with high doses, esp IV push | Hypersensitivity to drug |
| Methergine (Methylergo-nivine) 0.2mg/ml | 0.2 mg | IM (**not** given IV) | -Q 2-4 hours<br>-If no response after first dose, it is unlikely that additional doses will be of benefit | Nausea, vomiting<br>Severe hypertension esp. with rapid administration or in patients with HTN | HTN, Heart disease<br>Hypersensitivity to drug<br>**Caution** if multiple doses of ephedrine have been used, may exaggerate hypertensive response w/possible cerebral hemorrhage |
| Hemabate (15-methyl PG F2a) 250mcg/ml | 250 mcg | IM or intramyo-metrial (**not** given IV) | -Q 15-90 min<br>-Not to exceed 8 doses/24 hrs<br>-If no response after 3 doses, it is unlikely that additional doses will be of benefit. | Nausea, vomiting, Diarrhea, Fever (transient), Headache Chills, shivering Hypertension Bronchospasm | Caution with hepatic disease, asthma, HTN active cardiac or pulmonary disease Hypersensitivity to drug |
| Cytotec (Misoprostol) 100 or 200mcg Tablets | 400-1000mcg | Sublingual, oral, buccal, rectal* or combination | One time | Nausea, vomiting diarrhea, Shivering Fever (transient) Headache | Rare<br>Known allergy to prostaglandin Hypersensitivity to drug |

*__Misoprostol Pharmacokinetics__
SL or Buccal: Preferred for acute bleeding - rapid onset, prolonged duration, greatest bioavailability; 400mcg SL = fewest side effects and equivalent efficacy to higher doses; WHO recommends 800mcg SL; PO: 2nd line for acute bleeding, slower onset than SL; PR: Helpful in prevention, or for anticipated delayed PPH; *PR not effective if copious diarrhea from Hemabate

**Table 2**

# BLOOD PRODUCTS

**For Resuscitation: Proactively Transfuse Based on Vital Signs, Blood Loss**
**KEY: HIGH RATIO of FFP to RBC***
**Either: 6:4:1 PRBCs: FFP: Platelets***
**Or: 4:4:1 PRBCs: FFP: Platelets***

| | |
|---|---|
| **Packed Red Blood Cells (PRBC)** | |
| *(approx. 35-40 min. for crossmatch—assuming no sample is in the lab and assuming no antibodies are present)* | Best first-line product for blood loss<br>1 unit = 450ml volume<br>If antibody positive, may take 1-24 hrs. for crossmatch |
| Transfuse O Negative blood if you cannot wait | 1 unit=450 ml volume and typically increases Hct by 3% |
| **Fresh Frozen Plasma (FFP)** | |
| *(approx. 35-45 min. to thaw for release)* | Highly desired if >2 units PRBCs given, or for prolonged PT, aPTT >1.5x control<br>1 unit = 180ml volume and typically increases Fibrinogen by 10mg/dL |
| **Platelets (PLTS)** | |
| | Priority for women with Platelets <50,000<br>Single-donor Apheresis unit (= 6 units of platelet concentrates) provides 40-50k transient increase in platelets |
| **Cryoprecipitate (CRYO)** | |
| *(approx. 35-45 min. to thaw for release)* | Priority for women with Fibrinogen levels <80<br>10 unit pack typically raises Fibrinogen 80-100mg/dL<br>Best for DIC with low fibrinogen and don't need volume replacement<br>Caution: 10 units come from 10 different donors, so infection risk is proportionate. |

*In cases where high risk of coagulopathy exist (for reasons other than dilutional), attempts to mimic whole blood ratios seem to be supported. In other cases, direction of component therapy by explicit assessment of coagulopathy by either specific clinical or lab criteria is preferred. If bleeding and replacement go on long enough, factor replacement due to dilution will eventually be needed.

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