

Post partum hemorrhage

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Maternal Health Accelerator



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Disclosures

None

Learning Objectives

- Review **definitions of PPH**.
- Identify the **four primary causes** of PPH (The 4 Ts).
- Identify risk factors of PPH.
- Different medical and surgical management
- **Estimated Blood Loss (EBL)** and **Quantitative Blood Loss (QBL)**.
- List the first-line interventions in PPH emergency.
- How is this integrated in Simulation.



ACOG PRACTICE BULLETIN

Clinical Management Guidelines for Obstetrician–Gynecologists

NUMBER 183, OCTOBER 2017

(Replaces Practice Bulletin Number 76, October 2006)

FACTS:

- MMR decreased from PPH over past 4 decades vs. morbidity
- Still accounts >10% of pregnancy-related deaths.
- Postpartum hemorrhage is excessive bleeding (1,000 mL or greater) within the first 24 hours after birth but can occur up to 12 weeks postpartum, **V/CS** route.
- Most commonly caused by **uterine atony**, accounts for **70-80 percent of cases** and should usually be considered first.



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FACTS



Rates of PPH have continued to increase



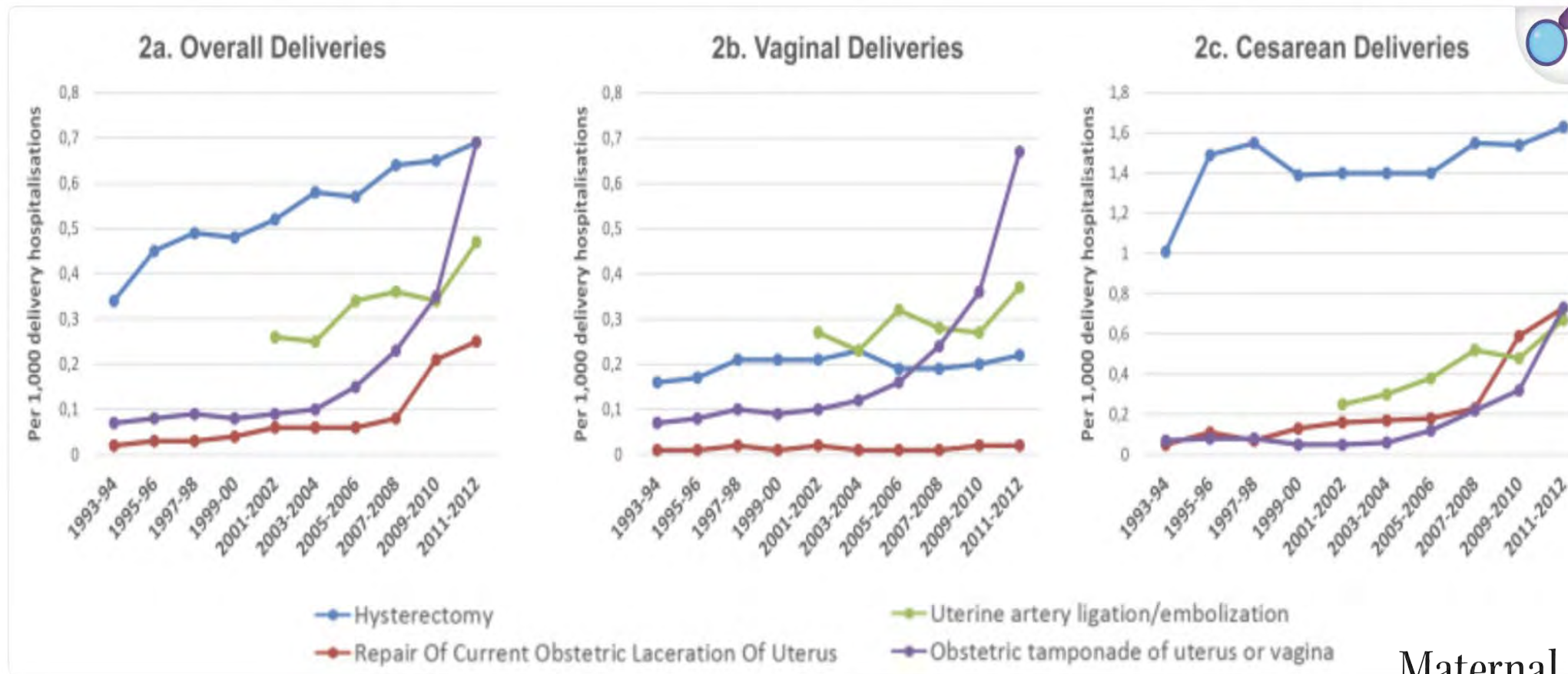
Affected 3% of delivery hospitalizations between 2000 and 2019, with a rate of 4.3% in 2019



Hemorrhage requiring blood transfusion is the leading cause of SMM in the US, closely followed by DIC.

Prevalence of procedures to control postpartum haemorrhage (PPH) per 1,000 delivery hospitalisations, the Nationwide Inpatient Sample, USA Separated into graphs for overall (2a), vaginal (2b) and caesarean deliveries (2c). Ahmadzia HK ET
 AL.Blood Transfus. 2020 July

2001-2012 Nationwide Inpatient Sample of the Healthcare Cost and Utilization Project.



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THE WHY BEHIND OUR TALK...

Postpartum Hemorrhage: WHY?

1. Most common cause of maternal mortality in the world
2. Of more than 7000 pregnancy-related maternal deaths in the United States from 2006 to 2015, hemorrhage was a direct cause in 11 percent
3. One of top 3 causes of maternal mortality in Texas
4. Hemorrhage that leads to blood transfusion is the leading cause of severe maternal morbidity(SMM) in the United States closely followed by disseminated intravascular coagulation

Health Resources and Services Administration (HRSA)



The Alliance for Innovation on Maternal Health (AIM) **started in 2014**, launched by the Health Resources and Services Administration (HRSA) (Maternal and Child Health Bureau) to improve maternal safety by creating and implementing "patient safety bundles" (best practice guidelines) in hospitals, with initial funding awarded to the American College of Obstetricians and Gynecologists (ACOG). The collaboration grew by bringing states and birthing facilities together to adopt these bundles, reducing severe maternal morbidity and mortality through standardized care.

