Postpartum Hemorrhage:
An Obstetric Emergency

Presented by
Sherrylyn Waldron, MSN, RNC-OB

Postpartum Hemorrhage

Definition

- Blood loss of > 500 ml of blood during vaginal delivery and > 1000 ml of blood with cesarean delivery.
- A 10% decrease in hematocrit from admission assessment to postpartum data collection.
- The need to administer a transfusion of red blood cells.

Source:

- Cunningham, F.G., Leveno, K.J., Bloom, S.L., Hauth, J.C., Gilstrap, L.C., & Wenstrom, K.D. (2005). Williams Obstetrics (22nd Edition). New York: McGraw-Hill.

Early Postpartum Hemorrhage

- After delivery of the placenta.
- Up to 24 hours after birth.

Causes:

  - Uterine atony
  - Lacerations of the cervix, vagina, perineum, labia
  - Disseminated intravascular coagulation

Late Postpartum Hemorrhage

- Occurs 24 hours to 6 weeks after delivery

Causes:

- Subinvolution of the uterus
- Retained placental tissue
- Abnormal implantation of the placenta

Postpartum Hemorrhage

Excessive and rapid blood loss

Severe drop in maternal bp

Shock and death, if untreated

Postpartum Hemorrhage

- Affects 2-4% vaginal deliveries and 6% of Cesarean sections.
- 11% of maternal deaths (ACOG -2022)
- Experienced by 14 million women globally resulting in 70,000 maternal deaths (2023 - WHO)
- Almost 95% occurred in low and lower middle-income countries in 2020, and most could have been prevented (54-93%)
- Responsible for 25-43% of maternal deaths in Sub-Saharan Africa

Postpartum Hemorrhage

- Causes of Maternal Death
  - Postpartum hemorrhage is the leading cause of maternal death followed by
  - infections (usually after childbirth);
  - high blood pressure during pregnancy (pre-eclampsia and eclampsia),
  - complications from delivery and
  - unsafe abortion.
- Uterine atony is the primary cause followed by retained tissue, genital tract tears, coagulation issues and uterine rupture

Postpartum Hemorrhage

WHO Postpartum Haemorrhage Summit

March 2023

140 Representatives from over 50 countries

SDG 3.1 goal by 2030

<70:100,000 live births

Postpartum Hemorrhage

Risk Factors

- Uterine atony and/or history of
- Precipitous labor, precipitous birth
- Intraamniotic infection (IAI)
- Enlarged uterus - Macrosomia, polyhydramnios
- Multifetal gestation
- Retained products of conception
- Clotted blood in uterus
- Prolonged labor
- High parity
- Prostaglandin ripening or induction
- Oxytocin induction or augmentation

Postpartum Hemorrhage

Risk Factors

- Anesthesia effects
- Genital tract lacerations, hematoma
- Compound presentation
- Forceps birth
- Vacuum extraction
- Episiotomy extension
- Coagulation defects
- Sepsis
- Large episiotomy, including extensions; lacerations of the perineum, vagina, or cervix: rupture uterus
- Poorly perfused myometrium because of hypotension, hemorrhage, conduction anesthesia

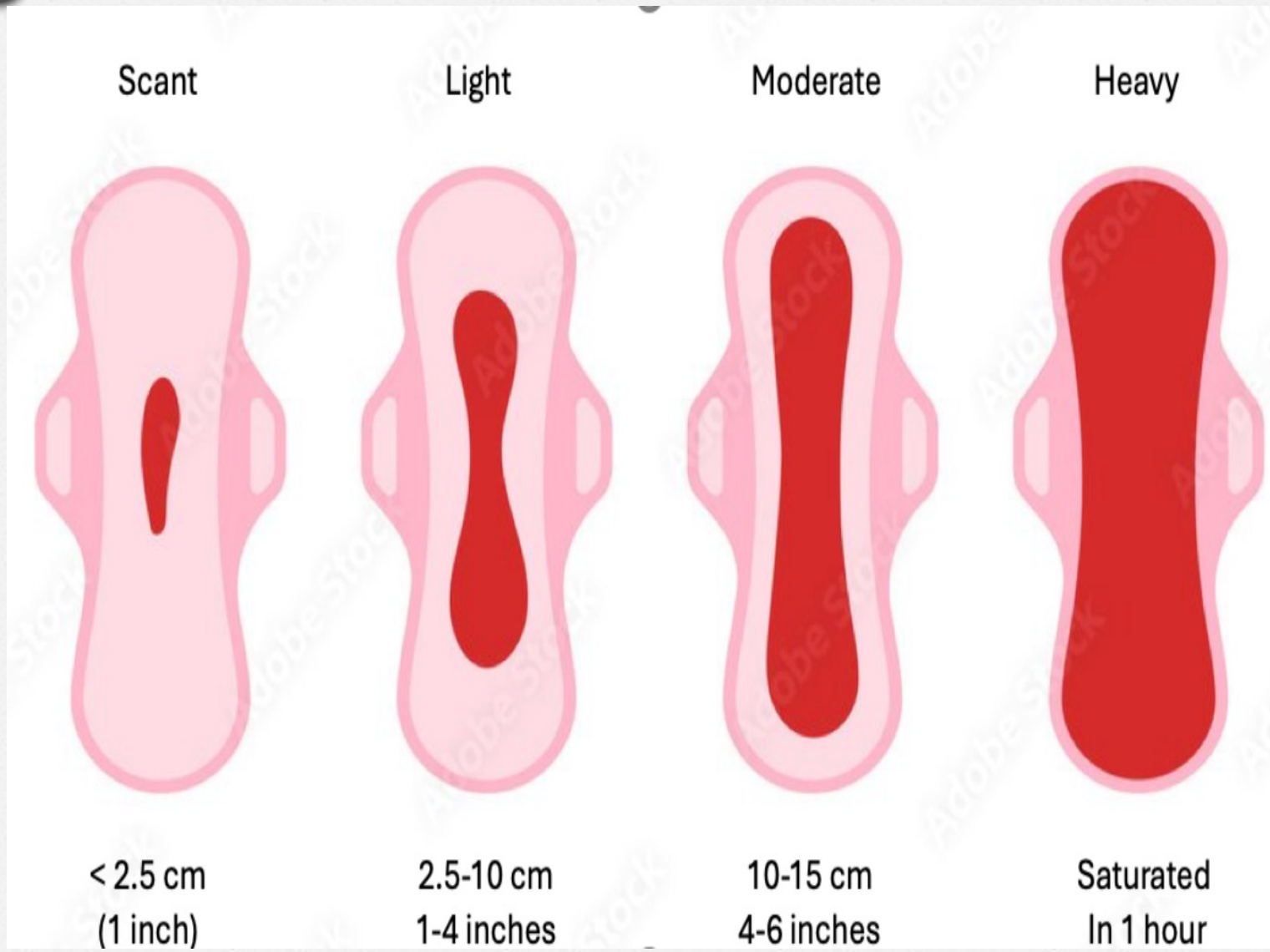
Signs and Symptoms of Postpartum Hemorrhage

