

Postpartum Hemorrhage: A Guide to Management and Prevention

Additional Presentation Information

Target Audience

This course is targeted to physicians, both on staff and in private practice, registered nurses, risk managers, quality assurance directors, and C-level administrators focused on ensuring patient safety and health care quality.

Accreditation – Physician Information

This activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education (ACCME) through the joint sponsorship of Cine-Med and Advanced Practice Strategies. Cine-Med is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

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Learning Objectives

- Define obstetrical hemorrhage
- Identify risk factors that contribute to obstetrical hemorrhage
- List the four primary causes of obstetrical hemorrhage
- Learn to accurately estimate blood loss through visual cues
- Understand the value and use of a structured medical management plan to include appropriate blood product selection, medication administration and surgical intervention
- Appreciate the value of a integrated team response to OB hemorrhage

Accreditation – Nurse Information

Ciné-Med Inc. is accredited as a provider of continuing education in nursing by the American Nurses Credentialing Center's Commission on Accreditation.

This program is approved for 1 contact hours for nurses.

Speakers

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Faculty Disclosure Statement

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Nancy Hudecek—employee of Healthstream, Inc.

Martin November—employee of Advanced Practice Strategies, Inc

Postpartum Hemorrhage

A Guide to Management and Prevention

Presented by:

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Learning Objectives

BACKGROUND

CAUSES/RISK FACTORS
ESTIMATING BLOOD LOSS
PPH MANAGEMENT
PPH PROTOCOLS
TEAM APPROACH

- Define obstetrical hemorrhage
- Identify risk factors that contribute to obstetrical hemorrhage
- List the primary causes of obstetrical hemorrhage
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Why is Postpartum Hemorrhage (PPH) a major perinatal issue?

BACKGROUND

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- **Severe bleeding is the single most significant cause of maternal death worldwide.** It is estimated that 140,000 women die of postpartum hemorrhage every year – one every 4 minutes. -- ACOG Practice Bulletin, 2006
- Postpartum hemorrhage ranks in the **top three** causes of maternal mortality.

**70 - 90 % of these deaths
are preventable.**

-- Berg, 2005, Clark 2008

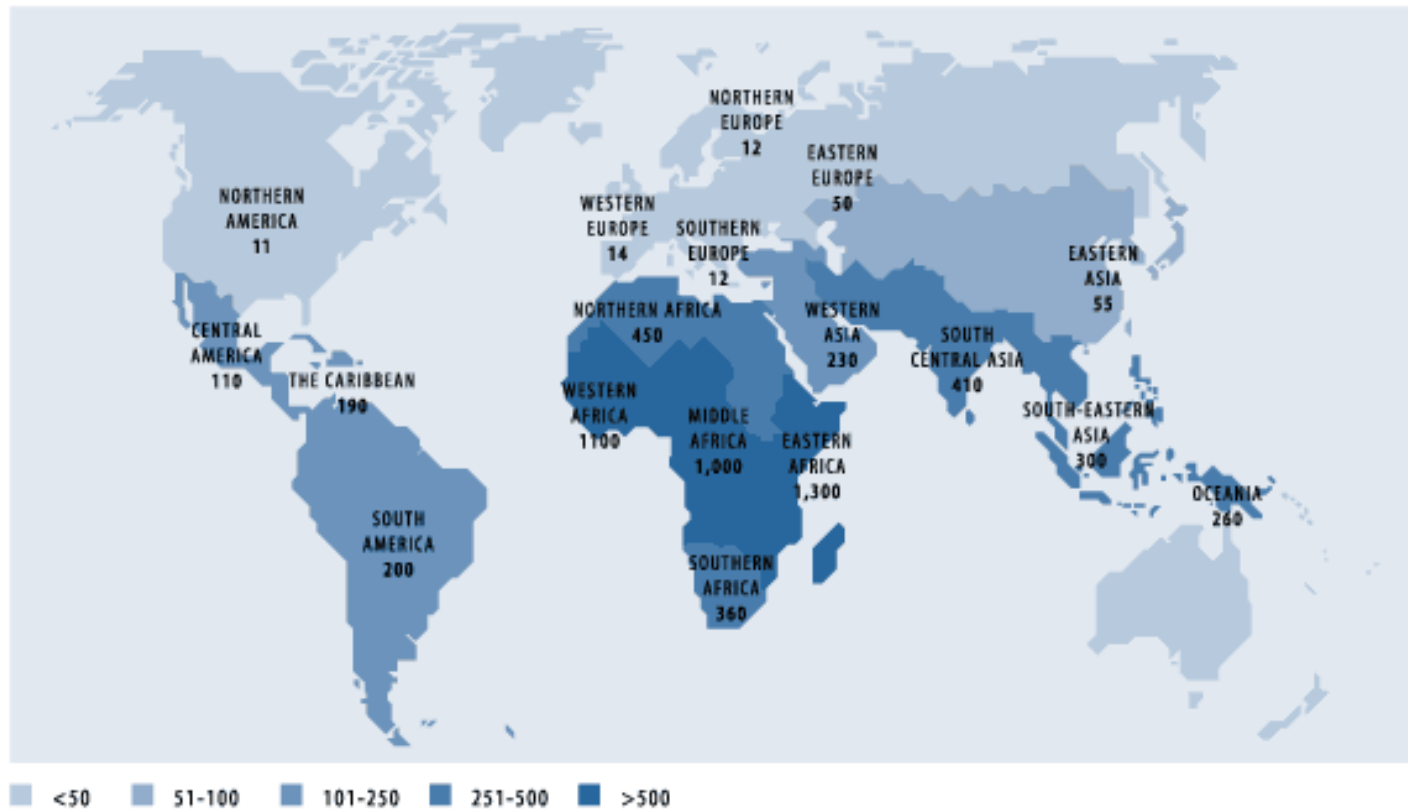


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Advancing Knowledge, Empowering Caregivers.

Maternal Mortality-Worldwide

FIGURE 1: MATERNAL MORTALITY BY SUBREGION, 1995
(deaths per 100,000 live births)



Source: WHO/UNICEF/UNFPA

What Exactly is PPH?

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Official Definition	Loss of ≥ 500 ml of blood after a vaginal delivery or ≥ 1000 ml after a cesarean delivery
<i>Roughly 50% of all deliveries involve this much blood loss.</i>	
Alternate Definition	10% drop in hematocrit
	Need for a transfusion
	Excessive bleeding makes the patient symptomatic (e.g., lightheadedness, vertigo, syncope) and/or results in signs of hypovolemia (e.g., hypotension, tachycardia, or oliguria)
	<i>By this definition, PPH occurs in 4% of vaginal births and 6% of cesarean births - <u>1 in 20 women experience a PPH</u></i>

What is at stake?