The Alliance for Innovation on Maternal Health, or **AIM**, is a national, cross-sector commitment designed to support best practices that make birth safer, improve maternal health outcomes and save lives.



51

49 Participating States, the
District of Columbia, & Puerto
Rico

2,069

AIM Participating Birthing
Facilities

75%

Percentage of Birthing Facilities
Participating with AIM State &
Jurisdiction Teams



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Obstetric Hemorrhage



- **Patient Safety Bundles**
- Patient Safety Bundles are collections of evidence-informed best practices, developed by multidisciplinary experts, which address clinically specific conditions in pregnant and postpartum women.

Bundle Goals and Components

Obstetric bundle development is founded in evidence-based, best practices

- Delineation of standard of care
- Minimization of variability
- Decreased reliance on memory
- Emphasized patient safety
- Reduction in redundant efforts



Bundle components

Readiness

- Risk assessment processes/ standard work
- Blood bank (Massive transfusion protocol)
- Cart & medication kit
- Hemorrhage team with education & drills for all stakeholders

Recognition & Prevention

- Risk Assessment
- Universal active management of 3rd stage of labor
- Quantitative and cumulative blood loss
- Patient Education

Response

- Medications
- Intrauterine devices
- Blood product replacement
- Compression techniques
- Surgical interventions
- Post-birth support for patient and support network

Reporting & Systems Learning

- Culture of huddles & debriefs
- Multidisciplinary review of serious hemorrhages
- Monitor outcome & process metrics

Respectful Care

- Screening for structural and social drivers of health
- Effective Communication
- Collaboration with patients and their identified support networks

Recommended: Medication Kit Checklist

Medication Kit Checklist	
Medication Kit (For Rapid Access to Medications)	*TXA is not in med kit
Medication Ensure appropriate medication given patient history	Amount
FIRST LINE UTEROTONIC AGENT	
☐ Oxytocin (Pitocin) 10-40 unites per 500- 1000mL solution	2 pre-mixed bags
☐ Oxytocin (Pitocin) 10 units	2 vials
SECOND LINE UTEROTONIC AGENT	
☐ Methylergonovine (Methergine) 0.2 milligrams per mL Avoid with hypertension	1 ampule*
☐ 15- methyl PGF 2a (Hemabate, Carbopost) 250 microgram per mL Avoid with asthma; use with caution with hypertension	1 ampule*
UNCERTAIN USEFULNESS	
☐ Misoprostol (Cytotec) 200 microgram tablets	5 tabs

Misoprostol has equivalent efficacy as IV Pitocin as a first line uterotonic agent and has no additional efficacy when used in addition to standard uterotonics. Given the slow onset of action, consider deprioritizing use of misoprostol in instances of acute PPH.



Women die from postpartum hemorrhage because they do not receive early, effective and aggressive lifesaving treatments.

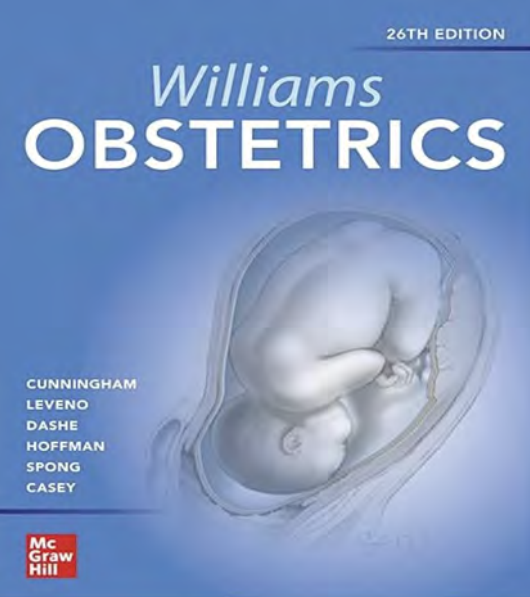


Definition

- **ACOG: Cumulative blood loss $\geq$ 1,000 mL** within 24 hours of delivery, regardless of whether it was a vaginal or C-section birth.
- **OR** blood loss accompanied by **signs of hypovolemia** (low blood volume), such as a rapid heart rate, dizziness, or a drop in blood pressure.
- Traditional definition: SVD $\geq$ 500ml and CS $\geq$ 1000ml.
- In late 2025, the **World Health Organization (WHO)** and other global agencies released updated guidelines advising clinicians to act even earlier—when blood loss reaches **300 mL**—if abnormal vital signs are present, to prevent the situation from becoming critical.

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Cunningham, F. G., Leveno, K. J., Dashe, J. S., Hoffman, B. L., Spong, C. Y., & Casey, B. M. Ch 42. Causes of Obst. Hem. (Eds.). (2022). Williams Obstetrics, 26e. McGraw-Hill Education.