- Continuous bleeding
- Light headedness
- Tachycardia
- Decreased blood pressure
- Oliguria
- Hypothermia
- Color pale
- Respiratory distress
- Syncope
- Sweating
- Coma
- Death

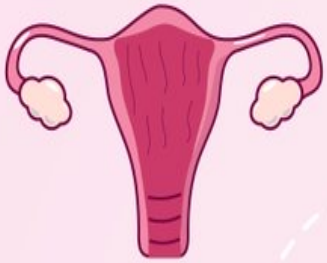
Clinical Findings in Obstetric Hemorrhage

Blood Volume Loss	Blood Pressure (systolic)	Symptoms and Signs	Degree of Shock
500-1000 mL (10-15%)	Normal	Palpitations, tachycardia, dizziness	Compensated
1000-1500 mL (15-25%)	Slight fall (80-100 mm Hg)	Weakness, tachycardia, sweating	Mild
1500-2000 mL (25-35%)	Moderate fall (70-80 mm Hg)	Restlessness pallor, oliguria	Moderate
2000-3000 mL (35-50%)	Marked fall (50-70 mm Hg)	Collapse, air hunger, anuria	Severe

ACOG educational bulletin: Hemorrhage Shock #235


Scant
Light
Moderate
Heavy
< 2.5 cm
(1 inch)
2.5-10 cm
1-4 inches
10-15 cm
4-6 inches
Saturated
In 1 hour

The 4 T's of Postpartum Hemorrhage



Tone

Uterine atony

Tx: - Bimanual uterine massage
- Oxytocin

Trauma

Lacerations, hematomas

Tx: - Repair lacerations
- Surgery if uterine rupture

Tissue

Retained products of conception

Tx: - Uterine evacuation
- Abx if endometritis

Thrombin

DIC

Tx: - Replace coagulation factors

Reference: Tintinalli's Emergency Medicine A Comprehensive Study Guide -9th, Edition 2020: Chapter 102

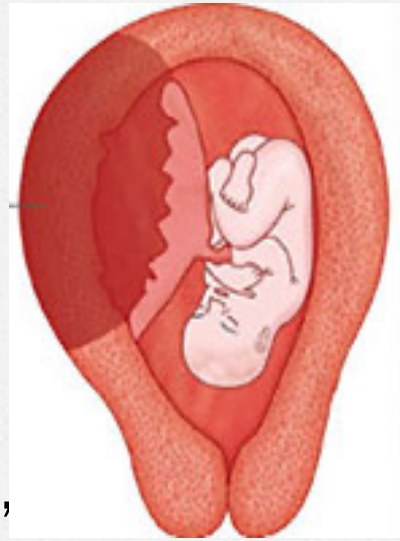
Postpartum Hemorrhage

4 T's of Postpartum Hemorrhage

- Tone – poor myometrial contraction
  - Uterine atony
  - Overdistention of the uterus
  - Uterine structural abnormality
  - Placenta implanted in the lower segment
  - Infection
  - Covelaire uterus
  - Hypothermia

Covelaire Uterus

- Occurs in about 5 % of placental abruptions - Most severe
- Bleeding penetrates into uterine myometrium, through the peritoneal cavity
- Uterus tense and rigid



Sxs - pain secondary to uterine contractions, uterine tetany or local uterine tenderness

Treatment – evacuate uterus, stimulate contractions, oxytocin, possible hysterectomy

Prognosis – compromised fetus, hypovolemic shock in mother.

Postpartum Hemorrhage

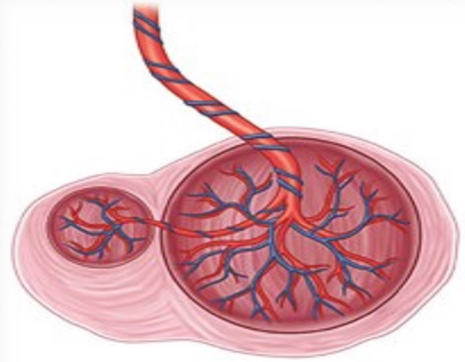
4 T's of Postpartum Hemorrhage

- Trauma– damage to the genital tract
  - Lacerations of the cervix, vagina, labia
  - Genital tract hematomas >3 cm
- Consider
  - Uterine rupture

Postpartum Hemorrhage

4 T's of Postpartum Hemorrhage

- Tissue – retention of placental tissue
  - Incomplete evacuation of placental tissue
  - Placenta accreta
  - Succenturiate or accessory lobe of placenta



Succenturiate placenta

Postpartum Hemorrhage

4 T's of Postpartum Hemorrhage

Thrombosis – clotting disorder

- Causes:
  - Platelet dysfunction
  - Inherited coagulopathy
  - Use of anticoagulants
  - Obstetric complications
    - Disseminated intravascular coagulation
    - Placental abruption
    - Amniotic fluid embolism
    - HELLP Syndrome
    - Sepsis

Postpartum Hemorrhage

Uterine Atony

- Occurs in 5% of deliveries.
- Is the leading cause of postpartum hemorrhage.
- The uterus is not contracted.
- There is usually no retained placental tissue.

