

Postpartum Hemorrhage -Maternity Safety Package

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Definition- Why It Matters

- Postpartum Hemorrhage (PPH) is a life-threatening **Obstetrical Emergency**
- cumulative blood loss greater than or equal to 1,000 mL or blood loss accompanied by signs or symptoms of hypovolemia within 24 hours after the birth process (includes intrapartum loss) regardless of route of delivery
 - Change from the previous defined amount
 - Raise suspicion after 500cc blood loss
 - Objective point of clinical significance
 - Hypovolemia → tachycardia and hypotension → 25% blood loss
- Top 5 causes of maternal related mortality in high and low income countries
- 30% of maternal mortality in Africa and Asia

PPH United States

- Single greatest cause for maternal mortality in the United States
- Incidence rate 2.9% of all births (125,000 cases annually)
- Incidence has risen by 26% (1994-2006)
- Maternal mortality has decreased
- A leading cause for morbidity and mortality is failure to recognize

Safety Motherhood Initiative

- In 2013, the American College of Obstetricians and Gynecologists/District II (NYS, Bermuda) incorporated 117 hospitals to begin a voluntary program that would decrease morbidity and mortality related to the three specific causes
 - Postpartum Hemorrhage
 - Hypertensive Emergencies
 - Thrombo-embolic Disease
- In 2013, NYS ranking was 48/50 (among the states in the union). Currently the ranking now stands at 30/50.
- 98% of the 117 hospitals involved noted that the SMI had a direct impact on practice improvements.

PPH Ukraine

- Definition 500cc blood loss
- #1 cause of pregnancy related death in Ukraine
- Incidence rate 10% (Ministry of Health 2016)
- Maternal Mortality rate is 3-4x greater than other EU nations (USAID)
- MMR secondary to PPH is 1-2% (ministry of health)...accurate?
- Why?
 - Failure to recognize...
 - Adoption of "alternative technique"
 - ...resources???

Objectives

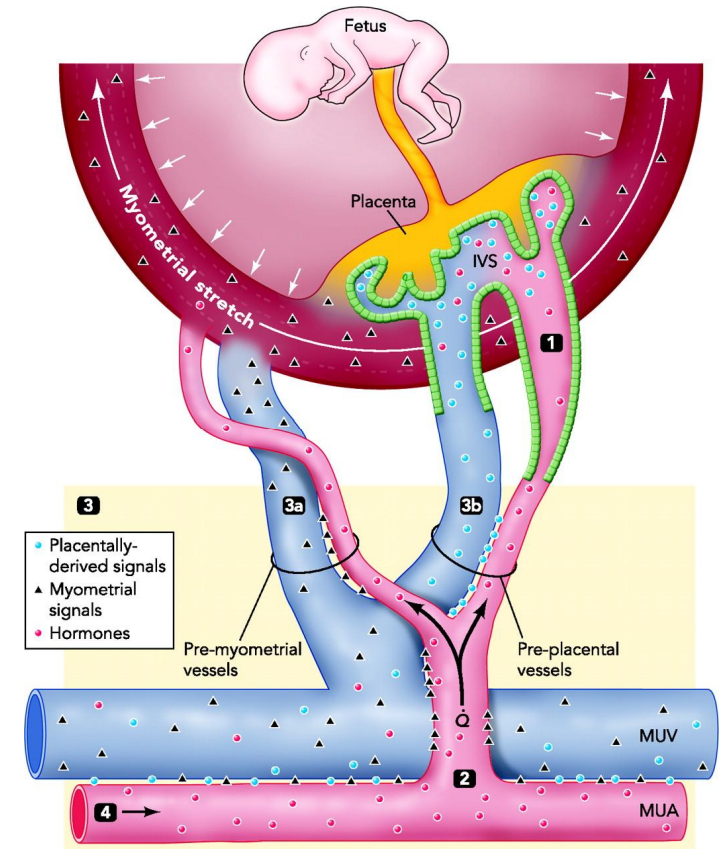
- Pathophysiology
- Etiology
- Risk Assessment
- Preparation
- Response
- Report/Systems Learning