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Normally:

- Pregnancy expands plasma volume by 42%
- Red cell volume goes up by 24%
- Enhanced blood volume compensates for blood loss when placenta detaches

In the majority of PPH cases:

- PPH does not require a transfusion
- There are no long term effects

BUT, in severe cases, PPH can cause:

- Hypovolemic shock
- Cardiac arrest
- Cerebral injury
- Viral infection (as a result of transfusion therapy)
- Death

Primary Causes for PPH

- **Uterine atony (80% of cases)**
- Lower genital tract lacerations (including uterine rupture)
- Retained placenta
- Coagulopathy (acquired or inherited)
- Placenta accreta/increta/percreta
- Uterine inversion or prolapse

“Tissue-Tone-Trauma-Thrombotic”

Placenta Accreta

BACKGROUND

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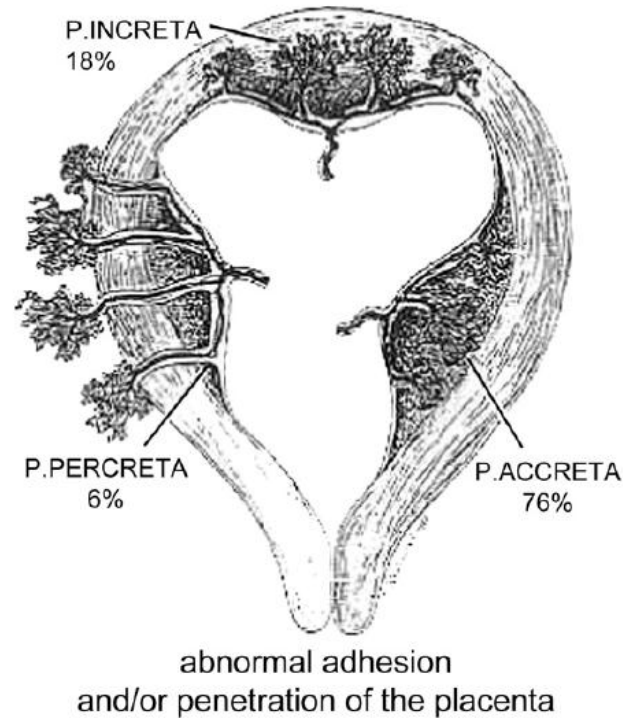


Fig. 1. Placenta accreta. (From Kamani AA, Gambling DR, Christilaw J, et al. Anesthetic management of patients with placenta accreta. Can J Anaesth 1987;34:613-7; with permission.)

Risk Factors for PPH

■ Antepartum

- Placental abruption
- Placenta previa
- Vasa previa
- Previous history
- Grand multiparity
- Obesity
- Multiple gestations
- Macrosomia
- Uterine anomalies (e.g. bicornuate uterus)
- Uterine fibroids
- Polyhydramnios

Distended uterus

■ Intra/Postpartum

- Prolonged induction or labor
- Precipitous labor
- Operative delivery (OVD or cesarean)
- Malpresentation
- Infection

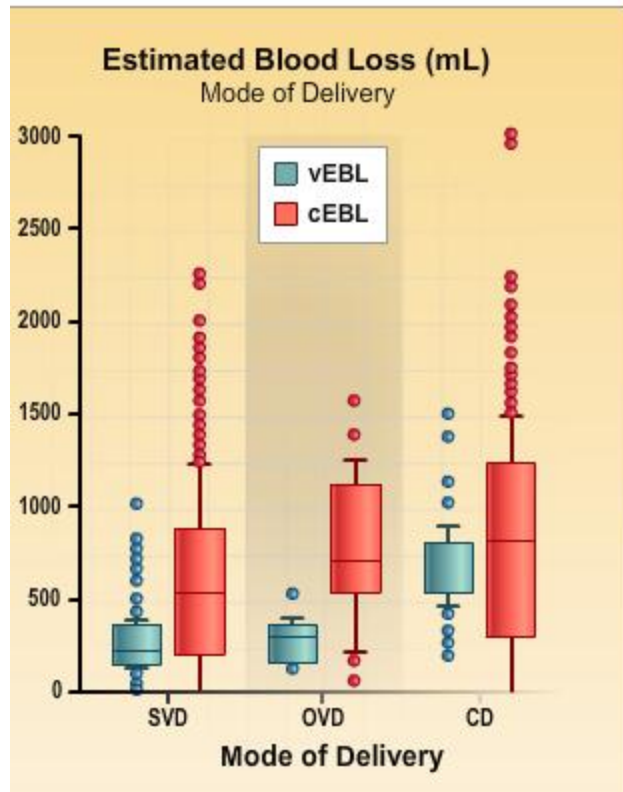
Responding to PPH is surprisingly simple, provided clinicians...

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TEAM APPROACH

- ✓ Stay calm
- ✓ Work as a team
- ✓ Make the jump from normal delivery to hemorrhagic emergency

*The key to making this jump is
**accurate measurement
and communication of blood loss***

Underestimation of Blood Loss



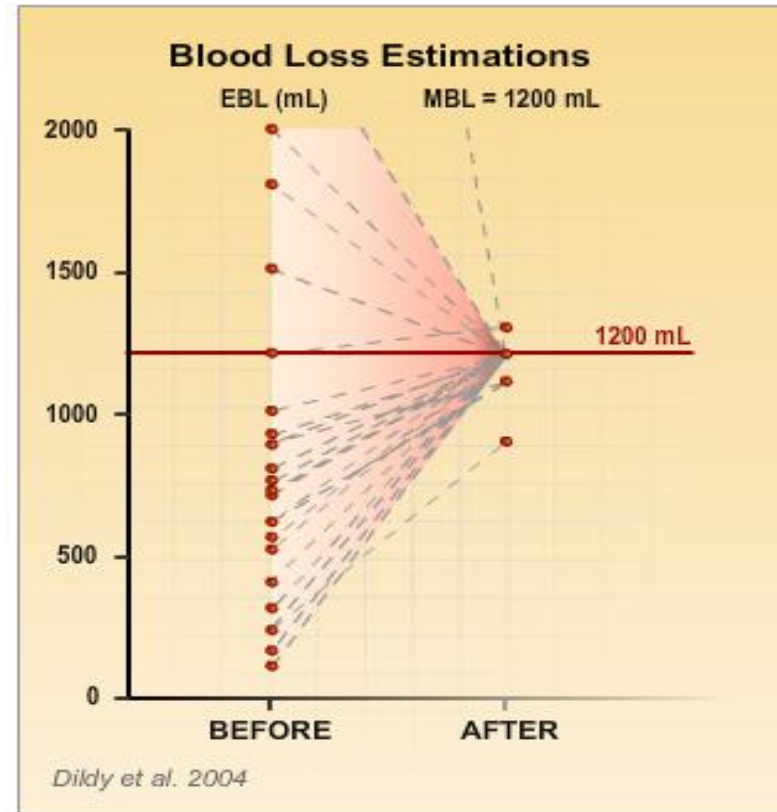
Blue Boxes: Clinicians visual estimates
Red Boxes: Calculated estimates
Dots: Outliers

- Clinicians' visual estimates of blood loss are often “**grossly inaccurate**” (Stafford, 2008)
 - Accuracy of assessing blood loss is *not* dependent on the physicians age or experience (Dildy 2004)
 - Underestimates are highest in operative vaginal delivery and perineal lacerations (Stafford, 2008)

Solution: Targeted Clinical Team Training

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- Teaching standard guidelines for estimating blood loss:
 - Dramatically improves estimates
 - Reduces discrepancy among team members (Dildy et al 2004)



External Blood Loss Tutorial

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Risk factors quiz

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Which of the following is NOT a known risk factor for PPH?

- A. Macrosomia
- B. Polyhydramnios
- C. Vaginal birth after cesarean (VBAC)
- D. Infection
- E. Prolonged labor

PPH causes quiz

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Which of the following is the most common cause of PPH?

- A. Maternal coagulopathy
- B. Retained placenta
- C. Perineal laceration
- D. Uterine inversion
- E. Uterine Atony



Using Weight for Calculation

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Conversion

- 1 Ounce = 30 mL
- 1 Gram = 1 mL

<http://www.worldwidemetric.com/metcal.htm>



Clinicians must be trained to:

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- Visually estimate blood loss QUICKLY and ACCURATELY
- Spot signs of internal vs. external bleeding
- Recognize different types of lacerations
 - E.g.: perineal, vaginal and cervical.
- Different types of possible hematoma
 - E.g.: vulvar, vulvovaginal, paravaginal, retroperitoneal.