Postpartum Hemorrhage

Uterine Atony – Caused by:

- A prolonged and difficult labor
- Excessive stretching of the uterus – macrosomia, twin gestation, polyhydramnios
- Oxytocin induction with prolonged labor.
- Magnesium sulfate
- Fibroids or benign growths in the uterus
- Chorioamnionitis
- Obesity

Postpartum Hemorrhage

Uterine Atony

Signs and Symptoms

- Low blood pressure
- Fast heartbeat
- Pale appearance
- Reduced urination
- Dizziness
- Unconsciousness

Management of Postpartum Hemorrhage

UTEROTONIC AGENTS USED FOR POSTPARTUM HEMORRHAGE				
Medical Management of Postpartum Hemorrhage				
Medication	*Dose/Route*	*Frequency*	*Side Effects*	*Comments/Contraindications*
Oxytocin (pitocin)	IV: 10-40 U in 1 L normal saline or lactated Ringer's solution IM: 10 U	Continuous	Usually non, but N&V and water intoxication have been reported	Avoid undiluted rapid IV infusion, which can cause hypotension
Methylergonovine (Methergine)	IM 0.2 mg	Every 2-4 hr	Hypertension, hypotension, N&V	Avoid if patient is hypertensive
15-methyl-prostaglandin F_2 (Carboprost, Hemobate)	IM: 0.25 mg α	Every 15-90 min, 8 doses maximum	N&V, diarrhea, flushing or hot flashes, chills or shivering	Avoid in asthmatic patients; relative contraindication if hepatic, renal, and cardiac disease. Diarrhea, fever, and tachycardia can occur.
Dinoprostone (Prostin E_2)	Suppository: vaginal or rectal 20 mg	Every 2 hr	N&V, diarrhea, fever, headache, chills or shivering	Avoid if patient is hypotensive. If available, 15-methyl-prostaglandin F_2 is preferred. Fever is common. Stored frozen, it must be thawed to room temperature.
Misoprostol (Cytotec, PGE_1)	800-1,000 micrograms rectally	1 dose	Fever, chills and shivering	Usually used when other medications have not resulted in resolution of hemorrhage

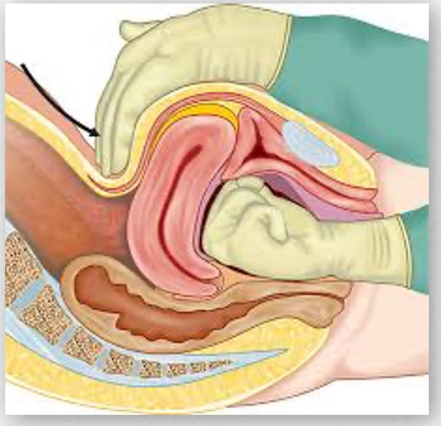
IV, intravenously; IM, intramuscularly; PG, prostaglandin; N&V, nausea and vomiting.

Adapted from American College of Obstetrics and Gynecologists. (2006b). Postpartum Hemorrhage (Practice Bulletin No. 76).

Postpartum Hemorrhage

Uterine Atony – Management

- Bilateral uterine massage
- Medications
- Postpartum hemorrhage control
- Uterine artery ligation
- Hysterectomy



Postpartum Hemorrhage

Lacerations

- Lacerations of the cervix, vagina, perineum, or labia cause bleeding until they are repaired.

If the uterus is firm and contracted and the patient continues to bleed, reinspection of the birth canal should be performed. The bleeding is usually bright red.

Postpartum Hemorrhage

Retained Placenta

- Occurs in 2% of all deliveries
- Pieces of the placenta remain attached at the placental site.
- The uterus will not contract completely.
- The patient will continue to bleed.

Management:

- Manual removal of placenta under anesthesia
- Administer antibiotic

Postpartum Hemorrhage

- Most placentas deliver within 30 minutes of delivery.
- 40% of placentas deliver spontaneously between 30-60 minutes with an average blood loss of 300 ml.

Postpartum Hemorrhage

Abnormal Implantation of the Placenta

- There is inadequate amounts of decidua basalis so the placenta attachment penetrates through the endometrium and into the myometrium.

Result:

- Delayed separation of the placenta
- Increased risk for heavy bleeding

Risk Factors:

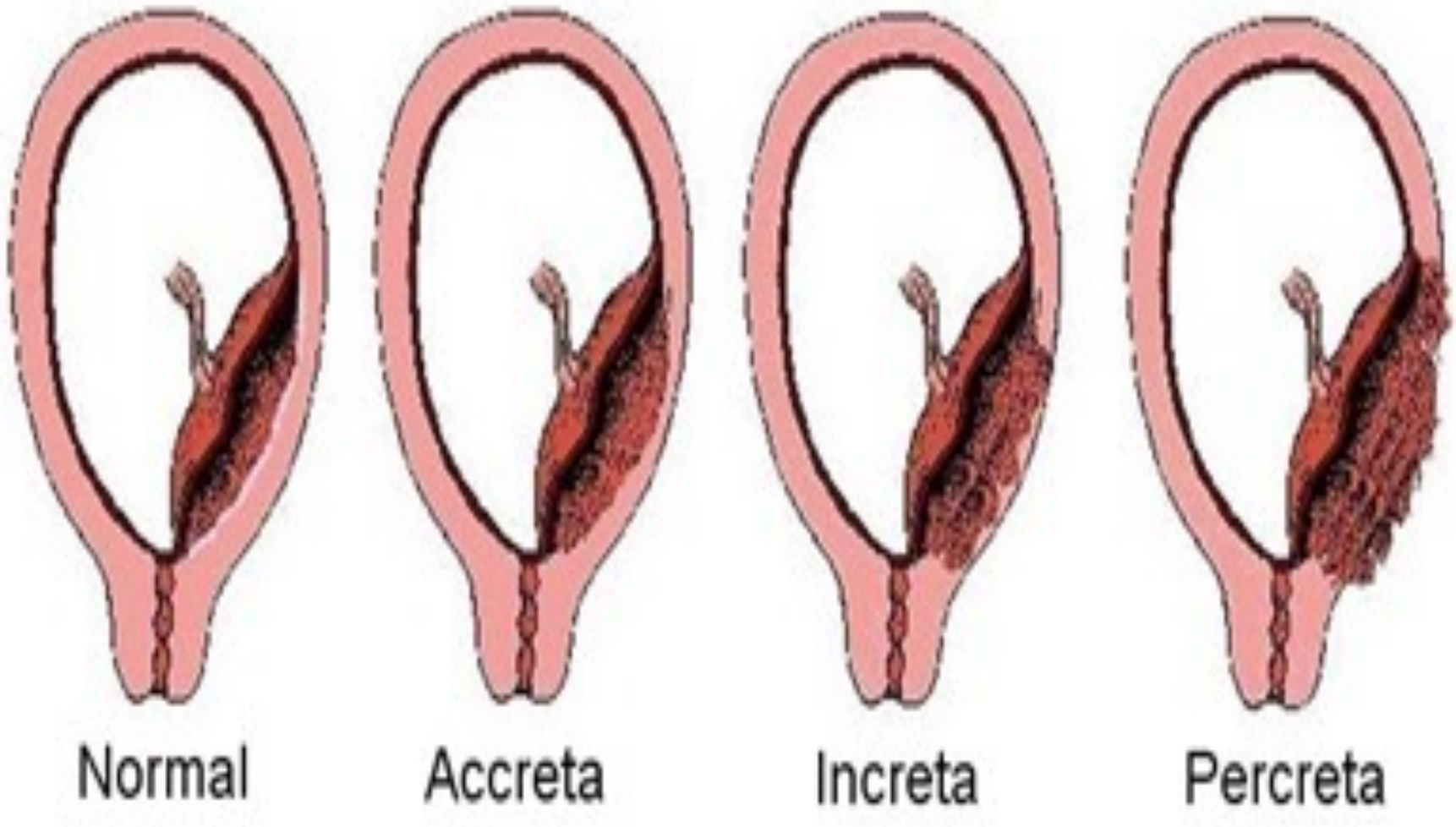
- Previous uterine surgery
- Thin decidua

Postpartum Hemorrhage

Abnormal Implantation of the Placenta

Types:

- Accreta – attachment to the myometrium without penetrating the entire thickness of the muscle
- Increta – the placenta attaches deeper into the myometrium
- Percreta – the placenta penetrates through the uterine wall and sometimes attaches to other organs



Abnormal Implantation of Placenta

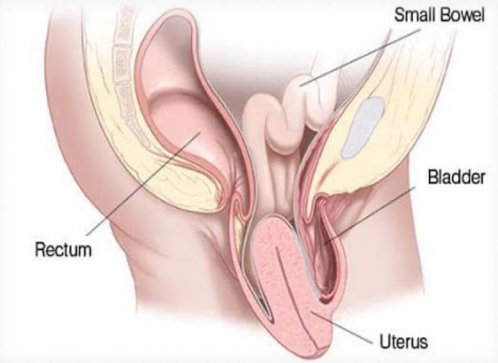
Postpartum Hemorrhage

Inversion of the Uterus

- The uterus literally turns inside out. The inversion may be partial or complete.
- Patient experiences sudden, acute pelvic pain
- Fundal massage unsuccessful

Causes include:

- Straining or Valsalva's maneuver
- Traction on the cord before separation of the placenta
- Kneading the uterus to induce separation of the placenta
- Placental extraction under deep relaxing anesthesia



Postpartum Hemorrhage

Inversion of the Uterus - Management:

- D/C uterotonic medications
- Administer IV fluids and blood products
- Attempt manual replacement of uterus
- Antibiotic
- Prepare for surgery, anesthesia
- Prevent recurrent inversion
  - Cerclage
  - Intrauterine balloon
  - Uterine compression sutures

Postpartum Hemorrhage

Tumors of the Cervix or Uterus

- Tumors of the uterus and cervix prevents proper contraction of these structures. During the gestation period, these myomas may increase in size because of the high levels of hormones in the blood.

Postpartum Hemorrhage

Complications

- Hypovolemic shock
- Disseminated intravascular coagulation
- Fluid overload
- Anemia
- Transfusion – related complications
- Anesthesia – related complications
- Sepsis
- Unplanned sterilization because of hysterectomy
- Sheehan Syndrome

Sheehan Syndrome

- Rare - Occurs in 1-2% of women who lose 1-2 liters of blood
- Severe blood loss leads to decreased oxygen to the pituitary gland leading to tissue death.
- SXS: difficulty breastfeeding, decreased sex drive, hypothyroidism, irregular or absent menses, inability to grow pubic or underarm hair, decreased blood sugar and blood pressure
- Treatment: hormone replacement - ovarian, thyroid or adrenocortical hormones

Hypovolemic Shock

An emergency condition caused by severe blood loss

Signs and symptoms

- Anxiety
- Cool, clammy skin
- CNS changes
- Weakness
- Respiratory distress
- Sweating
- Skin color pale
- Low blood pressure
- Hypothermia
- Tachycardia

Hypovolemic Shock

Management

- Replace blood and body fluids
- Identify and treat cause of bleeding

Disseminated Intravascular Coagulation

A life threatening pathologic form of clotting that is usually generalized. Occurs secondary to diseases and conditions that result in hypercoagulation and hemorrhage. Clotting factors such as fibrinogen are consumed.

