

Obstetric Hemorrhage

SUNY Stony Brook Education Module:

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Designed to promote a systemized and
standard response to

Obstetrical Hemorrhage

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Obstetric Hemorrhage

Stony Brook University Hospital has implemented a system for dealing with obstetrical hemorrhage to decrease the risk of maternal mortality. The components of the system include:

1. Education
2. Preparation
3. Vigilance
4. Persistence
5. Continuous improvement

Obstetric Hemorrhage

1. Education – includes this educational CD.
2. Preparation – includes:
 - a. standard admission orders for labor/delivery;
 - b. standard orders for obstetrical hemorrhage emergency;
 - c. a system developed to maintain obstetrical continuity with Maternal Fetal Medicine supervision for 24 hours after initiation of the obstetrical hemorrhage emergency;
 - d. appropriate equipment for labor and delivery;
 - e. appropriate training for physicians and nurses.

Obstetric Hemorrhage

3. Vigilance - is maintained by virtue of the system of orders, training, and monitoring which includes the education and preparation mentioned above.
4. Persistence - occurs for each individual patient by virtue of the mandated 24 hour monitoring (supervised by the perinatal and obstetrical teams) following the acute hemorrhage event.
5. Formal training - concerning obstetrical hemorrhage will occur for physicians and nurses and will include this instructional program (with additional practical drills).

Obstetric Hemorrhage

In the third trimester of pregnancy, blood flow to the uterus is increased to about 600 cc per minute. Most of this blood flows to the underside of the placenta where it bathes the coteledons. The human placental is hemochorial. This means that any loss in integrity in the utero-placental seal can allow leakage of virtually all of the maternal blood flowing to the uterus. Injury to the birth canal or uterus or failure of the uterus to contract properly after delivery can have the same hemorrhagic effects.

Obstetric Hemorrhage and Maternal Deaths

- Abruptio placenta – 19 percent
- Uterine rupture – 16 percent
- Uterine atony – 15 percent
- Coagulation disorder – 14 percent
- Placenta previa – 7 percent
- Placenta accreta – 6 percent
- Retained placenta – 4 percent

Chichaki, et al, 1999

Causes of Maternal Deaths due to Hemorrhage

- Inadequate resources and personnel – for example, home delivery attempts.
- Failure to prepare for obstetric hemorrhage –for example, no IV site started on admission.
- Delay in recognition of hemorrhage.
- Delay in treatment of hemorrhage.
- Treatment failures.

Antepartum Hemorrhage

- **Abruptio placenta**
- **Placenta previa**
- **Uterine rupture**

Definitive treatment is cesarean section for each of these conditions. Simultaneous preparation for transfusion should occur as needed. If heavy bleeding continues after the cesarean section, treat as postpartum hemorrhage.

Postpartum Hemorrhage: “Obstetrics is Bloody Business”*

*Cunningham, et. al: Williams Obstetrics, 21st ed., 2001

Postpartum Hemorrhage

Etiology

is linked to

Risk Factors

**Bleeding from
Placental
Implantation Site**

Hypotonic myometrium—uterine atony
Some general anesthetics
Poorly perfused myometrium
Over distended uterus
Prolonged labor
Very rapid labor
Oxytocin-induced or augmented labor
High parity
Uterine atony in previous pregnancy
Chorioamnionitis
Retained placental tissue
Avulsed cotyledon, succenturiate lobe
Abnormally adherent—accreta, increta,
percreta

Postpartum Hemorrhage

Etiology

is linked to

Risk Factors

Trauma to the
Genital Tract

Large episiotomy, including extensions
Lacerations of perineum, vagina or
cervix
Ruptured uterus

Coagulation Defects

Intensify all of the above

DO NOT UNDERESTIMATE BLOOD LOSS

Clinical Features of Shock

System	Early Shock	Late Shock
CNS	Altered mental states	Obtunded
Cardiac	Tachycardia Orthostatic hypotension	Cardiac failure Arrhythmias Hypotension
Renal	Oliguria	Anuria
Respiratory	Tachypnea	Tachypnea Respiratory failure
Hepatic	No change	Liver failure
Gastrointestinal	No change	Mucosal bleeding
Hematological	Anemia	Coagulopathy
Metabolic	None	Acidosis Hypocalcemia Hypomagnesemia