PPH Management

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- Hemodynamic
- Blood products
- Medical therapies
- Surgical techniques

Three Keys to Hemodynamic Management

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1. Volume status
 - Vitals, urine output, etc
2. Circulating red cell mass
 - Initial hct minus EBL
3. Coagulation mechanisms
 - Bleeding IV sites, red top test, etc



“Red Top Test” of Fibrinogen

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- Get a quick (10 minute) assessment of the fibrinogen level
 - Draw blood in a red top tube—
Label with date and time, tape to wall
- Results:
 - Clots < 10 minutes →
Fibrinogen > 150 mg/dL
 - Clots > 10 minutes →
Fibrinogen < 150 mg/dL → need cryoprecipitate
- In either case, if have bleeding at small sites → need platelets



Typical Coagulation Targets

- Hematocrit $\geq 21\%$
- International normalized ratio (INR) ≤ 1.5
- Platelets $\geq 50\text{K/uL}$
- Fibrinogen $\geq 100 \text{ mg/dL}$

Blood Product Replacement

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Table 4. Blood Component Therapy

Product	Volume (mL)	Contents	Effect (per unit)
Packed red cells	240	Red blood cells, white blood cells, plasma	Increase hematocrit 3 percentage points, hemoglobin by 1 g/dL
Platelets	50	Platelets, red blood cells, white blood cells, plasma	Increase platelet count 5,000–10,000/mm ³ per unit
Fresh frozen plasma	250	Fibrinogen, antithrombin III, factors V and VIII	Increase fibrinogen by 10 mg/dL
Cryoprecipitate	40	Fibrinogen, factors VIII and XIII, von Willebrand factor	Increase fibrinogen by 10 mg/dL

Modified from Martin SR, Strong TH Jr. Transfusion of blood components and derivatives in the obstetric intensive care patient. In: Foley MR, Strong TH Jr, Garite TJ, editors. Obstetric intensive care manual. 2nd ed. New York (NY): McGraw-Hill; 2004. Produced with permission of The McGraw-Hill Companies.

Autotransfusion

BACKGROUND
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- Collect blood with a large-bore suction device after removing all fetal products and amniotic fluid from the operative field post-delivery
- The cell saver device then washes and filters the suctioned fluid and the collected red cells can be re-infused
- Equip the re-infusion line with a leukocyte depletion filter
- The process can be set up in a single, continuous circuit so that patients with religious objections (e.g., Jehovah's Witnesses) may accept therapy with this device

Roman A. Contemp OBGYN 2001

Medical Management

Table 1. Medical Management of Postpartum Hemorrhage

Drug*	Dose/Route	Frequency	Comment
Oxytocin (Pitocin)	IV: 10–40 units in 1 liter normal saline or lactated Ringer's solution IM: 10 units	Continuous	Avoid undiluted rapid IV infusion, which causes hypotension.
Methylergonovine (Methergine)	IM: 0.2 mg	Every 2–4 h	Avoid if patient is hypertensive.
15-methyl PGF ₂ α (Carboprost) (Hemabate)	IM: 0.25 mg	Every 15–90 min, 8 doses maximum	Avoid in asthmatic patients; relative contraindication if hepatic, renal, and cardiac disease. Diarrhea, fever, tachycardia can occur.
Dinoprostone (Prostin E ₂)	Suppository: vaginal or rectal 20 mg	Every 2 h	Avoid if patient is hypotensive. Fever is common. Stored frozen, it must be thawed to room temperature.
Misoprostol (Cytotec, PGE ₁)	800–1,000 mcg rectally		

Abbreviations: IV, intravenously; IM, intramuscularly; PG, prostaglandin.

*All agents can cause nausea and vomiting.

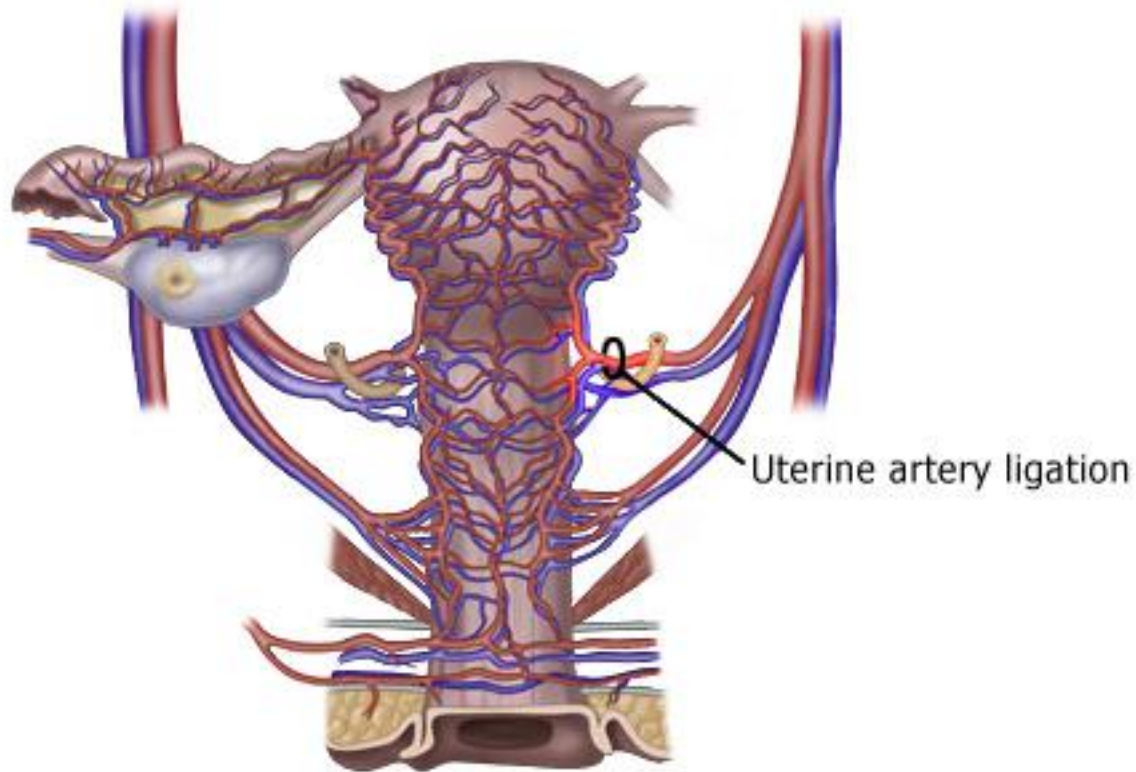
Modified from Dildy GA, Clark SL. Postpartum hemorrhage. Contemp Ob/Gyn 1993;38(8):21–9.