Result: Heavy bleeding

Shock

Organ failure

Death

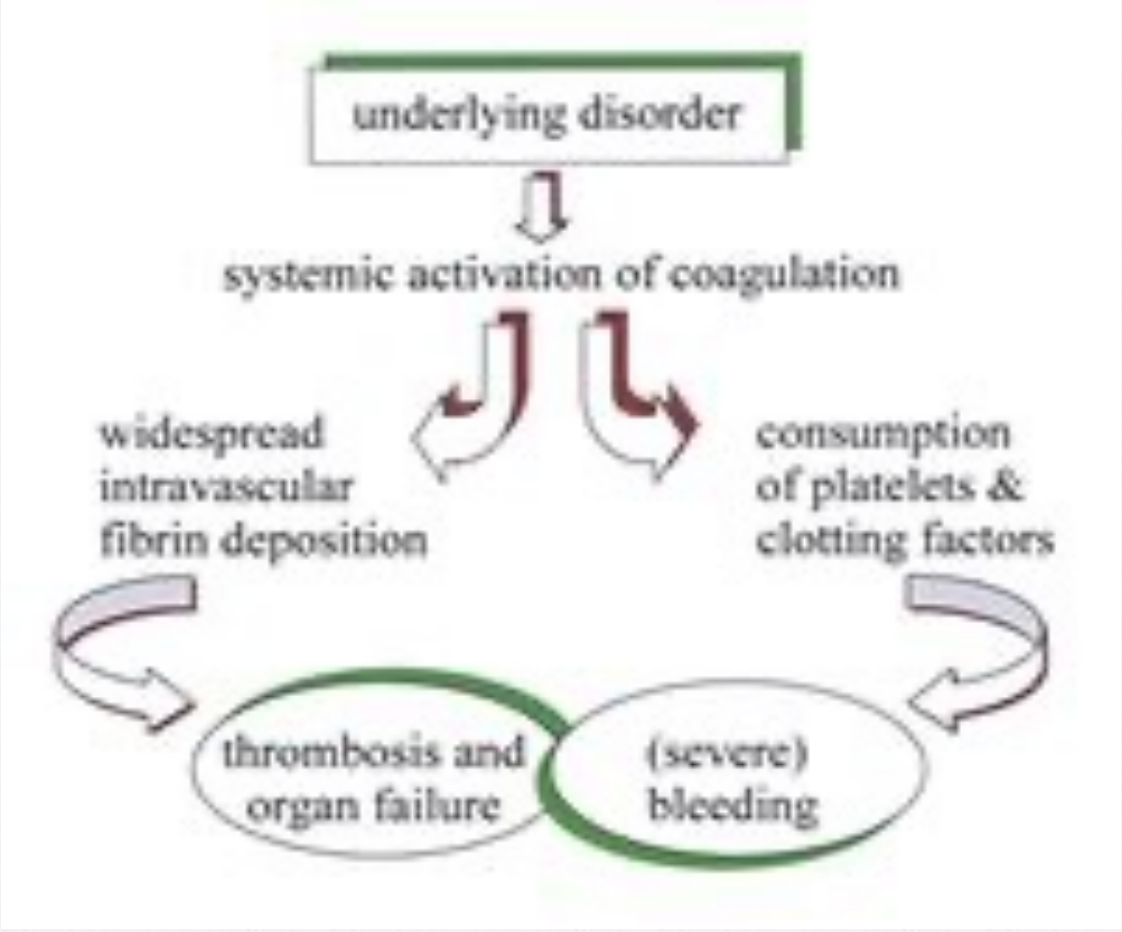
Disseminated Intravascular Coagulation

Pathophysiology

- The body loses the ability to regulate clotting of blood
- Platelets clump together and block small blood vessels throughout the body
  - The generation and deposition of fibrin
  - Organs are damaged
  - Blood cells are destroyed
  - Platelets and coagulation proteins are depleted

Disseminated Intravascular Coagulation

Pathophysiology



Disseminated Intravascular Coagulation

- Causes in Obstetrics
  - Infection
  - Sepsis
  - Preeclampsia/eclampsia
  - Placental abruption
  - Hemorrhage
  - HELLP syndrome
  - Amniotic fluid embolism
  - Retained stillbirth