- FACTS
- Blood volume in adults can be crudely estimated as 70 mL/kg in lean men and **60 mL/kg in lean women.**
- An average adult female has about 4 to 4.5 liters of blood.
- In pregnancy: 5-6lit; **600mL/min!**



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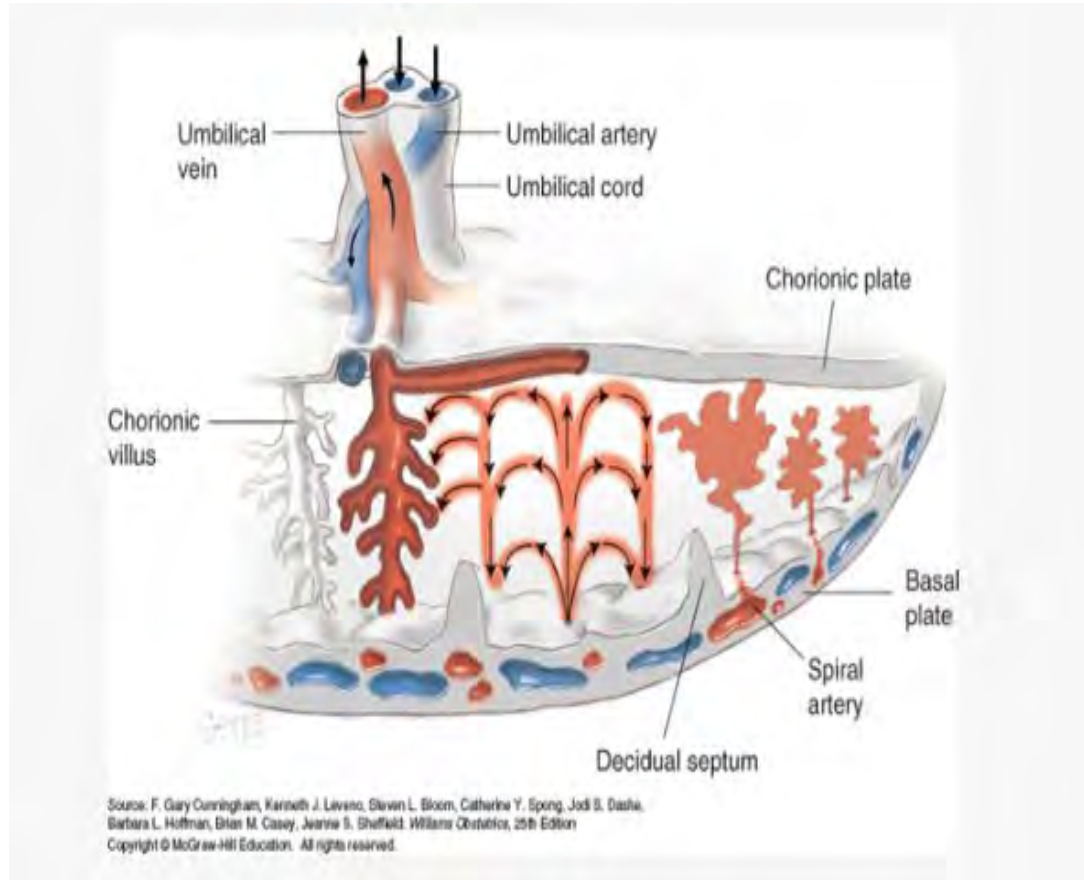
Why do patients bleed after birth?

"Cunningham, F. G., Leveno, K. J., Dashe, J. S., Hoffman, B. L., Spong, C. Y., & Casey, B. M. Ch 42. Causes of Obst. Hem. (Eds.). (2022). **Williams Obstetrics, 26e.** McGraw-Hill Education".

Mechanisms of Normal Hemostasis

Near term, an incredible amount of blood—at least 600 mL/min—flows through the spiral arteries and into the intervillous space (Pates, 2010). Averaging 120 in number, the spiral arteries lack a muscular layer because of their remodeling by trophoblasts and thereby form a low-pressure system. With placental separation, vessels at the implantation site are avulsed. Hemostasis is achieved first by myometrial contraction, which directly compresses the arteries. Compression is followed by clotting and eventually by obliteration of vessel lumens.

If, after delivery, the myometrium contracts vigorously, substantial hemorrhage from the placental implantation site is unlikely. *Importantly, an intact coagulation system is not necessary for postpartum hemostasis unless there are lacerations in the uterus, birth canal, or perineum.* However, fatal postpartum hemorrhage can result from uterine atony despite normal coagulation.



The "4 T's"-----Causes of PPH

Tone (Uterine Atony): 70–80% most common cause of PPH cases. Poor uterine muscle contraction post delivery.

Trauma: 10% Lacerations in the vagina, cervix, or uterus, hematomas, or uterine rupture.

Tissue: 20% retained placenta/membranes or blood clots preventing adequate contraction.

Thrombin: 1% Blood clotting disorders DIC, HELLP, VWD etc...

Tone (Atony)

Primary Problems:

- Atonic uterus
- Over-distended uterus
- Fibroid uterus
- Uterine inversion

Risk Factors/Signs:

- Prolonged oxytocin use
- High parity
- Multiple gestations/Twins
- Macrosomia or Polyhydramnios

Trauma (Genital Tract)

Primary Problems:

- Episiotomy
- Cervical, vaginal, or perineal lacerations
- Uterine rupture

Risk Factors/Signs:

- Operative vaginal delivery
- Precipitous delivery

Tissue (Retained)

Primary Problems:

- Retained placenta
- Placenta Accreta S

Risk Factors/Signs:

- Succenturiate placenta
- Previous uterine surgery
- Incomplete placenta at delivery

Thrombin (Coagulation)

Primary Problems:

- Preeclampsia
- Inherited clotting factor deficiency
- Amniotic fluid embolism (AFE)
- Severe infection or sepsis

Risk Factors/Signs:

- Abnormal bruising/petechia
- Placental abruption
- Fetal death
- Anticoagulation therapy



FACT...600ml/min!

Patient can exsanguinate in 10 minutes.....

The Golden Hour: early recognition in the first 15–30 minutes is critical.



Why should we do in-situ simulation at our hospital?

- **Teamwork and communication errors** are common reasons for poor outcomes and not taught well by lectures.
- Simulations on L&D, in the ED, or postpartum care settings can identify facilities and systems issues **before they cause problems** in real life.
- Studies on sim improve patients' outcomes.