Categorization of Acute Hemorrhage

	Class 1	Class 2	Class 3	Class 4
Blood loss (% blood volume)	15%	15%-30%	30%-40%	>40%
Pulse rate	<100	>100	>120	>140
Pulse pressure	Normal	Decreased	Decreased	Decreased
Blood pressure	Normal or increased	Decreased	Decreased	Decreased

Goals of Therapy

- Maintain the following:
 - Systolic pressure >90 mm Hg
 - Urine output >0.5 mL/kg/hr
 - Normal mental status
- Eliminate the source of hemorrhage
- Avoid overzealous volume replacement that may contribute to pulmonary edema

Management Protocol

To be undertaken simultaneously with management of hypovolemic shock

- Examine the uterus to rule out atony
- Examine the vagina and cervix to rule out lacerations; repair if present
- Explore the uterus and perform curettage to rule out retained placenta

Management Protocol (cont'd.)

- For uterine atony:
 - Firm bimanual compression
 - Oxytocin infusion, 40 units in 1 liter of D₅RL
 - 15-methyl prostglandin F_{2a}, 0.25 to 0.50 mg intramuscularly; may be repeated
 - Methergine 0.2 mg IM, PGE₁ 200 mg, or PGE₂ 20 mg are second line drugs in appropriate patients
 - Bilateral uterine artery ligation
 - Bilateral hypogastric artery ligation (if patient is clinically stable and future childbearing is of great importance)
 - Hysterectomy

Management of Hypovolemic Shock

- Insert at least two large catheters. Start saline infusion. Apply compression cuff to infusion pack. Monitor central venous pressure (CVP) and arterial pressure.
- Alert blood bank. Take samples for transfusion and coagulation screen. Order at least 6 units of red cells. Do not insist on cross matched blood if transfusion is urgently needed
- Place patient in the Trendelenburg position
- Warm the resuscitation fluids
- Call extra staff, including consultant anesthesiologist and obstetrician.
- Rapidly infuse 5% dextrose in lactated Ringer's solution while blood products are obtained.

Management of Hypovolemic Shock (cont'd)

- Transfuse red cells as soon as possible. Until then:
 - crystalloid, maximum of 2 liters
 - colloid, maximum of 1.5 liters
- Restore normovolaemia as priority, monitor red cell replacement with Hematocrit or Hemoglobin
- Use coagulation screens to guide and monitor use of blood components
- If massive bleeding continues, give FFP 1 unit, cryoprecipitate 10 units while awaiting coagulation results
- Monitor pulse rate, blood pressure, CVP, blood gases, acid-base status and urinary output (catheterization)
Consider adding oxygen by mask.

Emergency Obstetrics Hemorrhage Orders

- Transfuse two units of packed red blood cells immediately. Use cross matched blood if available; otherwise use type specific or O negative packed red blood cells. Call the blood bank with the patient's name, medical record number and DOB to request the two units.
- Bring a “request for release of blood” form for cross matched blood [or a “Blood Bank Emergency Blood Release” {Downtime} Form signed by the physician for O negative blood (uncross matched)].

Hemorrhage causes 30% of All Maternal Mortality

Causes of 763 Deaths due to hemorrhage

- Abruptio Placentae	19%
- Laceration or rupture	19%
- Atonic uterus	15%
- Coagulopathy	14%
- Placenta Previa	7%
- Placental accreta	6%
- Uterine Bleeding	6%
- Retained placenta	4%

Chichaki, et al, 1999

Postpartum Hemorrhage

- Traditional Definition: Loss of 500 ml of blood (or more) after completion of the third stage of labor (based on clinician's estimation of blood loss).
 - Problem 1: almost 50% of deliveries lose >500 ml of blood.
 - Problem 2: estimated blood loss is often less than half the actual blood loss.

Postpartum Hemorrhage

- Problem 3: Most of the serious causes of “Postpartum Hemorrhage” have origins prior to the end of the 3rd Stage of labor.
- Problem 4: Postpartum hemorrhage, as defined, is technically misdiagnosed and clinically irrelevant.