Surgical Management

- Uterine curettage
- Decrease uterine blood flow
 - Uterine artery ligation
 - Hypogastric artery ligation
 - Ovarian artery ligation
- Uterine compression
 - B-Lynch suture
 - Square stitch
- Uterine cavity tamponade
 - Bakri balloon
 - Uterine packing
 - Foley catheter
- Arterial embolization
 - Uterine artery
 - Hypogastric artery
- Hysterectomy

Uterine Artery Ligation

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O'Leary Stitch

- #1 chromic suture passed 2-3 cms medial to the uterine vessels then through an avascular site in broad ligament lateral to uterine vessels

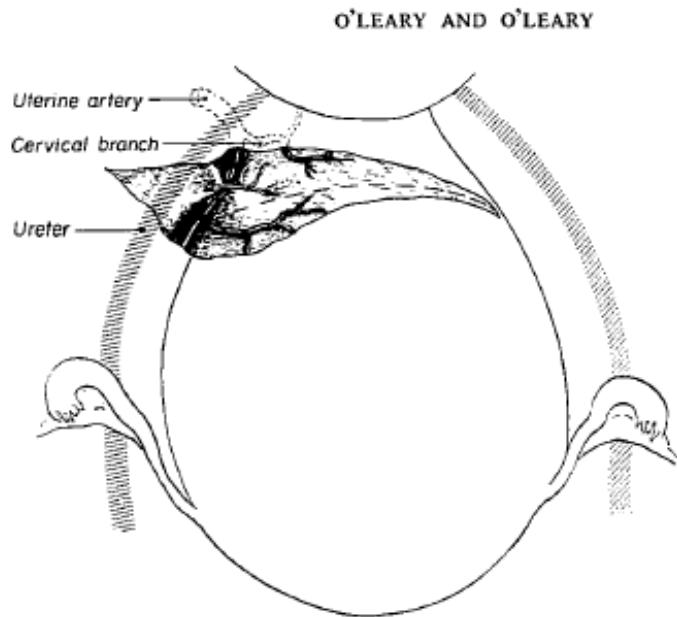


Fig 1. Ascending branch of left uterine artery after ligation. Note large amount of myometrium within the suture.

O'Leary Obstet Gynecol 1974

Stepwise Uterine Devascularization

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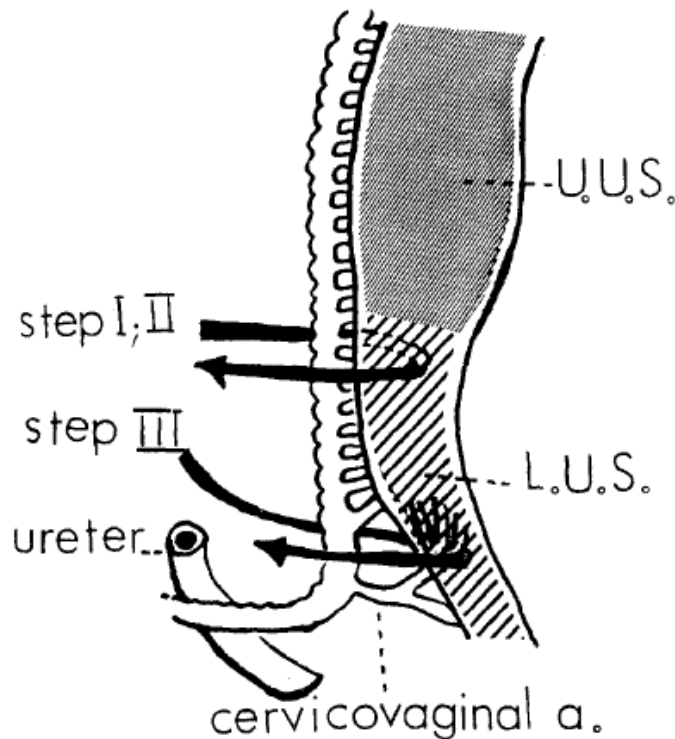
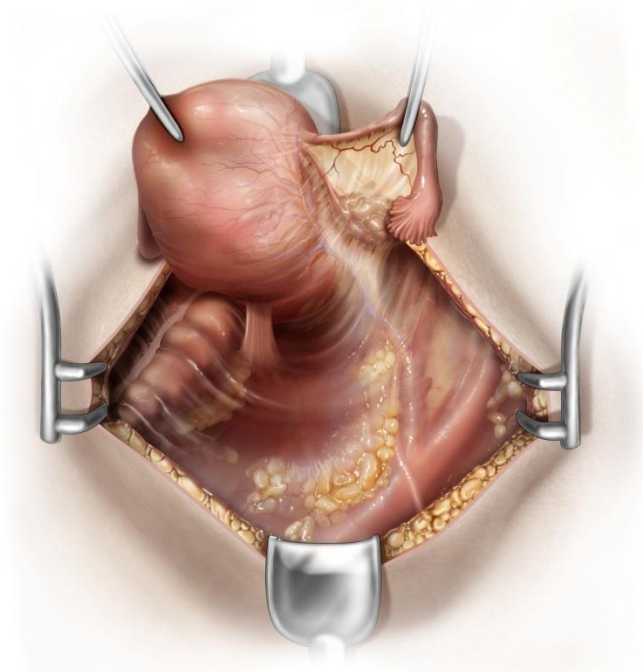
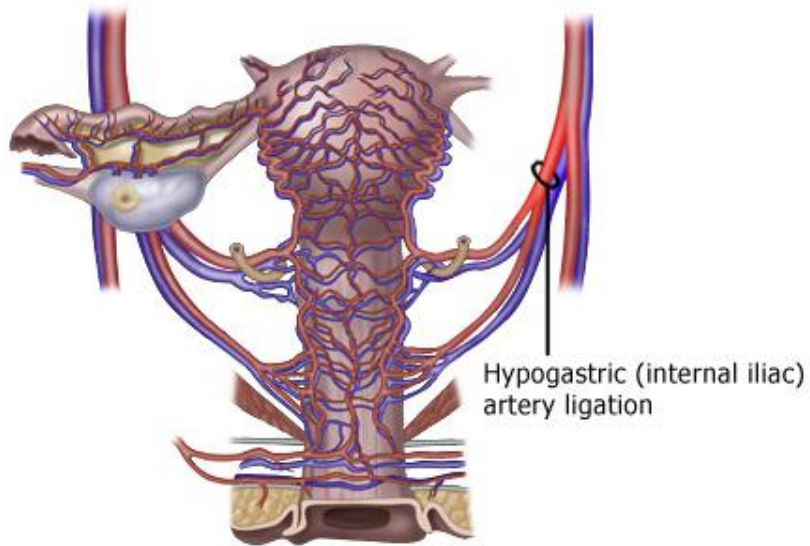


Fig. 1. Sites of uterine artery ligation in steps 1, 2 (*upper arrow*), and 3 (*lower arrow*). U.U.S., Upper uterine segment; L.U.S., Lower uterine segment.

1. Unilateral uterine vessel (~9%)
2. Bilateral uterine vessel (~75%)
3. Low uterine vessel (~4%)
 - Gets branches to LUS but not cervix/vagina
 - Requires takedown of bladder
4. Unilateral ovarian vessel (~7%)
5. Bilateral ovarian vessel (~6%)