Readiness

Multidisciplinary Simulations

- ✓ Simulations can improve preparedness in emergencies and improve communication and critical reaction time
- ✓ Multidisciplinary simulations- include RNs, anesthesiology, multidisciplinary providers at all levels
- ✓ TeamSTEPPS
- ✓ At regular interval (a minimum of 1-2x/year)

Surgical Management

- Uterine curettage
- Placental bed suture
- Uterine artery ligation
- Uteroovarian ligation
- Repair uterine rupture
- B-Lynch suture, multiple square sutures
- Hysterectomy

Images used with permission from:
FEMALE PELVIC SURGERY VIDEO ATLAS SERIES
Mickey Karam, Series Editor

Management of Acute Obstetric Emergencies
Baha Sibai, MD
[Copyright 2011 by Saunders]



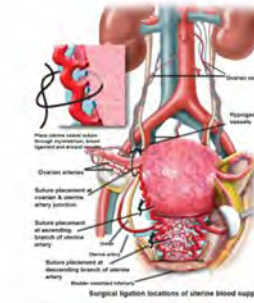
B-Lynch suture



B-Lynch suture



Hayman uterine
compression suture



Surgical ligation locations
of uterine blood supply

OB Hemorrhage Trauma-Informed Care

Provide trauma-informed support for patients, identified support network, and staff for all obstetric hemorrhages, including discussions regarding birth events, follow up care, resources, and appointments.

- Identify cultural/ethnic/language barriers
- Debrief with the patient and their identified support network with appropriate assistance (e.g., translator)
- Establish post-traumatic assessment and support as needed.

Obstetric Hemorrhage Protocol

Stage 1	Implement Stage 1 for any of the following - Blood loss >1,000 mL after vaginal delivery with normal vital signs (VS) and lab values – or – - If using a second non-prophylactic treatment for hemorrhage, eg, misoprostol, TXA, hemorrhage control devices Follow Checklist Items Achieve Hemostasis or Escalate to Next Stage
Stage 2	Escalate to Stage 2 for any of the following - Blood loss >1,000 mL but <1,500 mL - Using >2 uterotonic medications –and– normal VS (no vasopressor support) and lab values If abnormal labs, VS, or >1,500-mL blood loss, immediately complete Stage 2 and Stage 3 Follow Checklist Items Achieve Hemostasis or Escalate to Next Stage
Stage 3	Escalate to Stage 3 for any of the following: - Continued bleeding (EBL/QBL) >1,500 mL - Continued bleeding and 2 units of RBCs given - At risk for occult bleeding/coagulopathy - Any patient with abnormal VS, labs, oliguria Follow Checklist Items Achieve Hemostasis or Escalate to Next Stage
Stage 4	Escalate to Stage 4 with cardiovascular collapse: Massive hemorrhage, profound hypovolemic shock, or amniotic fluid embolism Achieve Hemostasis



Readiness



Rapid response team



Hemorrhage cart



Immediate access to
medication, blood
bank



Unit protocols , drills,
debriefs



READINESS

Every unit

- Hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compressions stitches
- Immediate access to hemorrhage medications (kit or equivalent)
- Establish a response team - who to call when help is needed (blood bank, advanced gynecologic surgery, other support and tertiary services)
- Establish massive and emergency release transfusion protocols (type-O negative/uncrossmatched)
- Unit education on protocols, unit-based drills (with post-drill debriefs)

RECOGNITION & PREVENTION

Every patient

- Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
- Measurement of cumulative blood loss (formal, as quantitative as possible)
- Active management of the 3rd stage of labor (department-wide protocol)

RESPONSE

Every hemorrhage

- Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
- Support program for patients, families, and staff for all significant hemorrhages

REPORTING/SYSTEMS LEARNING

Every unit

- Establish a culture of huddles for high risk patients and post-event debriefs to identify successes and opportunities
- Multidisciplinary review of serious hemorrhages for systems issues
- Monitor outcomes and process metrics in perinatal quality improvement (QI) committee

PATIENT
SAFETY
BUNDLE

Obstetric Hemorrhage

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Recognition and Prevention: every patient



Assess hemorrhage
Risk



Measure CBL



Active management
of 3rd stage of labor



READINESS

Every unit

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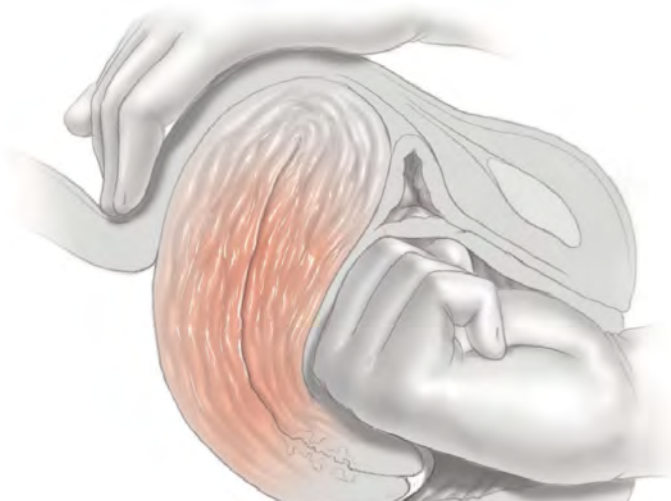
Obstetric Hemorrhage

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Recognition and prevention

Active management of 3rd stage of labor:

- Concurrent administration of a uterotonic agent, as cord is under tension, is another recommended preventive measure.
- Following placental delivery, the fundus is always palpated to confirm that the uterus is well contracted. If it is not firm, vigorous fundal massage usually prevents postpartum hemorrhage from atony (Hofmeyr, 2013).