Pathophysiology

Mechanism

- hemostasis is controlled by a combination of two mechanisms:
 - Contraction of the myometrium, which compresses the blood vessels
 - Local decidual hemostatic factors (tissue factor, type-1 plasminogen activator inhibitor, systemic coagulation factors [eg, platelets, circulating clotting factors]),

Uterine artery blood flow is 500 to 700 mL/min



Etiology

Primary (Early <24h)

- Uterine Atony
- Lacerations
- Retained Placenta
- Abnormal Placentation
- Coagulopathy
- Uterine Inversion

Secondary (Late >24h-6w)

- Subinvolution
- Retained Products
- Infection
- Inherited Coagulation Deficiencies (Von Willebrand Disease)






Risk Assessment

- Suspected previa/accreta/increta/percreta
- Pre-pregnancy BMI >50
- Clinically significant bleeding disorder
- Other significant medical/surgical risk

*(consider patients who decline transfusion)****

 **Transfer to appropriate level of care for delivery *****

Risk Assessment- When to Deliver?

- Placenta accreta  Deliver 34 0/7-35 6/7 wks
- Placenta previa  Deliver 36 0/7-37 6/7 wks
- Prior classical cesarean  Deliver 36 0/7-37 6/7wks
- Prior myomectomy  Deliver 37 0/7-38 6/7 wks
- If extensive:  Deliver 36-37 weeks

Risk Assessment- on Admission

Medium Risk

- Previous cesarean, uterine surgery or multiple laparotomies
- Multiple gestation
- Multiparity
- Prior obstetric hemorrhage
- Large myomas
- EFW >4000 g
- Obesity (BMI >40)
- Hematocrit <30% & other risk



**Type and Screen:
Review Protocol**

High Risk

- Active Bleeding
- Placenta Previa
- Placenta Accreta
- Platelet <70,000
- Coagulopathy
- 2 or more medium risks



**Type and Cross
Review
Protocol**

Risk Assessment -Intrapartum

- **Medium Risk**

- Chorioamnionitis
- Prolonged second stage
- Pitocin >24 hours
- Magnesium Sulfate



Type and Screen
Review Protocol

- **High Risk**

- 2 or more Medium Risk
- Active Bleeding



Type and Cross
Review Protocol

Risk Assessment -Placenta Accreta Management

- For those with more than one cesarean delivery, placental location should be documented before delivery
- For those at high risk for placenta accreta
 - Obtain proper imaging to determine risk of abnormal placental implantation
 - Transfer to a facility that is capable of providing appropriate level of care

Active Management -Third Stage of Labor

- Most organizations (Home and Abroad) agree that active management of this stage in labor can reduce risk of PPH by 60% (WHO)
- The three components of active management
 - 1) oxytocin administration
 - 2) uterine massage
 - 3) umbilical cord traction
- Prophylactic oxytocin remains the most effective medication with the fewest adverse effects.
- **The World Health Organization, ACOG, American Academy of Family Physicians, and Association of Women's Health, Obstetric and Neonatal Nurses recommend administering uterotronics (usually oxytocin) after all births for the prevention of postpartum hemorrhage**

Active Management -Third Stage of Labor

- Increase IV Oxytocin rate, 500mL/hour of 10-40 units/500 1000mL solution
- Titrate infusion rate to uterine tone, up to 500mL as needed
- Alternative 10mu IM injection

Preparation- Facilities with Limited Resources

- Centers who do not have the capability to appropriately care for PPH should develop a comprehensive plan for dealing with this obstetric emergency.
- In particular, these centers should consider establishing guidelines regarding appropriate case selection to triage or transfer patients to higher-level centers.
- Developing a comprehensive plan for evaluating and managing obstetric hemorrhage are important for reducing morbidity.