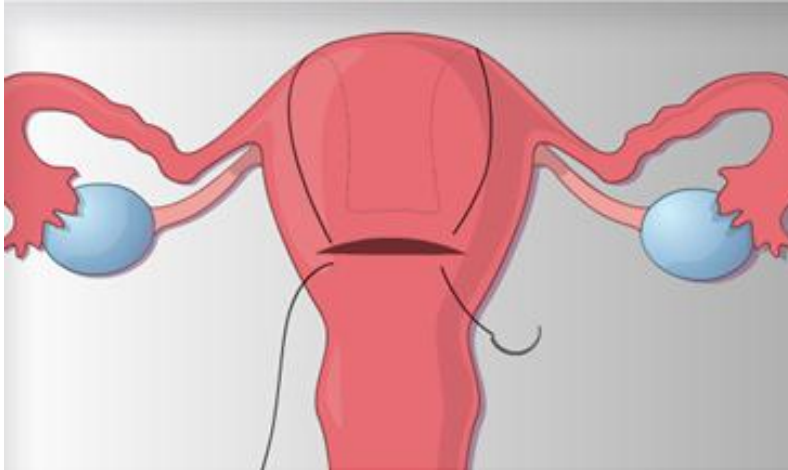
Hypogastric Artery Ligation

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CAUSES/RISK FACTORS
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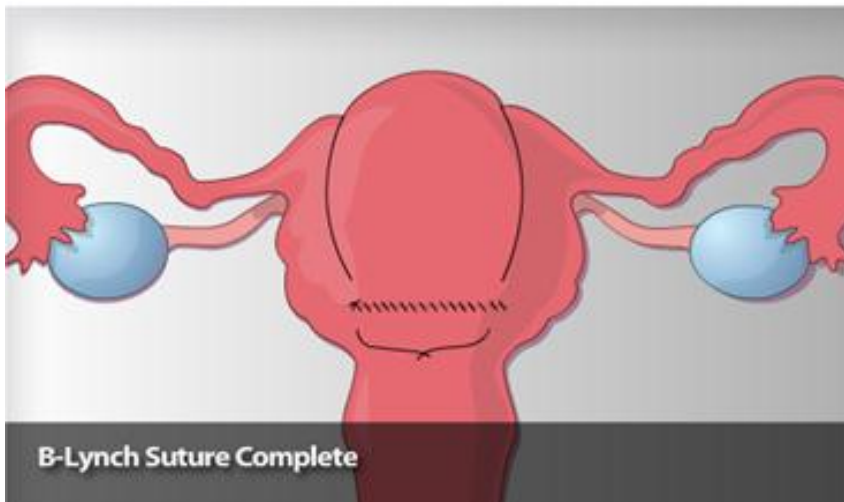


B-Lynch Suture

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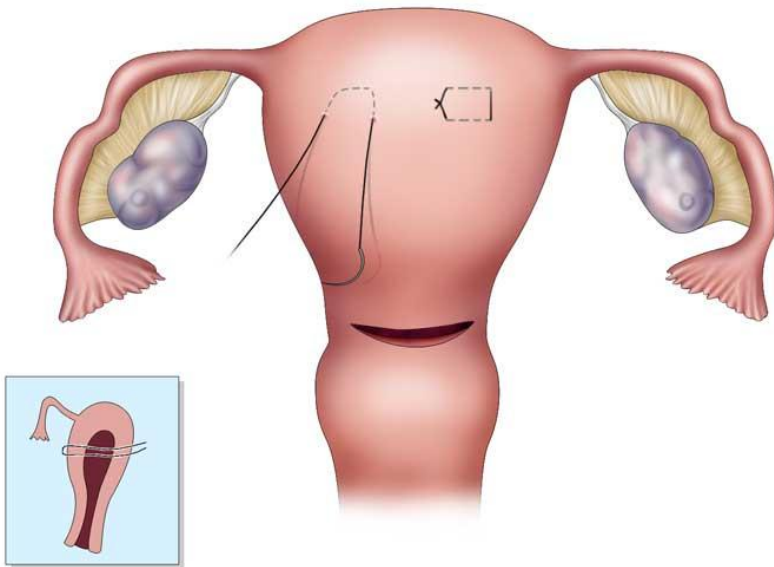
- Use #1 chromic suture though others have been described (0-PDS, #2 chromic, 0-Vicryl)



B-Lynch, et al. Br J Obstet Gynaecol 1997

Square Stitch

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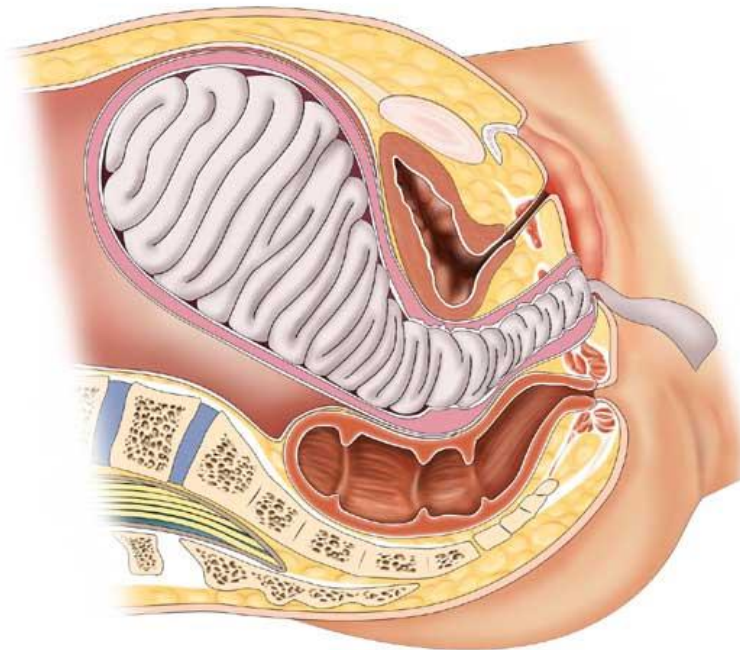


- Use #1 chromic with straight needle (#7 or #8)
- Can use in upper or lower segments

Cho JH, et al. Obstet Gynecol 2000

Uterine Packing

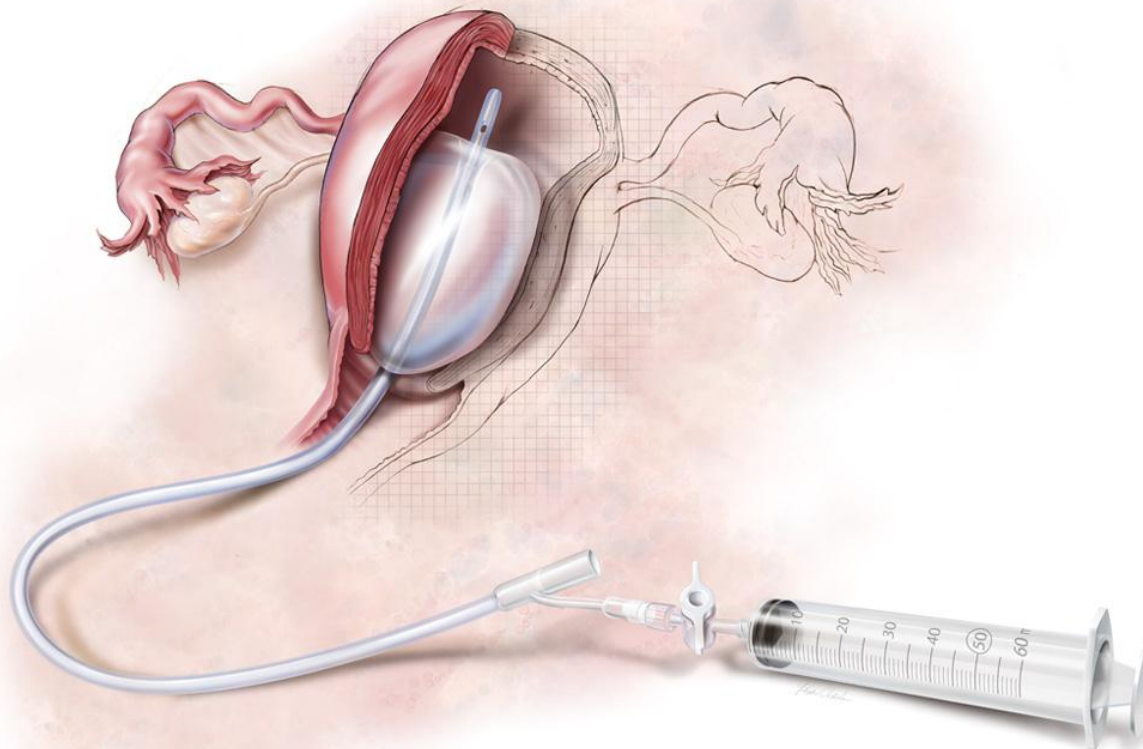
BACKGROUND
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Bakri Balloon