Response

Stage-based response

Parkland

POST PARTUM HEMORRHAGE (PPH) CHECKLIST

Initial Actions

- ☐ Call for assistance
- ☐ Response team to the bedside
 - Delivering attending MD/CNM
 - Primary RN
 - Anesthesiologist
- ☐ Brief: appoint leader, recorder, nursing roles
- ☐ Identify hemorrhage stage and document EBL & interventions

STAGE 1 PPH

Normal vital signs and lab values:
Blood loss > 500 mL vaginal -OR- blood loss > 1000 mL cesarean

- ☐ Record VS/O₂ saturation every 5 minutes
- ☐ Monitor cumulative blood loss
- ☐ Insert foley catheter
- ☐ Ensure IV access: 18 gauge if possible
- ☐ Increase IV fluid (crystalloid: estimated blood loss in 2:1 ratio without oxytocin)
- ☐ Fundal massage
- ☐ Determine and treat etiology (4 Ts - Tone, Trauma, Tissue, Thrombin)
- ☐ Contact blood bank: type and crossmatch 2 units PRBCs

Medications for Uterine Atony

Oxytocin (Pitocin)	10-40 international units/liter intravenously, or 10 units IM if no IV access
Methylergonovine (Methergine)	0.2 milligrams intramuscularly (may be repeated every 2-4 hours)
15-methyl PGF _{2α} (Hemabate, Carboprost)	250 micrograms intramuscularly (may repeat every 15 minutes, maximum 8 doses)
Misoprostol (Cytotec)	800-1000 micrograms rectally

STAGE 2 PPH

Normal vital signs and lab values:
Continued bleeding with EBL up to 1500 mL OR any patient requiring ≥ 2 uterotonics

- ☐ Obtain 2nd IV access (18 gauge if possible)
- ☐ STAT labs: with coags & fibrinogen
- ☐ Medications: continue medications from Stage 1
- ☐ Transfuse per clinical signs/symptoms
- ☐ Notify blood bank of OB hemorrhage, bring 2 units PRBCs to bedside, thaw 2 units FFP. **DO NOT wait for labs!**
- ☐ For uterine atony → Consider uterine balloon or packing, possible surgical interventions
- ☐ Consider moving patient to OR (better exposure, potential D&C)
- ☐ Mobilize additional team members as necessary
- ☐ Warming blanket

STAGE 3 PPH

Abnormal vital signs/labs/oliguria:
Continued bleeding with EBL > 1500 mL OR > 2 units PRBCs given OR patient at risk for occult bleeding (post-cesarean) & DIC

- ☐ Outline management plan → Serial re-evaluation → Communicate plans with hemorrhage team
- ☐ Transfusion → RBC: FFP: Platelets in a 6:4:1 ratio (active Massive Transfusion Protocol - MTP) → If coagulopathic, add cryoprecipitate. Consider consultation for alternative agents
- ☐ Identify etiology for bleeding (if still unclear)
- ☐ Rule out lacerations (exam), coagulopathy (labs), occult bleeding (imaging)
- ☐ Achieve hemostasis immediately, interventions based on etiology
- ☐ Adopt additional measures (if poor response)

STAGE 4 PPH

Cardiovascular Collapse:
For patients with cardiovascular collapse in setting of massive hemorrhage consider the following etiologies:

- ☐ Profound hypovolemic shock (blood loss not replaced)
- ☐ APE (sudden CV collapse followed by heavy uterine bleeding from uterine relaxation and associated coagulopathy)

- Immediate surgical intervention to ensure hemostasis (hysterectomy) may be necessary.
- Simultaneous aggressive blood and factor replacement & medical interventions initiated regardless of the patient's coagulation status.
- Expeditious hemostasis is the only step that will maximize survival rates for these critical patients.

Post-Hemorrhage Management

- ☐ Debrief with entire care team
- ☐ Document after team debrief
- ☐ Discuss interventions with patient/family members

Post Partum Hemorrhage (PPH) Checklist

Initial Actions

- ☐ Call for assistance
- ☐ Response team to the bedside
 - Delivering attending MD/CNM
 - Primary RN
 - Anesthesiologist
- ☐ Brief: appoint leader, recorder, nursing roles
- ☐ Identify hemorrhage stage and document EBL & interventions

STAGE 1 PPH

Normal vital signs and lab values:

Blood loss > 500 mL vaginal -OR- blood loss > 1000 mL cesarean

- ☐ Record VS/O₂ saturation every 5 minutes
- ☐ Monitor cumulative blood loss
- ☐ Insert Foley catheter
- ☐ Ensure IV access: 18 gauge if possible
- ☐ Increase IV fluid (crystalloid: estimated blood loss in 2:1 ratio without oxytocin)
- ☐ Fundal massage
- ☐ Determine and treat etiology (4 Ts - Tone, Trauma, Tissue, Thrombin)
- ☐ Contact Blood Bank: Type and crossmatch 2 units PRBCs

Medications for Uterine Atony

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15-methyl PGF _{2α} (Hemabate, Carboprost)	250 micrograms intramuscularly (may repeat every 15 minutes, maximum 8 doses)
Misoprostol (Cytotec)	800-1000 micrograms rectally

STAGE 2 PPH

Normal vital signs and lab values:

Continued bleeding EBL up to 1500 mL OR any patient requiring ≥ 2 uterotonics

- ☐ Obtain 2nd IV access (18 gauge if possible)
- ☐ STAT labs: with coags & fibrinogen
- ☐ Medications: Continue medications from Stage 1
- ☐ Transfuse per clinical signs/symptoms
- ☐ Notify blood bank of OB hemorrhage, bring 2 units PRBCs to bedside, thaw 2 units FFP. **DO NOT wait for labs!**
- ☐ For uterine atony → Consider uterine balloon or packing, possible surgical interventions
- ☐ Consider moving patient to OR (better exposure, potential D&C)
- ☐ Mobilize additional team members as necessary
- ☐ Warming blanket

STAGE 3 PPH

Abnormal vital signs/labs/oliguria:

Continued bleeding with EBL > 1500 mL OR > 2 units PRBCs given OR patient at risk for occult bleeding (post-cesarean) & DIC