Disseminated Intravascular Coagulation

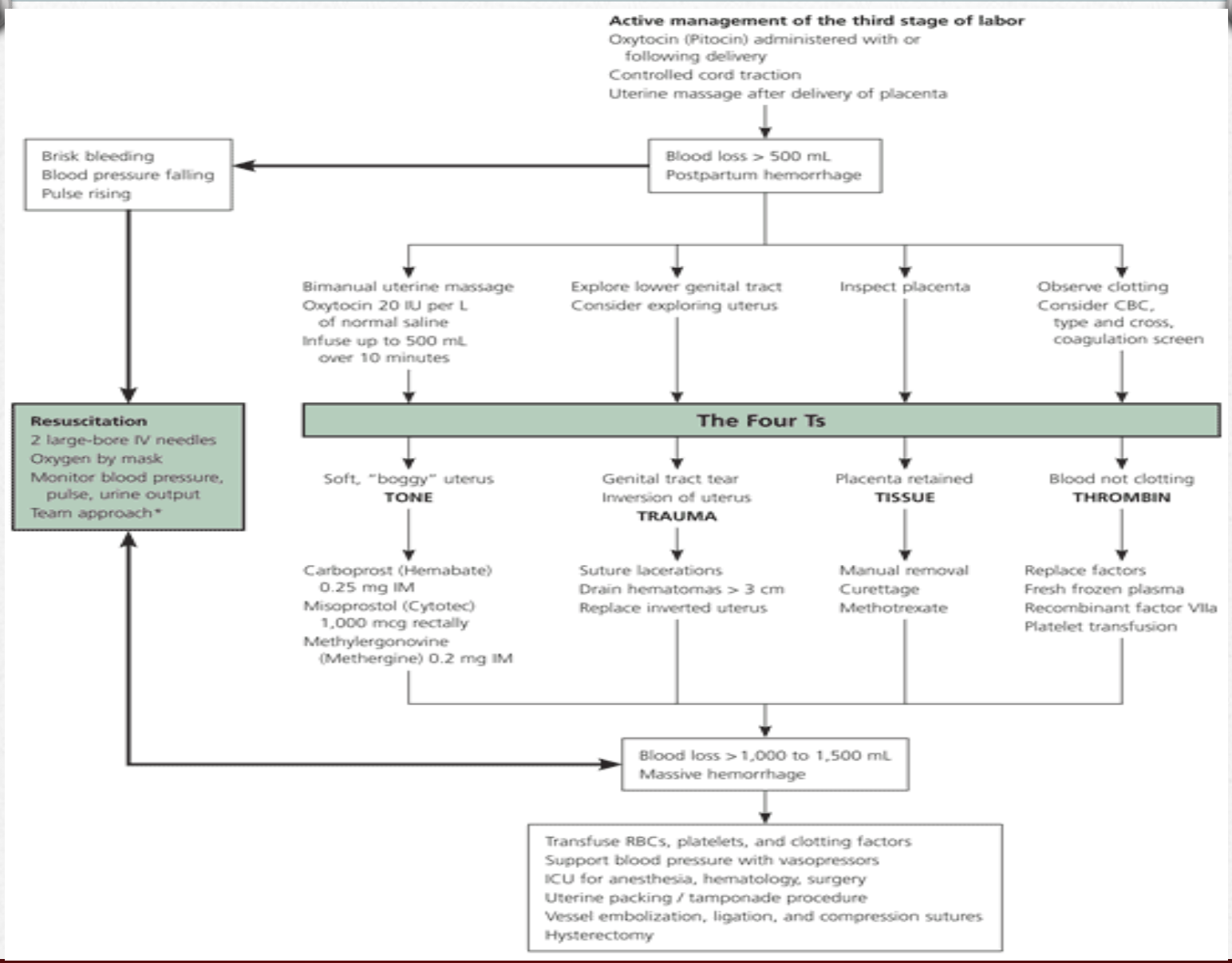
Signs and Symptoms

- Bleeding
- Sudden onset of bruising
- Nausea and vomiting
- Pain – back, muscle, chest
- Shortness of breath
- CNS changes

Management

- Identify and treat the underlying disorder

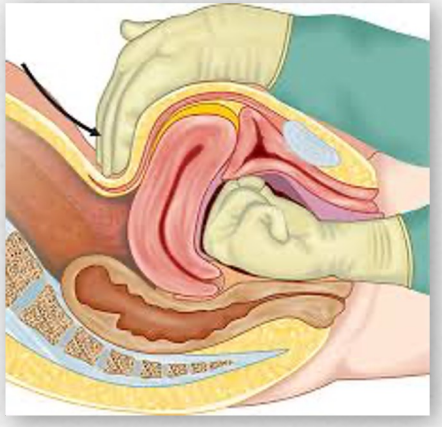
Management of Postpartum Hemorrhage



Management of Postpartum Hemorrhage

Medical

- Identify and treat source of bleeding
- Outline medical management plan
- Maintain fluid and electrolyte balance
- Medication therapy
- Consultations
- Bimanual uterus massage