Preparation is Futile

- Despite all the preparation and documentation of potential threats, only a third of PPH cases have identifiable risk factors.

Preparation

Massive Transfusion Protocol (MTP)

In order to provide safe obstetric care institutions must:

- Have a functioning Massive Transfusion Protocol (MTP)
- Have a functioning Emergency Release Protocol (a minimum 4 units of O negative blood)
- Have the ability to obtain 6 units PRBCs and 4 units FFP
 - *(compatible or type specific)* for a bleeding patient
- Have a mechanism in place to obtain platelets and additional products in a timely fashion

Preparation

Protocol Evaluation

Items to be determined before MTP is implemented

- How to activate MTP?
- Blood Bank number and location
- Emergency Release Protocol that all parties understand (blood bank, providers, ancillary staff)
- Blood product transport
- Mechanism for obtaining serial labs (confirm that target therapeutic levels are reached)

Preparation

Massive Transfusion Protocol (MTP)

I. PATIENT CURRENTLY BLEEDING & AT RISK FOR UNCONTROLLABLE BLEEDING

- 1. Activate MTP – call (add number) and say “*activate massive transfusion protocol*”
- 2. Nursing/Anesthesia draw stat labs
 - a. Type & crossmatch
 - b. Hemoglobin and platelet count, PT(INR)/PTT, fibrinogen, and ABG (*as needed*)

II. IMMEDIATE NEED FOR TRANSFUSION (*type and crossmatch not yet available*)

- 1. Give 2-4 units O-negative PRBCs (“OB EMERGENCY RELEASE”)