- ☐ Outline management plan → Serial re-evaluation → Communicate plans with hemorrhage team
- ☐ Transfusion → RBC: FFP: Platelets in a 6:4:1 ratio (active Massive Transfusion Protocol - MTP) → If coagulopathic, add cryoprecipitate. Consider consultation for alternative agents
- ☐ Identify etiology for bleeding (if still unclear)
- ☐ Rule out lacerations (exam), coagulopathy (labs), occult bleeding (imaging)
- ☐ Achieve hemostasis immediately, interventions based on etiology
- ☐ Adopt additional measures (if poor response)

STAGE 4 PPH

Cardiovascular Collapse:

For patients with cardiovascular collapse in setting of massive hemorrhage consider the following etiologies:

- ☐ Profound hypovolemic shock (blood loss not replaced)
- ☐ APE (sudden CV collapse followed by heavy uterine bleeding from uterine relaxation and associated coagulopathy)

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Post-Hemorrhage Management

- ☐ Debrief with entire care team
- ☐ Document after team debrief
- ☐ Discuss interventions with patient/family members

Adapted from ACOG Data & HDB Hemorrhage Checklist

Initial Actions

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- ☐ Response team to the bedside
 - Delivering attending MD/CNM
 - Primary RN
 - Anesthesiologist
- ☐ Brief: appoint leader, recorder, nursing roles
- ☐ Identify hemorrhage stage and document EBL & interventions



Normal vital signs and lab values:

Blood loss > 500 mL vaginal -OR- blood loss > 1000 mL cesarean

- ☐ Record VS/O₂ saturation every 5 minutes
- ☐ Monitor cumulative blood loss
- ☐ Insert Foley catheter
- ☐ Ensure IV access: 16 gauge if possible
- ☐ Increase IV fluid (crystalloid: estimated blood loss in 2:1 ratio without oxytocin)
- ☐ Fundal massage
- ☐ Determine and treat etiology (4 Ts - Tone, Trauma, Tissue, Thrombin)
- ☐ Contact Blood Bank: Type and cross-match 2 units PRBCs

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Medication	Dosage	Prevention	Treatment	Contraindications & cautions	Mechanism of action	Adverse effects	Cost*
First-line agent Oxytocin (Pitocin)	Prevention: 10 IU IM or 5 to 10 IU IV bolus Treatment: 20 to 40 IU in 1 L normal saline; infuse 500 mL over 10 mins then 250 mL per hour	+	+	Overdose or prolonged use can cause water intoxication Possible hypotension with IV use following cesarean delivery	Stimulates the upper segment of the myometrium to contract rhythmically, constricting spiral arteries and decreasing blood flow through the uterus	Rare	\$1 (\$13) for 10 units of injectable solution
Second-line agents Carboprost (Hemabate) a prostaglandin F_{2-alpha} analogue	250 mcg IM or into myometrium, repeated every 15–90 mins for a total dosage of 2mg	-	+	Avoid in patients with asthma or significant renal, hepatic, or cardiac disease	Improves uterine contractability by increasing the number of oxytocin receptors and causes vasoconstriction	Nausea, vomiting, and diarrhea	NA (\$270) for 250 mcg of injectable solution
Methylergonovine (Methergine)	0.2mg IM, repeat every two to four hours	-	+	Avoid in hypertensive disorders of pregnancy, including chronic hypertension	Causes vasoconstriction and contracts smooth muscles and upper and lower segments of the uterus tetanically	Nausea, vomiting, and increased blood pressure	\$9 (NA) for 0.2 mg of injectable solution
Misoprostol (Cytotec),†, a prostaglandin E1 analogue	Prevention: 600 mcg orally Treatment: 800 to 1,000 mcg rectally or 600 to 800 mcg sublingually or orally	Use only when oxytocin is unavailable	+	Use with caution in patients with cardiovascular disease	Causes generalized smooth muscle contraction	Nausea, vomiting, diarrhea, pyrexia, and shivering	\$1 (\$5) per 200-mcg tablet

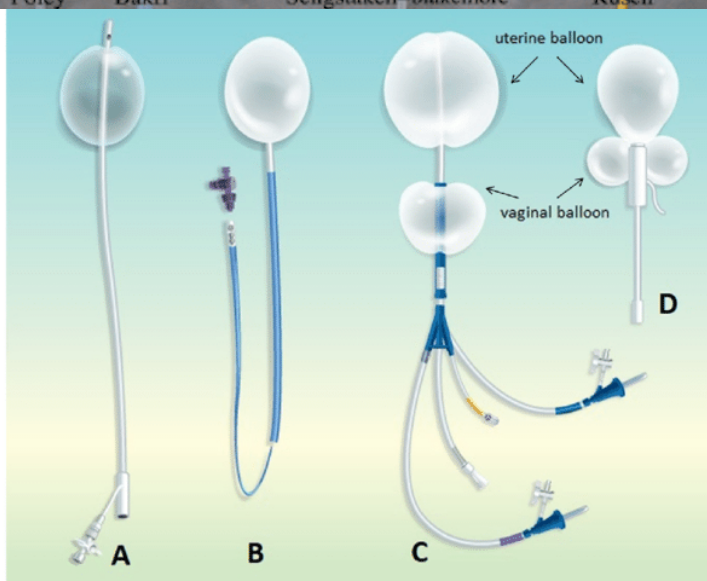
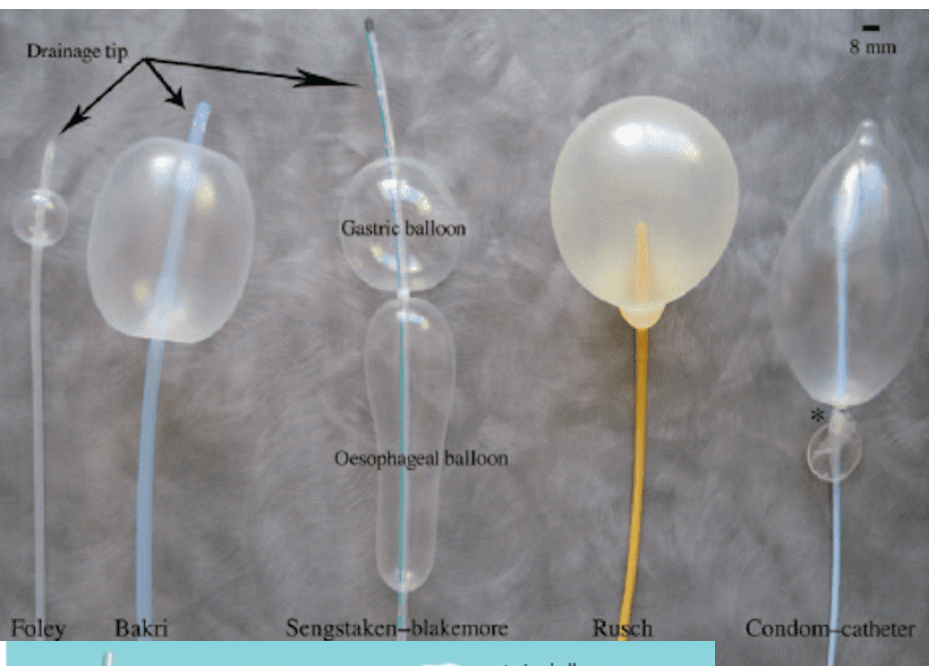