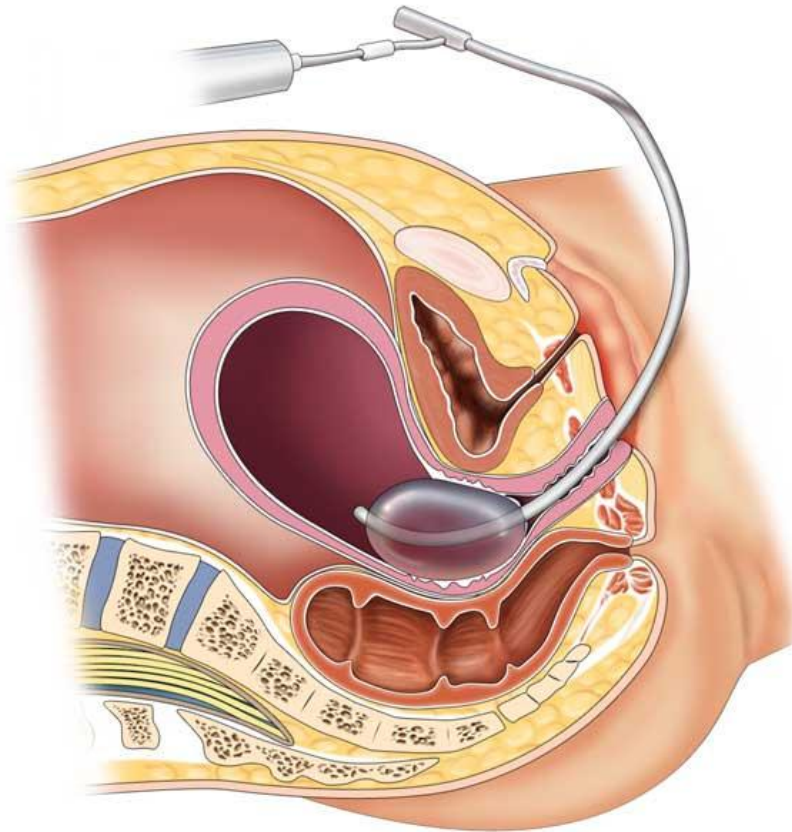
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COOK
MEDICAL **Bakri**
POSTPARTUM BALLOON



Foley Catheter

BACKGROUND
CAUSES/RISK FACTORS
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Pelvic Pressure Pack

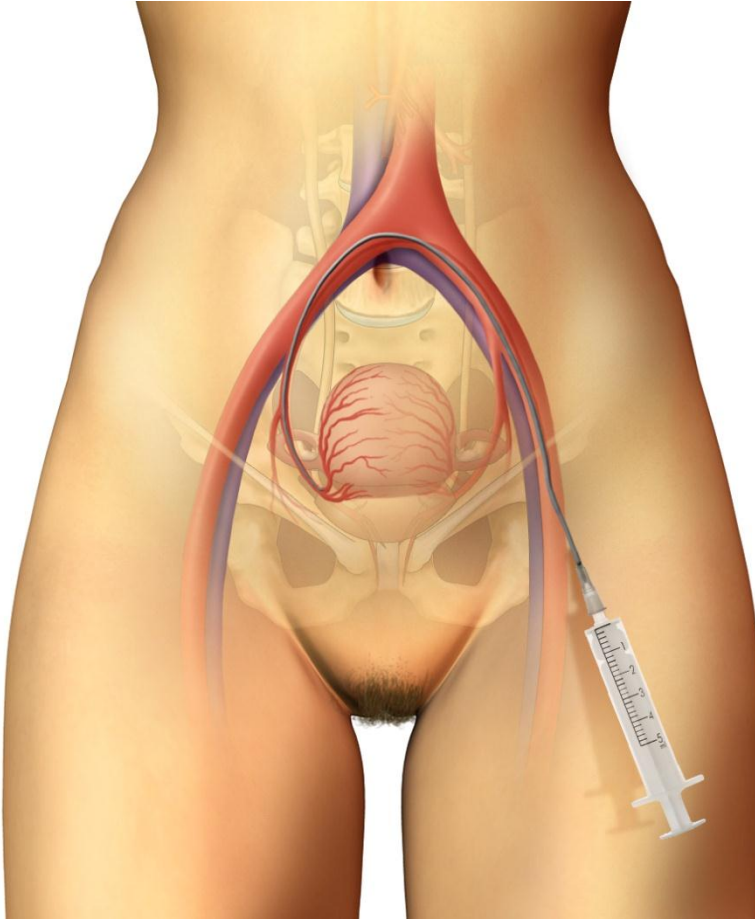
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- Pack made with a sterile x-ray cassette bag containing 4-6 gauze rolls tied end to end
- Use effectively after hysterectomy to tamponade any ongoing bleeding



Selective Arterial Embolization

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- Typically uterine or hypogastric arteries
- Requires interventional radiology service
- Reportedly effective in >95% of cases

California Maternal Quality Care Collaborative (CMQCC) Protocol

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CMQCC Obstetric Hemorrhage Care Summary: Table Chart Format Revised 1.3.07/08

	Assessments	Meds/Procedures	Blood Bank
Stage 0	Every woman in labor/giving birth		
<i>Stage 0 focuses on risk assessment and active management of the third stage.</i>	<ul style="list-style-type: none"> Assess every woman for risk factors for hemorrhage Ongoing quantitative evaluation of blood loss on every birth 	Active Management 3rd Stage: <ul style="list-style-type: none"> Oxytocin IV infusion or 10u IM Fundal Massage-vigorous, 15 seconds min. 	<ul style="list-style-type: none"> If Medium Risk: T&C 2 U If High Risk: T&C 2 U If Positive Antibody Screen (prenatal or current, exclude low level anti-D from RhoGam): T&C 2 U
Stage 1	Blood loss: >500 ml vaginal or >1000 ml Cesarean, or VS changes (by >15% or HR ≥110, BP ≤85/45, O2 sat <95%)		
<i>Stage 1 is short: activate hemorrhage protocol, initiate preparations and give Methergine IM.</i>	<ul style="list-style-type: none"> Activate OB Hemorrhage Protocol and Checklist Notify Charge nurse, Anesthesia Provider VS, O2 Sat q5' Calculate cumulative blood loss q5-15' Weigh bloody materials Careful inspection with good exposure of vaginal walls, cervix, uterine cavity, placenta 	<ul style="list-style-type: none"> IV Access: at least 18gauge Increase Oxytocin rate, and repeat fundal massage Methergine 0.2mg IM (if not hypertensive) May repeat if good response to first dose, BUT otherwise move on to 2nd level uterotonics (see below) Empty bladder: straight cath or place Foley with urimeter 	<ul style="list-style-type: none"> T&C 2 Units PRBCs (if not already done)
Stage 2	Continued bleeding with total blood loss under 1500ml		
<i>Stage 2 is focused on sequentially advancing through medications and procedures, mobilizing help and Blood Bank support, and keeping ahead with volume and blood products.</i>	OB back to bedside (if not already there) <ul style="list-style-type: none"> Extra help: 2nd OB, Rapid Response Team (per hospital), assign roles VS & cumulative blood loss q 5-10 min Weight bloody materials Complete evaluation of vaginal wall, cervix, placenta, uterine cavity Send additional labs, including DIC panel If In Postpartum: Move to L&D/OR Evaluate for special cases: <ul style="list-style-type: none"> Uterine Inversion Amn. Fluid Embolism 	2nd Level Uterotonic Drugs: <ul style="list-style-type: none"> Hemabate 250 mcg IM or Misoprostol 800-1000 mcg PR 2nd IV Access (at least 18gauge) <ul style="list-style-type: none"> Bimanual massage Vaginal Birth: (typical order) <ul style="list-style-type: none"> Move to OR Repair any tears D&C: r/o retained placenta Place intrauterine balloon Selective Embolization (interventional Radiology) Cesarean Birth: (still intra-op) (typical order) <ul style="list-style-type: none"> Inspect broad lig, posterior uterus and retained placenta B-Lynch Suture Place intrauterine balloon 	<ul style="list-style-type: none"> Notify Blood Bank of OB Hemorrhage Bring 2 Units PRBCs to bedside, transfuse per clinical signs – do not wait for lab values Use blood warmer for transfusion Consider thawing 2 FFP (takes 35+min), use if transfusing >2u PRBCs Determine availability of additional RBCs and other Coag products
Stage 3	Total blood loss over 1500ml, or >2 units PRBCs given or VS unstable or suspicion of DIC		
<i>Stage 3 is focused on the Massive Transfusion protocol and invasive surgical approaches for control of bleeding.</i>	<ul style="list-style-type: none"> Mobilize team Advanced GYN surgeon 2nd Anesthesia Provider OR staff Adult Intensivist Repeat labs including coags and ABG's Central line Social Worker/ family support 	<ul style="list-style-type: none"> Activate Massive Hemorrhage Protocol Laparotomy: B-Lynch Suture Uterine Artery Ligation Hysterectomy Patient support Fluid warmer Upper body warming device Sequential compression stockings 	<ul style="list-style-type: none"> Transfuse Aggressively Massive Hemorrhage Pack Near 1:1 PRBC:FFP 1 PLT pheresis pack per 6units PRBCs Unresponsive Coagulopathy: After 10 units PRBCs and full coagulation factor replacement: may consider rFactor VIIa