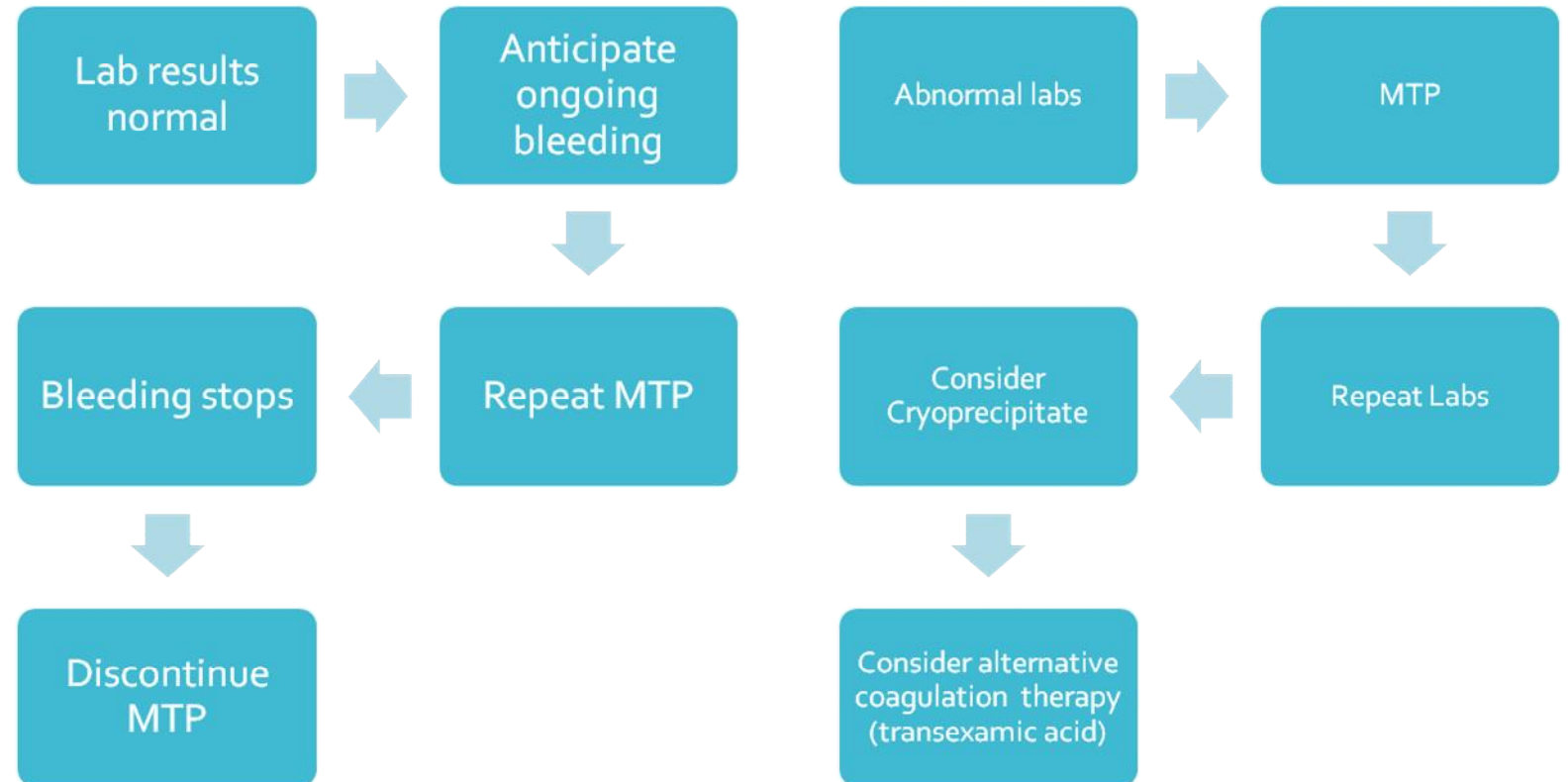
Preparation

Massive Transfusion Protocol (MTP)

III. ANTICIPATE ONGOING MASSIVE BLOOD NEEDS

- OBTAIN MASSIVE TRANSFUSION PACK (consider using coolers);
- administer as needed in the following ratio 6:4:1
 - ✓ 6 units PRBCs
 - ✓ 4 units FFP
 - ✓ 1 apheresis pack of platelets

Preparation Massive Transfusion Protocol (MTP)



RECOMMENDED INSTRUMENTS MEDICATION KIT

(for rapid access to medications)

[] Oxytocin (Pitocin)	10-40 units per 500-1000mL solution	2 pre-mixed bags
[] Oxytocin (Pitocin)	10 units	2 vials
[] 15-methyl PGF ₂ α (Hemabate)	250 micrograms/milliliters	1 ampule *
[] Misoprostol (Cytotec)	200 microgram tablets	5 tabs
[] Methylergonovine (Methergine)	0.2 milligrams/milliliters	1 ampule *

** Needs refrigeration*

RECOMMENDED INSTRUMENTS HEMORRHAGE CART

Vaginal

- Vaginal retractors; long weighted speculum
- Long instruments (*needle holder, scissors, Kelly clamps, sponge forceps*)
- Intrauterine balloon
- Banjo curette
- Bright task light
- Procedural instructions (*balloon*)

Cesarean/Laparotomy

- Hysterectomy tray
- #1 chromic or plain catgut suture & reloadable straight needle for B-Lynch sutures
- Intrauterine balloon
- Procedural instructions (*balloon, B-Lynch, arterial ligations*)

PPH

Response Team



HEMORRHAGE CHECKLIST

RECOGNITION

- Call for assistance (obstetric hemorrhage team)
- Designate
 - Team leader
 - Checklist reader/recorder
 - Primary RN
- Announce
 - Cumulative blood loss
 - Vital signs
 - Determine stage

CHECKLIST: STAGE 1

Blood loss >500 mL vaginal OR blood loss >1000 mL cesarean
WITH NORMAL VITAL SIGNS and LAB VALUES

Initial Steps

- Ensure 16G or 18G IV access
- Increase IV fluid (crystalloid without oxytocin)
- Insert indwelling urinary catheter
- Fundal massage