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- ☐ Obtain 2nd IV access (16 gauge if possible)
- ☐ STAT labs, with coags & fibrinogen
- ☐ Medications : Continue medications from Stage 1
- ☐ Transfuse per clinical signs/symptoms
 - Notify blood bank of OB hemorrhage, bring 2 units PRBCs to bedside, thaw 2 units FFP. **DO NOT wait for labs!**
- ☐ For uterine atony → Consider uterine balloon or packing, possible surgical interventions
- ☐ Consider moving patient to OR (better exposure, potential D&C)
- ☐ Mobilize additional team members as necessary
- ☐ Warming blanket



The different types of balloon tamponade specifically designed for use in postpartum hemorrhage. a Bakri balloon. b Vagistop. c BelfortDildy Complete Obstetrical Tamponade System (ebb's balloon). d Zhukovsky obstetric balloon



Abnormal vital signs/labs/oliguria:

Continued bleeding with EBL > 1500mL **OR** >2 units PRBCs given
OR patient at risk for occult bleeding (post-cesarean) & DIC

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- ☐ Rule out lacerations (exam), coagulopathy (labs), occult bleeding (imaging)
- ☐ Achieve hemostasis immediately, interventions based on etiology
- ☐ Adopt additional measures (if poor response)

Massive Transfusion Protocol

Shipment #	Red Cells 5 units	Plasma 3 units	Platelets 1 dose	Cryoprecipate 1 dose	2.0 mg rVlla (NovoSeven)
1	X	X			
2	X	X	X		X
3	X	X		X	
4	X	X	X		X
5	X	X			
6	X	X	X	X	X
7	X	X			
8	X	X	X		X
9	X	X		X	
10	X	X	X		X

STAGE
4
PPH

Cardiovascular Collapse:

For patients with cardiovascular collapse in setting of massive hemorrhage consider the following etiologies:

- ☐ Profound hypovolemic shock (blood loss not replaced)
- ☐ AFE (sudden CV collapse followed by heavy uterine bleeding from uterine relaxation and associated coagulopathy)

- Immediate surgical intervention to ensure hemostasis (hysterectomy) may be necessary.
- Simultaneous aggressive blood and factor replacement & medical interventions initiated regardless of the patient's coagulation status.
- Expeditious hemostasis is the only step that will maximize survival rates for these critical patients.

Post-Hemorrhage Management

- ☐ Debrief with entire care team
- ☐ Document **after** team debrief
- ☐ Discuss interventions with patient/family members

Adopted from ACOG District II OB
Hemorrhage Checklist

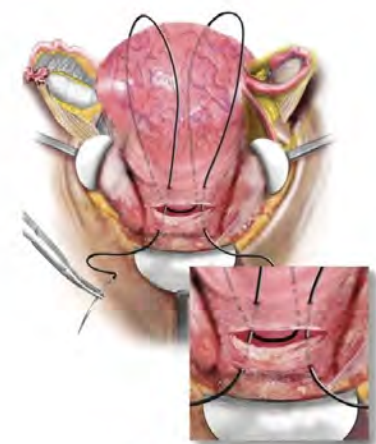
- Uterine curettage
- Placental bed suture
- Uterine artery ligation
- Uteroovarian ligation
- Repair uterine rupture
- B-Lynch suture, multiple square sutures
- Hysterectomy

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 FEMALE PELVIC SURGERY VIDEO ATLAS SERIES
 Mickey Karam, Series Editor

Management of Acute Obstetric Emergencies
 Baha Sibai, MD
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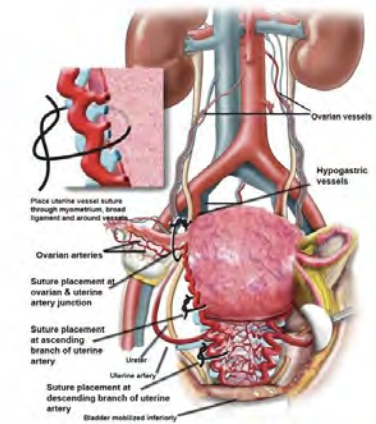
B-Lynch suture



B-Lynch suture



*Hayman uterine
compression suture*



*Surgical ligation locations
of uterine blood supply*

Reporting/system Learning



READINESS

Every unit

- Hemorrhage cart with supplies, checklist, and instruction cards for intrauterine balloons and compressions stitches
- Immediate access to hemorrhage medications (kit or equivalent)
- Establish a response team - who to call when help is needed (blood bank, advanced gynecologic surgery, other support and tertiary services)
- Establish massive and emergency release transfusion protocols (type-O negative/uncrossmatched)
- Unit education on protocols, unit-based drills (with post-drill debriefs)