Change of Nomenclature

- For the reasons given, consider replacing the term “ Postpartum Hemorrhage” with the following term:

“Obstetrical Hemorrhage”

Obstetrical Hemorrhage

■ New definition:

Blood loss associated with pregnancy or parturition that meets one or more of the following criteria:

- causes maternal or perinatal death
- requires blood transfusion
- decreases Hct by 10 points
- triggers emergency therapeutic response

Obstetrical Hemorrhage

- Placental causes:
 - Placenta Previa
 - Abruptio Placentae
 - Accreta, increta, percreta
 - Vasa previa

Obstetric Hemorrhage

■ Obstetric Trauma

- Uterine Rupture

- Lacerations of the Birth Canal

- Operative Trauma

 - Cesarean sections

 - Episiotomies

 - Forceps, Vacuums, Rotations

Obstetric Hemorrhage

■ Uterine Atony

- Retained placental tissue
- Over distended Uterus
- Inhalation Anesthesia Agents
- Uterine Muscle Failure
- Grand Multiparity

Obstetric Hemorrhage

- Coagulation Defects (contributory)
 - Sepsis
 - Amniotic Fluid Embolism
 - Abruptio Placentae associated coagulopathy
 - HELLP Syndrome
 - Dilutional Coagulopathy
 - Inherited Clotting Disorders
 - Anticoagulant Therapy

Obstetric Hemorrhage

■ Abruptio Placenta:

- 1/200 deliveries
- Painful tetanic uterus
- Bleeding may be hidden initially
- Causes 12% to 15% of all stillbirths
- Can NOT be predicted by tests for fetal wellbeing (NST nor BPP)
- Can be associated with preterm labor

Obstetric Hemorrhage

- Abruptio Placenta – Risk factors:
 - Previous Abruptio Placenta = 10%
 - Elevated Blood Pressure (chronic and preeclampsia) = 1%
 - Preterm premature rupture of membranes = 1-2%
 - Cigarette Smoking = 1%
 - Cocaine Abuse = 15%
 - Blunt abdominal trauma = 1%

Abruptio Placenta

Diagnosis may be less important than the clinical presentation!

- Treat the bleeding and fetal distress with delivery (often Cesarean-section)
- Treat maternal blood loss and disseminated intravascular coagulation with IV fluids and blood products

Placenta Previa

- occurs in about 0.5% of pregnancies (like Abruptio Placenta) :
 - “painless” antepartum vaginal bleeding
 - Best diagnosed by ultrasound
- Delivery at term or when clinically necessary by Cesarean section.

Placenta Previa – Obstetric Hemorrhage

- Can be associated with heavy bleeding at Cesarean section because of placental invasion of the myometrium (placenta accreta, increta, or percreta) or placental growth through the old scar of a previous C-section.

Obstetric Hemorrhage: MANAGEMENT

Delivery Considerations:

1. Avoid difficult forceps and vacuum deliveries
2. Consider delaying or avoiding episiotomy
3. (Epidural anesthesia seems to help us)
4. Attendant for the newborn (so maternal care is not compromised)
5. Blood bank availability

Uterine Rupture

- Prior Cesarean section = 1-2%
- Modern obstetrics = 1/10,000 to 1/20,000 in unscarred uterus
- In “Neglected labors”, this accounts for many maternal deaths where modern obstetrical care is not available.

Obstetric Hemorrhage: MANAGEMENT

- Modern Obstetrical Care –

Early Prenatal Care:

1. Confirms Intrauterine Pregnancy and gives correct gestational age (early ultrasound)
2. Identifies risk factors by History
3. Potential for prevention: **STOP SMOKING**
4. and treat drug addiction
5. Educate patient and provide emergency communication and care

Obstetric Hemorrhage: MANAGEMENT

- Modern Obstetrical Care –

Routine Management of Care on Admission for delivery includes:

1. Decreased rate of Vaginal Birth after prior Cesarean section (and with close monitoring)
2. Intravenous lines for all patients admitted in labor or for induction
3. Close monitoring of Maternal and Fetal condition until after delivery

Obstetric Hemorrhage: MANAGEMENT

- Modern Obstetrical Care –

1. Initial Laboratory work: Blood type and Hct
2. 2nd trimester ultrasound for placental position and other risk factors
3. Monitor blood pressure – treat with rest or delivery if necessary
4. **EMERGENCY ACCESS** to Hospital level care

Obstetric Hemorrhage: MANAGEMENT

The Placenta:

1. Deliver intact and in 20 minutes.
2. Check for evidence of missing fragments after delivery.
3. If manual extraction is needed, alert the operative team of potential need for laparotomy.