MEDICATIONS

- Increase oxytocin, additional uterotonics

BLOOD BANK

- Type & crossmatch 2 units RBCs

ACTION

- Determine etiology & treat
- Prepare OR, if clinically indicated

Oxytocin (Pitocin)

10-40 units per 500-1000mL solution

Methylergonovine (Methergine)

0.2 milligrams IM (may repeat)

15-methyl PGF₂ α (Hemabate, Carboprost)

250 micrograms IM (may repeat in q15 minutes, maximum 8 doses)

Misoprostol (Cytotec)

800-1000 micrograms PR

600 micrograms PO or 800 micrograms PL

Tone (i.e., atony)

Trauma (i.e., laceration)

Tissue (i.e., retained products)

Thrombin (i.e., coagulation dysfunction)

Stage 2
EBL >1500 or
>2
Uterotonics
with normal
vital signs

- **INITIAL STEPS** Mobilize additional help
 - Place 2nd IV (16-18G)
 - Draw STAT labs (CBC, PT/PTT/INR, fibrinogen)
 - Prepare OR
- **MEDICATIONS**
 - Continue Stage 1 medications
- **BLOOD BANK**
 - Obtain 2 units RBCs (DO NOT wait for labs. Transfuse per clinical signs/symptoms)
 - Thaw 2 units FFP
- **ACTION**
 - Escalate therapy with goal of hemostasis

CHECKLIST: STAGE 3

EXAMPLE
23

Continued bleeding with EBL >1500 mL OR >2 units RBCs given
OR Patient at risk for occult bleeding/coagulopathy OR
any patient with abnormal vital signs/labs/oliguria

INITIAL STEPS

- Mobilize additional help
- Move to OR
- Announce clinical status
(vital signs, cumulative blood loss, etiology)
- Outline & communicate plan

MEDICATIONS

- Continue Stage 1 medications

BLOOD BANK

- Initiate massive transfusion protocol
(If clinical coagulopathy: add cryoprecipitate, consult for additional agents)

ACTION

- Achieve hemostasis, interventions based on etiology

Oxytocin (Pitocin)

10-40 units per 500-1000mL solution

Methylergonovine (Methergine)

0.2 milligrams IM (may repeat)

15-methyl PGF₂ α (Hemabate, Carboprost)

250 micrograms IM (may repeat in q15 minutes, maximum 8 doses)

Misoprostol (Cytotec)

800-1000 micrograms PR

600 micrograms PO or 800 micrograms PL

CHECKLIST: STAGE 4

Cardiovascular Collapse (massive hemorrhage, profound hypovolemic shock or amniotic fluid embolism)

INITIAL STEPS

- Mobilize additional resources

MEDICATIONS

- ACLS

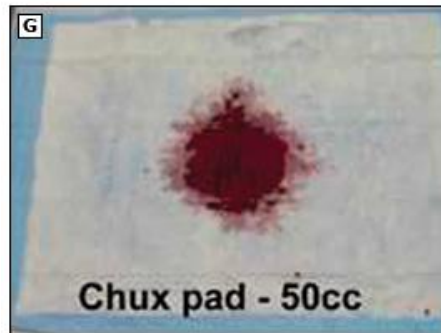
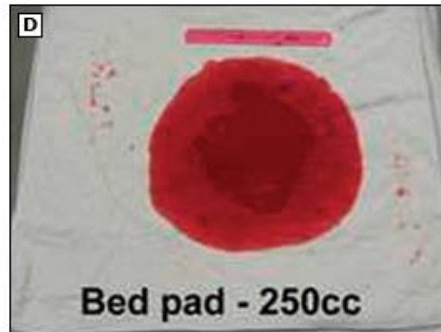
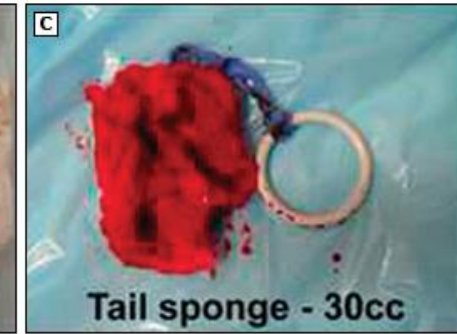
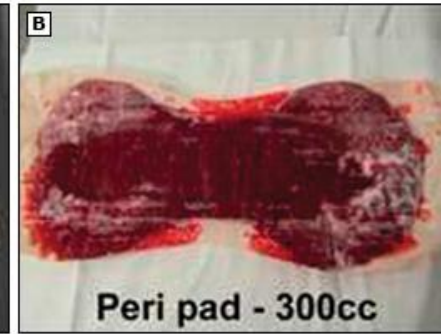
BLOOD BANK