RECOGNITION & PREVENTION

Every patient

- Assessment of hemorrhage risk (prenatal, on admission, and at other appropriate times)
- Measurement of cumulative blood loss (formal, as quantitative as possible)
- Active management of the 3rd stage of labor (department-wide protocol)

RESPONSE

Every hemorrhage

- Unit-standard, stage-based, obstetric hemorrhage emergency management plan with checklists
- Support program for patients, families, and staff for all significant hemorrhages

REPORTING/SYSTEMS LEARNING

Every unit

- Establish a culture of huddles for high risk patients and post-event debriefs to identify successes and opportunities
- Multidisciplinary review of serious hemorrhages for systems issues
- Monitor outcomes and process metrics in perinatal quality improvement (QI) committee

PATIENT SAFETY BUNDLE

Obstetric Hemorrhage

Maternal Health
Accelerator

Hospitals should consider adopting a system to implement key elements in four categories

1) readiness to respond to a maternal hemorrhage,

2) recognition and prevention measures in place for all patients

3) a multidisciplinary response to excessive maternal bleeding

4) a systems-based quality improvement process to improve responsiveness through reporting and system learning. Respectful care.

Reporting/system Learning/respectful care

- Culture of huddles for HR pts
- Post-events debriefs
- Identify successes and opportunities
- Provide support for team and family
- Monitor outcome metrics in QI committee

Appendix W: Patient and Family Support Checklist for Postpartum Hemorrhage

Patient and Family Support Checklist for Postpartum Hemorrhage



Insert Hospital
Logo Here



Supporting patients and families during a serious maternal event is a vital aspect of patient care. Use this checklist to help ensure patients and their family members have their emotional needs met when a postpartum hemorrhage occurs.

Prior to the Event

- ☐ Identify a staff person who will provide continuous updates to the family and facilitate completion of the below listed support items. ***Whenever possible, identification of this person should occur during morning huddle (using a previously prescribed process) so that the assigned individual is immediately ready to support families in the event of an emergency. ***

Immediately Following the Event

- ☐ Introduce yourself and your role to the family
- ☐ Offer to move the family to a new room, away from where the hemorrhage took place; explain that the purpose of maintaining soiled linens etc. is to enable accurate measurement of blood loss
- ☐ Explain to the family what has happened and what they can expect to occur in the next few hours, including the length of surgery (if applicable) and how often you will be in touch with them (at least every hour); provide them with your contact information; act as a liaison between the family and other units in order to provide timely updates

Maternal Health
Accelerator



THANK YOU



Maternal Health
Accelerator



References

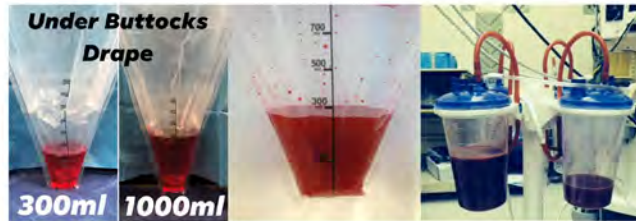
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- Hemorrhage risk assessment tool predicts obstetric hemorrhage-related morbidity. Colalillo, Emer et al. *American Journal of Obstetrics & Gynecology*, Volume 222, Issue 1, S423 - S424

Training Tools

Appendix N: Techniques for Quantitative Assessment of Blood Loss (QBL)

Quantify blood loss by measuring

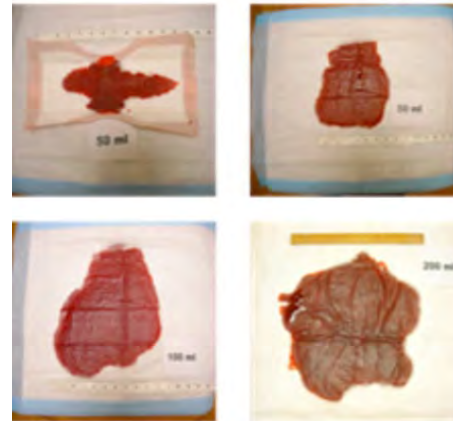
- Under buttock drapes with graduated markings – may have to lift bottom of drape out of the kick bucket to see markings
- Graduated collection containers
- Account for other fluids (amniotic fluid, urine)
- At C/S hold irrigation until after blood loss calculated



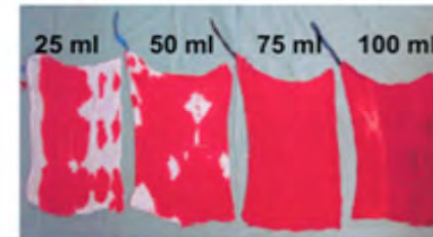
Quantify blood loss by weight

- Make scales available in all delivery rooms
- Standardize supplies and establish dry weights of commonly used items (Chux, peripads, lap holder, etc.)
- Incorporate weighing of appropriate materials into routine practice

Posters



18 X 18 inch Dry Lap Sponges



- 25 ml saturates about 50% area
- 50 ml saturates about 75% area
- 75 ml saturates entire surface
- 100 ml will saturate and drip

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Oxytocin (Pitocin):

10-40 units per 500-1000mL solutions

Methylergonovine (Methergrine):

0.2 milligrams IM (may repeat);

Avoid with hypertension

15-methyl PGF 2 α (Hemabate, Carboprost):

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

Avoid with asthma, use with caution with hypertension

Misoprostol (Cytotec):

600 micrograms PO or 800 micrograms SL (preferred route)

800-1000 micrograms PR

Tranexamic Acid (TXA):

1 gram IV over 10 min (add 1 gram vial to 100mL NS & give over 10 min; may be repeated once after 30 min)

Tone (i.e., atony)

Trauma (i.e., laceration)

Tissue (i.e., retained products)

Thrombin (i.e., coagulation dysfunction)



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