Obstetric Hemorrhage: MANAGEMENT

BLOOD BANK:

- All patients should have records of blood type and antibody screen by time they are admitted for delivery.
- Patients at risk for Obstetric Hemorrhage should have blood drawn on admission to either hold in the blood bank or crossmatch.

Obstetric Hemorrhage: MANAGEMENT

On recognition of Hemorrhage:

1. Initiate volume replacement with lactated ringers or normal saline.
2. Alert blood bank and surgical team.
3. Control the blood loss.
4. Initiate decisive therapy.
5. Monitor for complications.

Obstetric Hemorrhage: MANAGEMENT

Control the Blood Loss Immediately:

1. Uterine atony – explore uterus for retained placental tissue.
2. Uterine atony – uterine massage.
3. Uterine atony – oxytocin IM or in the Intravenous fluid, methylergonovine 0.2 mg IM, or 15-methyl-prostaglandins F2alpha 0.25 mg IM.
4. Inspect the cervix, vagina, and perineum for lacerations and apply direct pressure until sutures can stop the bleeding.
5. Identification and ligation of arterial bleeding is preferred, if possible.

Obstetric Hemorrhage

- If Hemorrhage is not controlled by medications, massage, manual uterine exploration, or suturing lacerations in the birth canal, then surgical or radiological options must be considered. At this time, start:
 1. Packed red blood cell transfusion
 2. Foley catheter and monitor urine output

Obstetric Hemorrhage

- If the patient is stable and bleeding is not “torrential”, and if interventional radiology is available, then pelvic arteriography may show the site of blood loss and therapeutic arterial embolization may suffice to stop the bleeding.

Obstetric Hemorrhage

Laparotomy for Obstetric Hemorrhage:

- Bleeding at Cesarean section
- “Torrential” Hemorrhage
- Pelvic hematoma (expanding)
- Bleeding uncontrolled by other means

Obstetric Hemorrhage

Laparotomy for Hemorrhage

- continue to replace blood loss with fluid and packed red blood cells; add fresh frozen plasma and platelets after about 6 units of blood. Use pulse, blood pressure, and urinary output to monitor adequacy of fluid replacement.

Obstetric Hemorrhage

Laparotomy for Hemorrhage:

- Transient compression of the aortic bifurcation against the sacral prominence can increase arterial perfusion pressure to the maternal heart, brain, and kidneys; also this will decrease loss of blood into the operative field.
- Consider cell saver.

Obstetric Hemorrhage

Laparotomy for Hemorrhage:

- Uterine artery ligation (with additional ligation of the utero-ovarian artery)
- Ligation of the internal iliac artery (bilateral may be needed)
- Hysterectomy (super cervical may need to be done)

Obstetric Hemorrhage

Complications following heavy bleeding and/or surgery:

- Shock lung requires careful fluid management and respiratory therapy.
- Pituitary ischemic injury (Sheehan's syndrome) may require endocrinologic replacement therapy.
- Acute renal injury may require dialysis.
- Antibiotic therapy may be indicated.

Obstetric Hemorrhage

CONCLUSIONS:

1. Management of Obstetric Hemorrhage starts with good prenatal care and a system that allows appropriate emergency services.
2. Logical organized approach to evaluation and treatment of Obstetrical Hemorrhage has been described.

Emergency Obstetrical Hemorrhage

- Please answer these following questions as a practice quiz following this lecture (see next slides).
- Please make suggestions concerning improving this CD lecture in writing.
- Thank you for your help.

