1.0 Risk Factors

Level 1 (Declarative Knowledge)

1.1 The learner will be able to state the following most common risk factors for postpartum hemorrhage:

- Prolonged labor
- Augmentation of labor
- Rapid labor
- History of postpartum hemorrhage
- Vaginal laceration and episiotomy, especially mediolateral
- Preeclampsia
- Overdistended uterus (macrosomia, multiple gestations, hydramnios)
- Operative delivery
- Asian or Hispanic ethnicity
- Chorioamnionitis
- Coagulation disorder, acquired or inherited
- Anticoagulation therapy
- Abnormal placentation (previa, accreta)
- Placental abruption
- Magnesium sulfate use
- Thrombocytopenia
- Prolonged intrauterine fetal demise
- Amniotic fluid embolism
- Grand multiparity

Level 2 (Simulated and Clinical Performance)

1.2 The learner will be able to recognize the listed risk factor for postpartum hemorrhage in a simulated context:

- Prolonged labor
- Augmentation of labor
Rapid labor
History of postpartum hemorrhage
Vaginal laceration and episiotomy, especially mediolateral
Preeclampsia
Overdistended uterus (macrosomia, multiple gestations, hydramnios)
Operative delivery
Asian or Hispanic ethnicity
Chorioamnionitis
Coagulation disorder, acquired or inherited
Anticoagulation therapy
Abnormal placentation (previa, accreta)
Placental abruption
Magnesium sulfate use
Thrombocytopenia
Prolonged intrauterine fetal demise
Amniotic fluid embolism
Grand multiparity

2.0 Criteria
Level 1 (Declarative Knowledge)

2.1.1 The learner will be able to list common etiologies for postpartum hemorrhage:
- Uterine atony
- Lacerations (see separate LO)
- Retained products of conception (see separate LO)
- Invasive placentation
- Defects in coagulation
- Uterine inversion

2.1.2 The learner will be able to define postpartum hemorrhage due to uterine atony:
- Soft, poorly contracted uterus
- EBL >500cc at vaginal delivery or EBL of >1000 cc at cesarean section
- Decrease in hemoglobin of 10% or more
- Blood loss requiring blood transfusion to prevent shock
Level 2 (Simulated and Clinical Performance)

2.2.1 The learner will be able to recognize common etiologies for postpartum hemorrhage in a simulated context:
- Uterine atony
- Lacerations (see separate LO)
- Retained products of conception (see separate LO)
- Invasive placentation (see retained POC LO)
- Defects in coagulation
- Uterine inversion

2.2.2 The learner will be able to recognize postpartum hemorrhage due to uterine atony:
- Boggy, poorly contracted uterus
- EBL >500cc at vaginal delivery or EBL of >1000 cc at cesarean section
- Decrease in hemoglobin of 10% or more
- Blood loss requiring blood transfusion to prevent shock

3.0 Complications

Level 1 (Declarative Knowledge)

3.1 The learner will be able to describe the following potential complications of postpartum hemorrhage due to atony:
- Adverse effects of uterotonics (see section 6.1.1)
- Blood transfusion risks, including blood borne diseases, transfusion reactions, acute respiratory distress syndrome
- Coagulopathy
- Hemodynamic shock
- Hysterectomy (and inherent surgical risks)
  - Loss of fertility
  - Damage to bowel/bladder/ureter
- Infection
- Maternal mortality
- Pituitary necrosis (Sheehan Syndrome)

Level 2 (Simulated and Clinical Performance)
3.2 The learner will be able to recognize the occurrence of these complications in a simulated context without prompting from others

- Adverse effects of uterotonics (see section 6.1.1)
- Blood transfusion risks, including blood borne diseases, transfusion reactions, acute respiratory distress syndrome
- Coagulopathy
- Hemodynamic shock
- Hysterectomy (and inherent surgical risks)
- Loss of fertility
- Infection
- Maternal mortality
- Pituitary necrosis (Sheehan Syndrome)

4.0 Procedure Patient Management

Level 1 (Declarative Knowledge)

4.1.1 The learner will be able to state the steps necessary to care for a patient who is having a postpartum hemorrhage due to uterine atony:

- Perform bimanual uterine massage
- Place 1-2 large bore IV’s
- Monitor vital signs
- Provide supplemental oxygen
- Administer crystalloid at 3:1 replacement rate
- Ensure bladder is empty
- Inform clinical team of hemorrhage
- Assign responsibilities to clinical team members
- Notify anesthesia of hemorrhage
- Assure adequate anesthesia
- Obtain baseline laboratory tests (CBC, prothrombin time, partial thromboplastin time, INR, fibrinogen, type and cross)
- Transfer to OR if appropriate
- Use of MAST/Antishock trousers as needed
- Obtain Bakri Balloon