- Simultaneous aggressive massive transfusion

ACTION

- Immediate surgical intervention to ensure hemostasis (hysterectomy)

Estimate Blood Loss



Estimate Blood Loss

- Weight of Laparotomy Pads (Saturated Pad-Clean pad)
 - 1gm=1cc of blood
- Underbuttocks Collection Bag
 - Quantify Fluid Collection before and after delivery of placenta



Post- Hemorrhage Evaluation

- Disposition
- Debrief
 - Obstetrical team
 - Family
- Document

Reporting

- Create an atmosphere that is receptive to discussing high risk cases and post event debriefings
- Multi-disciplinary Review
- Monitor outcomes and performance metrics

Conclusion

- Assess risk for each patient admitted for Labor and Delivery. Anticipate potential for PPH
- Multi-disciplinary approach, especially with a blood bank is vital to success
- Staged checklist/algorithm of appropriate responses to be taken during an emergency situation can help improve outcomes.

References

The American College of Obstetricians and Gynecologists. "Postpartum Hemorrhage." Practice Bulletin, Number 76. October 2006.

The American College of Obstetricians and Gynecologists. "Placenta Accreta ." Committee Opinion, Number 529. July 2012.

<http://tinyurl.com/pf3rweu>

The American College of Obstetricians and Gynecologists. "Postpartum Hemorrhage from Vaginal Delivery." Patient Safety Checklist, Number 10. May 2013. <http://tinyurl.com/kltspw>

Association of Women's Health, Obstetric and Neonatal Nurses (AWHONN). Postpartum Hemorrhage Project: A Multi -Hospital Quality Improvement Program, 2013. <http://www.pphproject.org>

Campbell KH, Savitz D, Werner EF, et al. "Maternal morbidity and risk of death at delivery hospitalization." Obstetrics and Gynecology, 2013(122): pp. 627-33.

Chen M, Chang Q, Duan T, et al. "Uterine massage to reduce blood loss after vaginal delivery." Obstetrics and Gynecology, 2013(122): pp. 290-5.

Guly HR, Bouamra, O, Spiers M, et al. "Vital signs and estimated blood loss in patients with major trauma: Testing the validity of the ATLS classification of hypovolaemic shock." Resuscitation, 2011(82): pp. 556-9.

Lyndon A, Lagrew D, Shields L, Melsop K, Bingham B, Main E (Eds). "Improving Health Care Response to Obstetric Hemorrhage." (California Maternal Quality Care Collaborative Toolkit to Transform Maternity Care) Developed under contract #08-85012 with the California Department of Public Health; Maternal, Child and Adolescent Health Division; Published by the California Maternal Quality Care Collaborative, July 2010.

https://cmqcc.org/ob_hemorrhage

Mutschler M, Nienaber U, Brockamp T, et al. "A critical reappraisal of the ATLS classification of hypovolaemic shock: Does it really reflect clinical reality?" Resuscitation, 2013(84): pp. 309-13.

Parks JK, Elliott, AC, Gentilello LM, Shafi S. "Systemic hypotension is a late marker of shock after trauma: a validation study of Advanced Trauma Life Support principles in a large national sample." The American Journal of Surgery, 2006(192): pp. 727 -31.