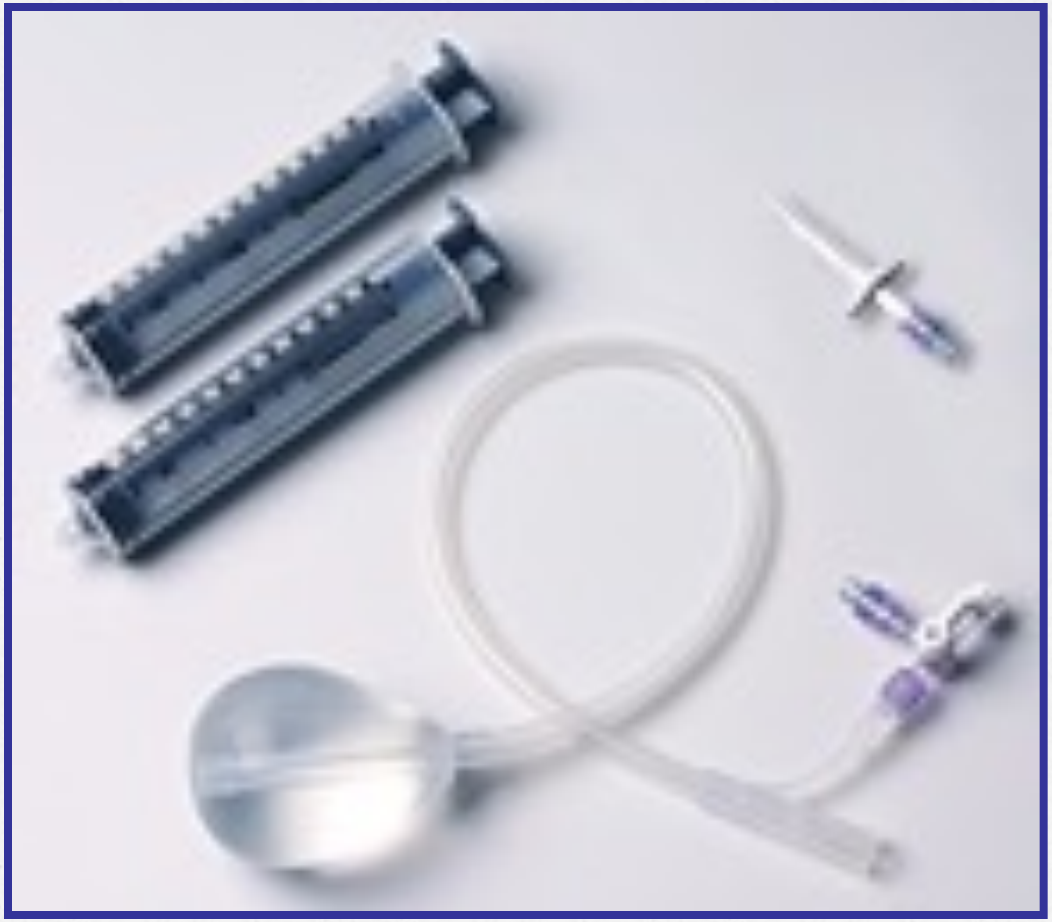
Management of Postpartum Hemorrhage

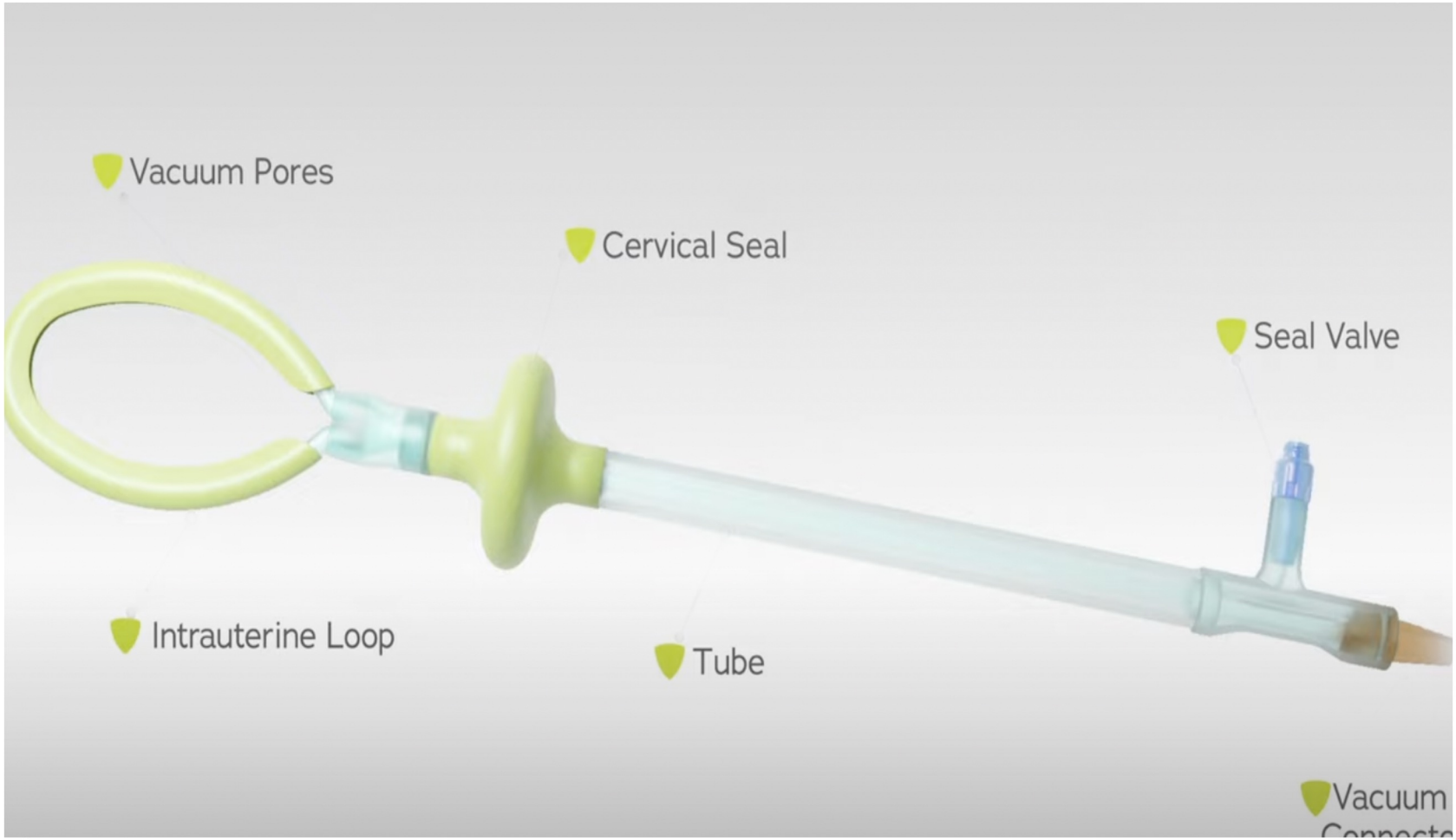
Medical

- Postpartum hemorrhage control - Balloon tamponade catheter insertion - Bakri and JADA system device
- Surgical procedures
- Transfusion of blood and blood products
- Hemodynamic monitoring