Questions

- Which of these drugs are given intravenously to treat uterine atony?
 - a. prostaglandins
 - b. methergine
 - c. oxytocin

Questions

- Uterine blood flow near the end of pregnancy equals how many cc per minute?
- Appropriate treatment for uterine rupture with vaginal bleeding is:
 - a. cesarean section
 - b. emergency transfusion
 - c. prostaglandins

Questions

- In Chichaki's study of obstetrical hemorrhage in 1999, which of these caused the most maternal deaths?
 1. placenta previa
 2. uterine atony
 3. abruptio placenta

Questions

- In Chichaki's study of obstetrical hemorrhage in 1999, which of these were associated with the highest risk of abruptio placenta?
 1. cocaine abuse
 2. previous abruptio placenta
 3. smoking



**Labor and Delivery Admission:
PHYSICIAN'S ORDERS**

ORDERS: Must include physician's signature and ID# STAT ORDERS <u>MUST</u> BE COMMUNICATED TO NURSE	Transcriber's Initials/ID#
Admit to Labor and Delivery Service of Dr./CNM _____	
Condition:	
Diagnosis:	
Allergies:	
Activity: <input type="checkbox"/> Ad lib <input type="checkbox"/> Complete bed rest <input type="checkbox"/> Bed rest Bathroom Privileges	
Fetal Monitoring: <input type="checkbox"/> Continuous, except for ambulation <input type="checkbox"/> Intermittent Schedule: _____ <input type="checkbox"/> May ambulate after reactive FHR tracing is obtained	
Vital Signs: <input type="checkbox"/> Per policy <input type="checkbox"/> Other _____	
IV Fluids: Start _____ gauge IV: IV _____ to run at _____ mL / Hour.	
Diet: <input type="checkbox"/> NPO <input type="checkbox"/> NPO except ice chips <input type="checkbox"/> Clear liquids until in active labor, then NPO <input type="checkbox"/> Other _____	
Labs: <input type="checkbox"/> Blood typing- see pg 2 <input type="checkbox"/> CBC with platelets, RPR <input type="checkbox"/> Hepatitis B surface antigen (if no prenatal results available) <input type="checkbox"/> Expedited Maternal HIV test (if no prenatal results available) <input type="checkbox"/> Other _____	
MD/LIP/NP Signature: _____ ID# _____ Date: _____ Time: _____	
Nurse's Signature: _____ ID# _____ Date: _____ Time: _____	
DO NOT ORDER MEDICATIONS ON THIS SHEET	



Labor and Delivery Admission:
PHYSICIAN'S ORDERS

ORDERS: Must include physician's signature and ID# STAT ORDERS <u>MUST</u> BE COMMUNICATED TO NURSE	Transcriber's Initials/ID#
One of the following must be chosen:	
<input type="checkbox"/> Low Risk for Hemorrhage OR <input type="checkbox"/> Moderate Risk for Hemorrhage May include but not limited to: Cesarean Sections, previous uterine incision, multiple gestations, macrosomia, prior post partum hemorrhage, uterine fibroids, and any other increased risk identified by the physician or CNM. CBC with platelets Type and Screen Additional Labs: _____	
<input type="checkbox"/> High Risk for Hemorrhage May include but not limited to: placenta previa, suspected placenta accreta, suspected placental abruption, Hematocrit less than 26%, vaginal bleeding on admission, coagulation defects and any other increased risk identified by physician or CNM. CBC with platelets Type, Screen and Crossmatch for 2 units of Packed Red Blood Cells PT/APTT Fibrinogen Additional Labs: _____ Start primary IV: 18 gauge or larger, _____ at _____ mL/hr Start second IV: 18 gauge or larger, Normal Saline, with Y tubing for blood administration at _____ mL/hr Anesthesia Consult Maternal Fetal Medicine Consult	
<input type="checkbox"/> Contact Cell Saver Team 800 235 5728	
MD/LIP/NP Signature:	ID#
Date:	Time:
Nurse's Signature:	ID#
Date:	Time:

OBSTETRICAL HEMORRHAGE PHYSICIAN'S ORDER SHEET

ORDERS: Must include physician's signature and ID# STAT ORDERS <u>MUST</u> BE COMMUNICATED TO NURSE	Transcriber's Initials/ID#
Labwork: CBC with platelets, PT/APTT, Fibrinogen, D-Dimer, Urinalysis Blood Bank orders: Type and Screen, and 4 crossmatched Packed Red blood Cell units Other Labwork _____	
Use fluid warmer to infuse IV fluids and blood products	
Start <u>second IV</u> Normal Saline, 16 or 18 gauge, with Y tubing for blood administration	
IV fluids: #1 Lactated Ringers at 125 mL/hr #2 Normal Saline at 125 mL/hr (adjust IV fluids rate as directed by responsible physician)	
Transfuse 2 units available Packed Red Blood Cells immediately	
Thaw 2 units Fresh Frozen Plasma: Transfuse as directed by responsible physician.	
<input checked="" type="checkbox"/> Hetastarch (HEXTEND) 500 mL x 1 prn volume depletion. Infuse as directed by responsible physician.	
Document Blood Pressure, Pulse, Respirations q 5 minutes during acute hemorrhage, and every 15 minutes when stable	
Temperature Q 1 Hour	
Continuous cardiac monitoring, pulse oximetry	
Oxygen at 10 L /minute by nonrebreather mask	
Insert indwelling Foley catheter	
Strict hourly intake and output	
Anesthesia Consult	
Maternal Fetal Medicine Consult	
MD/LIP/NP Signature: _____ ID# _____ Date: _____ Time: _____	
Nurse's Signature: _____ ID# _____ Date: _____ Time: _____	



**OBSTETRICAL HEMORRHAGE
PHYSICIAN'S ORDER SHEET**

ORDERS: Must include physician's signature and ID# STAT ORDERS <u>MUST</u> BE COMMUNICATED TO NURSE	Transcriber's Initials/ID#
Medications: <input type="checkbox"/> Oxytocin ___units/L in _____ to run at _____mL/hr, times ____ Liters <input type="checkbox"/> Methylergonovine (METHERGINE) 0.2 mg IM X 1 <i>(Prescriber : Use with extreme caution in hypertensive patients)</i> <input type="checkbox"/> Carboprost (HEMABATE) 250 micrograms IM X 1 <input type="checkbox"/> Misoprostol (CYTOTEC) _____micrograms per rectum by physician X 1	
<input type="checkbox"/> Interventional Radiology consult (4-2413, or page radiology resident on call)	
<input type="checkbox"/> GYN Oncology Consult	
<input type="checkbox"/> Surgical Trauma Consult	
<input type="checkbox"/> Call Cell Saver Team (800 235 5728)	
Other Orders:	
MD/LIP/NP Signature: _____ ID# _____ Date: _____ Time: _____	
Nurse's Signature: _____ ID# _____ Date: _____ Time: _____	



* O B 2 C 2 8 9 *



OBSTETRIC HEMORRHAGE FLOW SHEET

To be completed by Obstetric Service for first 24 hours after Emergency Hemorrhage. DATE: _____

Time Following Hemorrhage	BP	Pulse	RR	Recent H&H*	Bleeding Status	Urine Total	Total Intake	Total Blood Products Infused	MFM Notified (Name, Date/ Time)	Physician Signature/ID#
0 Hours Time: _____										
2 Hours Time: _____										
4 Hours Time: _____										
6 Hours Time: _____										
8 Hours Time: _____										
12 Hours Time: _____										
18 Hours Time: _____										
24 Hours Time: _____										

COMMENTS:

Date/Time	Comment**	Signature/ID#

Maternal Fetal Medicine Comments: _____

MFM Physician Signature: _____ ID# _____ DATE: _____ TIME: _____

* Include Time Drawn
 ** Include Appropriate Lab Values

References

Cunningham FG, et. al: Williams Obstetrics. McGraw-Hill, 2001, 21st ed.

Clark S, et. al: Critical Care Obstetrics. Blackwell, 1997, 3rd ed.

Clinical Practice Obstetric Committee, Society of Obstetricians and Gynecologists of Canada: Clinical Practice Committee Guidelines: Hemorrhagic Shock. Vol. 115, June 2002.

Stony Brook University Hospital Transfusion Services Manual.

Stony Brook University Hospital Transfusion Order Reminders.

The End



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