CMQCC
This Project was supported by funds received from the State of California, Department of Public Health, Center for Family Health, Maternal, Child and Adolescent Health Division



CMQCC Protocol-Stage 0

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Stage 0	Every woman in labor/giving birth		
<i>Stage 0 focuses on risk assessment and active management of the third stage.</i>	<ul style="list-style-type: none">• Assess every woman for risk factors for hemorrhage• Ongoing quantitative evaluation of blood loss on every birth	Active Management 3rd Stage: <ul style="list-style-type: none">• Oxytocin IV infusion or 10u IM• Fundal Massage- vigorous, <u>15 seconds min.</u>	<ul style="list-style-type: none">• If Medium Risk:T&Scr• If High Risk: T&C 2 U• If Positive Antibody Screen (prenatal or current, exclude low level anti-D from RhoGam):T&C 2 U

CMQCC Protocol-Stage 1

Stage 1	Blood loss: >500 ml vaginal <u>or</u> >1000 ml Cesarean, <u>or</u> VS changes (by >15% <u>or</u> HR \geq 110, BP \leq 85/45, O2 sat <95%)		
<p><i>Stage 1 is short: activate hemorrhage protocol, initiate preparations and give Methergine IM.</i></p>	<ul style="list-style-type: none"> • Activate OB Hemorrhage Protocol and Checklist • Notify Charge nurse, Anesthesia Provider • VS, O2 Sat q5' • Calculate cumulative blood loss q5-15' • Weigh bloody materials • Careful inspection <u>with good exposure</u> of vaginal walls, cervix, uterine cavity, placenta 	<ul style="list-style-type: none"> • IV Access: at least 18gauge • Increase Oxytocin rate, and repeat fundal massage • Methergine 0.2mg IM (if not hypertensive) May repeat if good response to first dose, BUT otherwise <u>move on</u> to 2nd level uterotonic drug (see below) • Empty bladder: straight cath or place foley with urimeter 	<ul style="list-style-type: none"> • T&C 2 Units PRBCs (if not already done)

CMQCC Protocol-Stage 2

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TEAM APPROACH

Stage 2	Continued bleeding with total blood loss under 1500ml		
<p><i>Stage 2 is focused on sequentially advancing through medications and procedures, mobilizing help and Blood Bank support, and keeping ahead with volume and blood products.</i></p>	<p>OB back to bedside (if not already there)</p> <ul style="list-style-type: none"> • Extra help: 2nd OB, Rapid Response Team (per hospital), assign roles • VS & cumulative blood loss q 5-10 min • Weigh bloody materials • Complete evaluation of vaginal wall, cervix, placenta, uterine cavity • Send additional labs, including DIC panel • If in Postpartum: Move to L&D/OR • Evaluate for special cases: <ul style="list-style-type: none"> -Uterine Inversion -Amn. Fluid Embolism 	<p>2nd Level Uterotonic Drugs:</p> <ul style="list-style-type: none"> • Hemabate 250 mcg IM <u>or</u> • Misoprostol 800-1000 mcg PR <p>2nd IV Access (at least 18gauge)</p> <p>Bimanual massage</p> <p>Vaginal Birth: (typical order)</p> <ul style="list-style-type: none"> • Move to OR • Repair any tears • D&C: r/o retained placenta • Place intrauterine balloon • Selective Embolization (Interventional Radiology) <p>Cesarean Birth: (still intra-op) (typical order)</p> <ul style="list-style-type: none"> • Inspect broad lig, posterior uterus and retained placenta • B-Lynch Suture • Place intrauterine balloon 	<ul style="list-style-type: none"> • Notify Blood Bank of OB Hemorrhage • Bring 2 Units PRBCs to bedside, transfuse per clinical signs – do not wait for lab values • Use blood warmer for transfusion • Consider thawing 2 FFP (takes 35+min), use if transfusing >2u PRBCs • Determine availability of additional RBCs and other Coag products