4.1.2 The learner will be able to describe how to communicate with the patient about the hemorrhage:

- Use patient-friendly language throughout encounter when speaking to patient and family
ACOG Simulations Consortium Learning Objectives
Postpartum Hemorrhage Caused by Uterine Atony

- Inform patient and partner why the procedures and medications are necessary
- Explain procedures that will take place
- Explain risks and benefits of procedures and medications
- Ask if the patient and partner have any questions
- Wait for the patient and partner to ask questions
- Answer questions
- Reassure patient and partner

Level 2 (Simulated and Clinical Performance)

4.2.1 The learner will be able to perform the steps necessary to prepare a patient who is having a postpartum hemorrhage due to uterine atony in a simulated context:
- Perform a bimanual uterine massage
- Place 1-2 large bore IV’s
- Monitor vital signs
- Provide supplemental oxygen
- Administer crystalloid at 3:1 replacement rate
- Assure bladder is empty
- Inform clinical team of hemorrhage
- Assign responsibilities to clinical team members
- Notify anesthesia of hemorrhage
- Assure adequate anesthesia
- Obtain baseline laboratory tests (CBC, prothrombin time, partial thromboplastin time, fibrinogen, type and cross)
- Transfer to OR if appropriate
- Use of MAST/Antishock trousers as needed
- Obtain Bakri Balloon

4.2.2 The learner will be able to demonstrate how to communicate with the patient about the hemorrhage in a simulated context:
- Use patient-friendly language throughout encounter when speaking to patient and family
- Inform patient and partner why the procedures and medications are necessary
- Explain procedures that will take place
- Explain risks and benefits of procedures and medications
- Ask if the patient and partner have any questions
- Wait for the patient and partner to ask questions

5.0 Treatment

Level 1 (Declarative Knowledge)
5.1.1 The learner will be able to state medication dose and route of administration for a patient with a postpartum hemorrhage due to atony:

- Oxytocin (Pitocin)
  10-40 units in 1 liter NS or LR rapid IV infusion
- Methylergonovine (Methergine)
  0.2 mg IM or intramyometrial q2-4hrs
- Prostaglandin F2 alpha (Carboprost, Hemabate)
  0.25mg IM or intramyometrial q15-90mins, maximum 8 doses
- Prostaglandin E1 (Misoprostol, Cytotec)
  800-1000mcg per rectum or sublingual
- Prostaglandin E2 (Dinoprostone, Prostin E2)
  20mg suppository per rectum q2hrs

5.1.2 The learner will be able to state and describe the tamponade procedure options for treatment of a postpartum hemorrhage due to atony

- Gauze packing of the uterus
- Uterine tamponade balloon (300-500cc) (Bakri or Ebb)
- Foley balloon in the uterus (60-80cc)
- Bakri Balloon

5.1.3 The learner will be able to describe surgical procedures for treatment of a postpartum hemorrhage due to atony:

- Exploratory laparotomy
- Bilateral uterine artery ligation (O’Leary stitch)
- Uterine compression stitch (B Lynch, Hayman, Cho)
- Ligation of uterovarian vessels
- Hysterectomy
- Hypogastric artery ligation (performance limited by training)
- Uterine artery embolization by interventional radiology

5.1.4 The learner will describe each component and correct indications for each blood product replacement (based on their institutional guidelines):

- Packed red blood cells
- Fresh frozen plasma
- Platelets
- Cryoprecipitate
- Recombinant factor VIIa

**Level 2 (Simulated and Clinical Performance)**
ACOG Simulations Consortium Learning Objectives
Postpartum Hemorrhage Caused by Uterine Atony

5.2.1 The learner will be able to demonstrate correct use of medications, including dose and route of administration, for a patient with a postpartum hemorrhage due to atony in a simulated context:

- Oxytocin (Pitocin)
  10-40 units in 1 liter NS or LR rapid IV infusion
- Methylergonovine (Methergine)
  0.2 mg IM or intramyometrial q2-4hrs
- Prostaglandin F2 alpha (Carboprost, Hemabate)
  0.25mg IM or intramyometrial q15-90mins, maximum 8 doses
- Prostaglandin E1 (Misoprostol, Cytotec)
  800-1000mcg per rectum or sublingual
- Prostaglandin E2 (Dinoprostone, Prostin E2)
  20mg suppository per rectum q2hrs

5.2.2 The learner will be able to correctly use and describe the tamponade procedure options needed for treatment of a postpartum hemorrhage due to atony in a simulated context:

- Gauze packing of the uterus
- Uterine tamponade balloon (300-500cc) (Bakri, Ebb)
- Foley balloon in the uterus (60-80cc)

5.2.3 The learner will be able to perform surgical procedures for treatment of a postpartum hemorrhage due to atony in a simulated context:

- Exploratory laparotomy
- Bilateral uterine artery ligation (O’Leary stitch)
- Uterine compression sutures (B Lynch, Hayman, Cho)
- Ligation of uterovarian vessels
- Hysterectomy
- Hypogastric artery ligation (performance limited by training)
- Uterine artery embolization (by interventional radiology)

5.2.4 The learner will administer each blood component, given appropriate indications, in the simulated context

- Packed red blood cells
- Fresh frozen plasma
- Platelets
- Cryoprecipitate
- Recombinant factor VIIa
6.0 Contra-Indications

Level 1 (Declarative Knowledge)

6.1.1 The learner will be able to describe the contraindications and side effects to the medical treatment options for a postpartum hemorrhage:

- Oxytocin (Pitocin)
  - Can cause hypotension/water intoxication
- Methylergonovine (Methergine)
  - Avoid with hypertension
- Prostaglandin F2 alpha (Carboprost, Hemabate)
  - Can cause diarrhea, fever and tachycardia
  - Avoid with asthma or hypertension
- Prostaglandin E1 (Misoprostol, Cytotec)
  - Elevated temperature, shivering, diarrhea
- Prostaglandin E2 (Dinoprostone, Prostin E2)
  - Elevated temperature
  - Avoid with hypertension

6.1.2 The learner will be able to describe the contraindications to the surgical treatment of postpartum hemorrhage caused by uterine atony. Learner must assess patient’s hemodynamic status and weigh this against time needed to perform more conservative treatment measures. A hemodynamically unstable patient must move on to more definitive treatment measures such as surgery.

Level 2 (Simulated and Clinical Performance)

6.2.1 The learner will be able to recognize the contraindications and side effects to the medical treatment options for a postpartum hemorrhage in a simulated context:

- Oxytocin (Pitocin)
  - Can cause hypotension/water intoxication
- Methylergonovine (Methergine)
  - Avoid with hypertension
- Prostaglandin F2 alpha (Carboprost, Hemabate)
  - Can cause diarrhea, fever and tachycardia
  - Avoid with asthma or hypertension
- Prostaglandin E1 (Misoprostol, Cytotec)
  - Elevated temperature, shivering, diarrhea
- Prostaglandin E2 (Dinoprostone, Prostin E2)
  - Elevated temperature
  - Avoid with hypotension

6.2.2 The learner will be able to recognize the contraindications to the surgical treatment of postpartum hemorrhage caused by uterine atony in a simulated context.
Learner must assess patient’s hemodynamic status and weigh this against time needed to perform more conservative treatment measures. A hemodynamically unstable patient must move on to more definitive treatment measures such as surgery.

7.0 Post-hemorrhage Patient Management

Level 1 (Declarative Knowledge)

7.1 The learner will be able to describe the correct post-hemorrhage care for the patient including the following:

- Frequency of vital signs
- Frequency of serial labs
- Release and removal of tamponade balloon or packing
- Coordination of care with other providers such as ICU attending and interventional radiologist
- Communication to patient and partner as outlined in section 4.1.2 (including discussion of loss of fertility if appropriate)

Level 2 (Simulated and Clinical Performance)

7.2 The learner will demonstrate the correct post-hemorrhage care for the patient including the following:

- Frequency of vital signs
- Frequency of serial labs
- Release and removal of tamponade balloon or packing
- Coordination of care with other providers such as ICU attending or interventional radiologist
- Communication to patient and partner as outlined in section 4.1.2 (including discussion of loss of fertility if appropriate)

8.0 Teamwork

Level 1 (Declarative Knowledge)

8.1 The learner will be able to describe the physician’s role and expected communication strategies for working with assistants to treat of postpartum hemorrhage including:

- Assume a leadership role for patient management
- Strategically use assistants and provide specific instructions
- Use closed-loop communication
• Respond to requests and questions from assistants promptly and professionally

Level 2 (Simulated Performance)

8.2 The learner will be able to describe the physician’s role and expected communication strategies for working with assistants to treat of postpartum hemorrhage including:
• Assume a leadership role for patient management
• Strategically use assistants and provide specific instructions
• Use closed-loop communication
• Respond to requests and questions from assistants promptly and professionally

References:
• American College of Obstetricians and Gynecologists: Postpartum Hemorrhage. Practice Bulletin #76, October 2006. (Reaffirmed 2011)
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