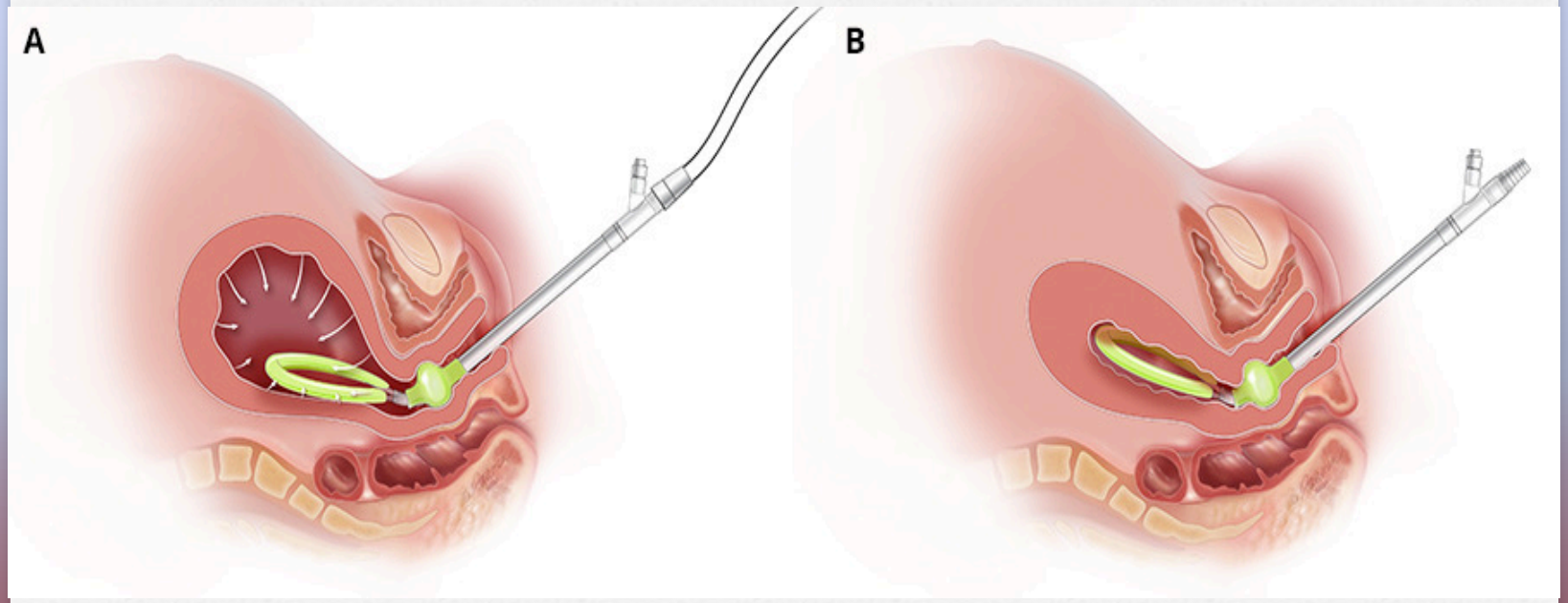
Management of Postpartum Hemorrhage

Balloon Tamponade Catheter





JADA System Device



JADA System

Management of Postpartum Hemorrhage

Medical

- Balloon tamponade catheter insertion
- Surgical procedures
- Transfusion of blood and blood products
- Hemodynamic monitoring

Management of Postpartum Hemorrhage

Medical

Labs:

- CBC
- Fibrin degradation products
- Platelet count
- Blood type and screen
- Arterial blood gases
- Urine analysis

- Anticipate complications
  - Hypovolemic shock
  - Pulmonary edema
  - DIC

Management of Postpartum Hemorrhage

BLOOD REPLACEMENT PRODUCTS			
Blood Component Therapy			
Product	*Volume (mL)**	*Contents*	*Effect (per unit)*
Fresh whole blood	500	Red blood cells, all procoagulants	Increase hematocrit by 3 percentage points, hemoglobin by 1g/dL
Packed red blood cells	240	Red blood cells, white blood cells, plasma	Increase hematocrit by 3 percentage points, hemoglobin by 1g/dL
Platelets	50	Platelets, red blood cells, plasma; small amounts of fibrinogen, factors V and VIII	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 to 25 mg/dL
Cryoprecipitate	40	Fibrinogen, factors VIII and XIII, von Willebrand factor	Increase fibrinogen by 10 mg/dL to 25 mg/dL

*Volume depends on individual blood bank.

Adapted from American College of Obstetrics and Gynecologists. (2006b). Postpartum Hemorrhage (Practice Bulletin No. 76).

Management of Postpartum Hemorrhage

Nursing Management

- Get Help
  - Postpartum Hemorrhage Team
  - Rapid Response Team (if necessary)
- Assess uterine tone and bleeding; massage fundus (if necessary)
- Oxygen administration
  - 8-12 liters via mask
- Intravenous therapy – 2 lines
  - Increase rate or initiate infusion with 16 or 18 gauge angiocath

Management of Postpartum Hemorrhage

Nursing Management

- Position patient
  - Elevate legs
  - Lower head of bed
- Insert foley catheter with urimeter
- Obtain blood specimens
- Contact blood bank – Activate massive transfusion protocol
- Assess and monitor all systems
- Monitor intake and output
- Monitor blood loss

Management of Postpartum Hemorrhage

Nursing Management

- Apply monitoring equipment
  - Cardiac monitor
  - Blood pressure
  - Pulse oximeter
  - Pneumatic compression device
- Monitor vital signs q 15 mins or as indicated/blood pressure/oxygen saturation
- Medication administration
- Transfusion of blood and blood products

Management of Postpartum Hemorrhage

Nursing Management

- Preoperative preparation
- Emotional/Spiritual support
- Follow Chain of Command
  - Medical
  - Nursing

Patient Education

- **Diagnosis**
- **Management Plan**
- **Patient care activities**

Nursing Documentation

- Assessment
  - Subjective
  - Objective
- Diagnosis
  - The patient's response to actual or potential health issues
- Planning
  - Patient care activities
  - Schedule procedures
- Implementation
  - Patient care activities
- Evaluation
  - Patient status
  - Effectiveness of care

Nursing Documentation

- Document
  - All care provided by the interdisciplinary team
  - Barriers to providing care, reasons, steps towards resolution
  - Date/time/sign every entry
  - Include time of care activities
  - Include interdisciplinary communication

Recommendations

- Obstetrician 24/7
- Anesthesiologist 24/7
- Blood bank 24/7
- Neonatologist/Pediatrician 24/7
- Dedicated OBS operating rooms
- Emergency equipment and supplies
- Postpartum Hemorrhage Cart

Recommendations

Ongoing staff education & skills training

- Surgical procedures
- Management of emergencies
- Conduct emergency management drills
- Have a Postpartum Hemorrhage Cart with all supplies that would be needed for management of the situation
- Blood available in Labor & Delivery for immediate transfusion

Postpartum Hemorrhage