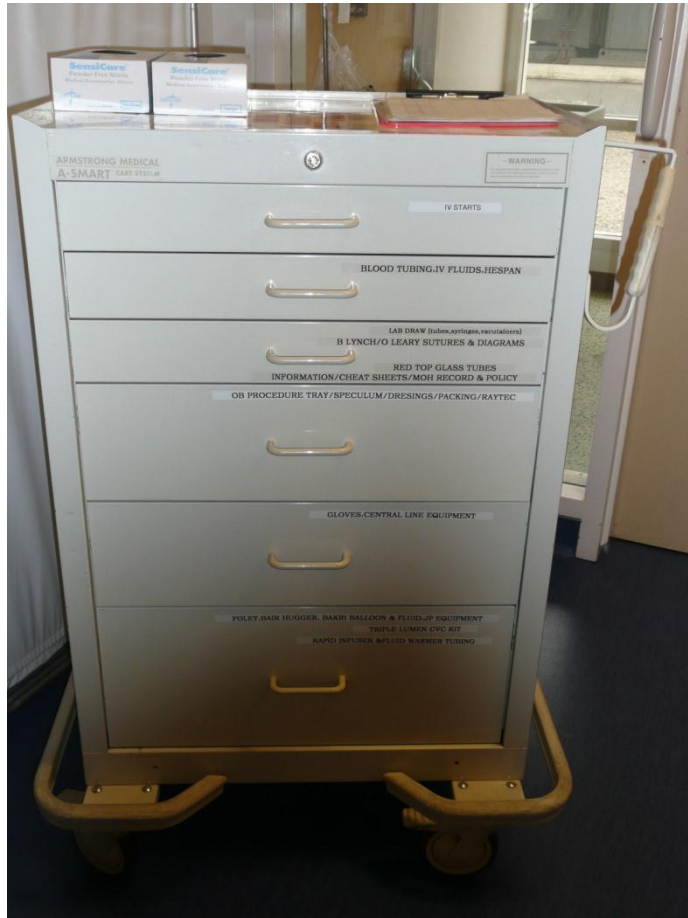
CMQCC Protocol-Stage 3

BACKGROUND
CAUSES/RISK FACTORS
ESTIMATING BLOOD LOSS
PPH MANAGEMENT
PPH PROTOCOLS
TEAM APPROACH

Stage 3	Total blood loss over 1500ml, <u>or</u> >2 units PRBCs given <u>or</u> VS unstable <u>or</u> suspicion of DIC		
<p><i>Stage 3 is focused on the Massive Transfusion protocol and invasive surgical approaches for control of bleeding.</i></p>	<ul style="list-style-type: none"> • Mobilize team <ul style="list-style-type: none"> -Advanced GYN surgeon -2nd Anesthesia Provider -OR staff -Adult Intensivist • Repeat labs including coags and ABG's • Central line • Social Worker/ family support 	<ul style="list-style-type: none"> • Activate Massive Hemorrhage Protocol • Laparotomy: <ul style="list-style-type: none"> -B-Lynch Suture -Uterine Artery Ligation -Hysterectomy • Patient support <ul style="list-style-type: none"> -Fluid warmer -Upper body warming device -Sequential compression stockings 	<p>Transfuse Aggressively Massive Hemorrhage Pack</p> <ul style="list-style-type: none"> • Near 1:1 PRBC:FFP • 1 PLT pheresis pack per 6units PRBCs <p>Unresponsive Coagulopathy: After 10 units PRBCs <u>and</u> full coagulation factor replacement: may consider rFactor VIIa</p>

Hemorrhage Cart

BACKGROUND
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TEAM APPROACH



Hemorrhage Box Contents

- ☐ Fluids: Lactated Ringers 1000 MI x 2; Normal Saline 1000 MI x 2
- ☐ Blood tubing x 2
- ☐ Rapid infusion blood tubing x 1
- ☐ Primary IV tubing x 3
- ☐ Extension IV tubing x 3
- ☐ IV start kit x 2
- ☐ 18 gauge IV catheter x 4
- ☐ 16 gauge IV catheter x 4
- ☐ 3 MI syringes x 4
- ☐ 20 MI syringes x 1
- ☐ IV pressure bags x 2
- ☐ 27 gauge spinal needles x 4
- ☐ Chux packs x 2
- ☐ Suction canister x 1
- ☐ Suction tubing 12 foot x 1
- ☐ Lap sponge packs x 2
- ☐ 4 x 4 packs x 2
- ☐ Foley catheter with Urimeter x 1
- ☐ Manual blood pressure cuff x 1
- ☐ Stethoscope x 1
- ☐ Oxygen mask x 2
- ☐ Calculator x 1
- ☐ Size 7 sterile gloves x 2
- ☐ Size 7 ½ sterile gloves x 2
- ☐ Ring forceps x 1
- ☐ Banjo curette x 1
- ☐ Right angle retractor x 1
- ☐ Sterile speculum x 1
- ☐ Central line kit, 9 French x 1
- ☐ Blood draw supplies: CBC; Type and Screen
- ☐ Flashlight x 1

HCA Women's and Children's Clinical Services, Postpartum Hemorrhage Skills and Simulation, August 28, 2008.



Value of Team Approach

Improving Hospital Systems for the Care of Women With Major Obstetric Hemorrhage

– Skupski DW, et al. Obstet Gynecol 2006

- In wake of 2 maternal mortalities, system changes implemented including a rapid response team as well as protocols for early diagnosis, assessment, and management of high risk patients
- Despite a significant increase in major obstetric hemorrhage cases, there were improved outcomes and fewer maternal deaths after implementing systemic approaches to improve patient safety.
Attention to improving the hospital systems necessary for the care of women at risk for major obstetric hemorrhage is important in the effort to decrease maternal mortality from hemorrhage

Use of Simulation

- **Recurrent Obstetric Management Mistakes Identified by Simulation**
 - Maslovitz S, et al. Obstet Gynecol 2007
- Simulation training of four OB emergencies—eclamptic seizure, postpartum hemorrhage, shoulder dystocia, and breech extraction.
- The most common management errors were:
 - Underestimation of blood loss (95%)
 - Delay in transporting the bleeding patient to the operating room (82%)
 - Unfamiliarity with prostaglandin administration to reverse uterine atony (82%)
 - Delayed administration of blood products to reverse consumption coagulopathy (66%)
- A curricular unit based on simulation of obstetric emergencies can identify pitfalls of management in labor and delivery rooms that need to be addressed

SBAR-Report to Clinician

BACKGROUND
CAUSES/RISK FACTORS
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SITUATION

- I am calling about: (patient name and location)
- The problem I am calling about is: (amount of bleeding, when bleeding started, etc.)
- I am concerned about the bleeding.

BACKGROUND

- State the pertinent delivery information: (time of delivery/route/medications received)
- State any pertinent obstetrical or medical history.
- Most recent vital signs:
- BP_____ Pulse_____Respirations_____Oxygen saturation_____
- Fundus_____Estimated blood loss_____
- Lab results_____

ASSESSMENT

- State your assessment of the clinical situation

RECOMMENDATION

- I request you come examine and evaluate the patient now.
- Additional tests to order? (CBC with platelets, brinogen, PT, PTT, T&C 4 units PRBC)
- Additional medication to order? (Oxytocin, methylergonovine, misoprostol, Hemabate)



SBAR-Handoff

BACKGROUND
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SITUATION

- Patient Name
- Room Number
- Admission Date/Delivery Date
- Physician(s)

BACKGROUND

- Delivery Note (vaginal, spontaneous or operative; episiotomy; lacerations)
- Pertinent History – Medical and Obstetrical
- Vital signs
- Fundus (firm, boggy, height)
- Bleeding (when bleeding began, for how long, estimated loss)
- IV (gauge, date started, fluids running, fluids given)
- Intake & Output (Foley, totals)
- Pain (location, last medication)

ASSESSMENT

- State your assessment of the clinical situation

RECOMMENDATION

- What are you concerned about?
- What are you uncomfortable with?
- Pending labs/tests, etc.
- Does a consult need to be requested?
- Does the plan of care need to be changed?
- Does the physician need to be contacted?



Massive Transfusion Protocol

BACKGROUND
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Stanford Massive Transfusion Protocol (Burtelow Trans 2007)

- Provides for emergency release of a “package” consisting of 6 units of pRBCs, 4 units of plasma (liquid or fresh-frozen), and 1 apheresis PLT unit
- Can be compiled, electronically issued, and delivered to the operating room, delivery room, or emergency department in less than 15 minutes
- The 6:4:1 ratio of pRBCs, plasma, and PLTs was designed to replace approximately 70% of the total RBC volume and 60% of the total circulating plasma volume of a 70 kg individual
- The 6:4:1 combination of pRBCs, plasma, and apheresis PLTs approximates a 60:40 volume-to-volume ratio of plasma to RBCs (i.e. hct 40%)



Resources

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- California Maternal Quality Care Collaborative
 - www.CMQCC.org
- ACOGNY Safe Motherhood Initiative
 - http://www.acog.org/acog_districts/dist_notice.cfm?recno=1&bulletin=1551
- Perinatal Foundation
 - http://www.perinatalweb.org/index.php?option=com_content&task=view&id=201&Itemid=304

