

Postpartum Hemorrhage

Topic- based Uworld Questions

Block 1, 2, 7, 8



A 34-year-old woman is evaluated in the postpartum unit for vaginal bleeding. Two hours ago, she underwent an uncomplicated spontaneous vaginal delivery with an estimated blood loss of 250 mL. Bleeding was initially minimal, but there is now profuse vaginal bleeding, and the patient's perineal pad is soaked with blood and large clots. This was her eighth vaginal delivery; her only surgery was a dilation and curettage 4 years ago for a spontaneous abortion. The patient has chronic hypertension that has been managed throughout this pregnancy with labetalol. She has no medication allergies. Blood pressure is 148/102 mm Hg and pulse is 110/min. On pelvic examination, the uterine fundus is soft, and the lower uterine segment is distended with blood clots. Which of the following medications is contraindicated in this patient?



- A. Carboprost tromethamine
- B. Methylergonovine
- C. Misoprostol
- D. Oxytocin
- E. Tranexamic acid

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- A. Carboprost tromethamine (7%)
- B. Methylergonovine (60%)
- C. Misoprostol (13%)
- D. Oxytocin (9%)
- E. Tranexamic acid (8%)

Omitted

Correct answer
B 60%
Answered correctly 01 sec
Time Spent 02/10/2020
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Explanation

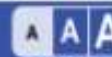
Postpartum uterine atony

- Uterine fatigue from prolonged, induced, or precipitous

Postpartum uterine atony	
Risk factors	<ul style="list-style-type: none"> • Uterine fatigue from prolonged, induced, or precipitous labor • Chorioamnionitis • Uterine overdistension (multiple gestation, macrosomia, polyhydramnios) • Retained placenta • Grand multiparity (≥ 5 prior deliveries)
Clinical features	<ul style="list-style-type: none"> • Most common cause of postpartum hemorrhage • Enlarged, soft, boggy, poorly contracted uterus
Interventions	<ul style="list-style-type: none"> • Bimanual uterine massage • Correction of bladder distension • High-dose oxytocin, misoprostol • Tranexamic acid • Carboprost, methylergonovine • Intrauterine balloon tamponade • Possible surgical intervention (if atony unresolved)

This patient with profuse vaginal bleeding and a soft uterine fundus has **uterine atony**, the most common cause of **postpartum hemorrhage (PPH)**. Uterine atony occurs because of insufficient uterine contractility after delivery, resulting in continued bleeding from open placental bed vessels. Risk factors include grand multiparity (eg, ≥ 5 prior deliveries), hypertensive disorders, and uterine overdistension (eg, macrosomia).

First-line treatment for uterine atony is [bimanual uterine massage](#) and high-dose oxytocin. If heavy bleeding persists, additional medications are administered based on patient-specific contraindications:



- Possible surgical intervention (if atony unresolved)

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First-line treatment for uterine atony is **bimanual uterine massage** and high-dose oxytocin. If heavy bleeding persists, additional medications are administered based on patient-specific contraindications:

- Tranexamic acid is an antifibrinolytic that prevents blood clot breakdown and significantly decreases blood loss if administered within 3 hours of delivery. Therefore, it is used for PPH of any etiology (eg, uterine atony, retained placenta). Tranexamic acid has no absolute contraindications but is used with caution in patients with hypercoagulability (eg, inherited thrombophilia) due to the potential increased risk of thromboembolism (**Choice E**).
- Carboprost tromethamine is a second-line uterotonic agent that stimulates contractions to increase uterine tone and decrease bleeding. It is a synthetic prostaglandin F_{2α} analog that can cause bronchospasm; therefore, it is contraindicated in patients with asthma (**Choice A**).
- Methylergonovine is another second-line uterotonic agent that stimulates contractions. It is a potent vasoconstrictor and therefore **contraindicated** in patients with **hypertensive disorders** (eg, this patient with chronic hypertension) due to **increased risk of stroke**.

(Choices C and D) Oxytocin is a first-line uterotonic agent administered to all patients after placental delivery for PPH prophylaxis; high-dose oxytocin is used for PPH treatment. Misoprostol is a prostaglandin E₁ analog used for the induction of labor or as a second-line uterotonic to treat uterine atony. There are typically no contraindications to the use of either oxytocin or misoprostol in patients with PPH.

Educational objective:

The most common cause of postpartum hemorrhage is uterine atony, which typically presents with heavy vaginal bleeding and a soft uterine fundus. The choice of medical therapy for atony depends on patient contraindications: Methylergonovine is contraindicated in hypertensive patients, carboprost tromethamine is contraindicated in patients with asthma, and tranexamic acid is used with caution in patients with hypercoagulability.

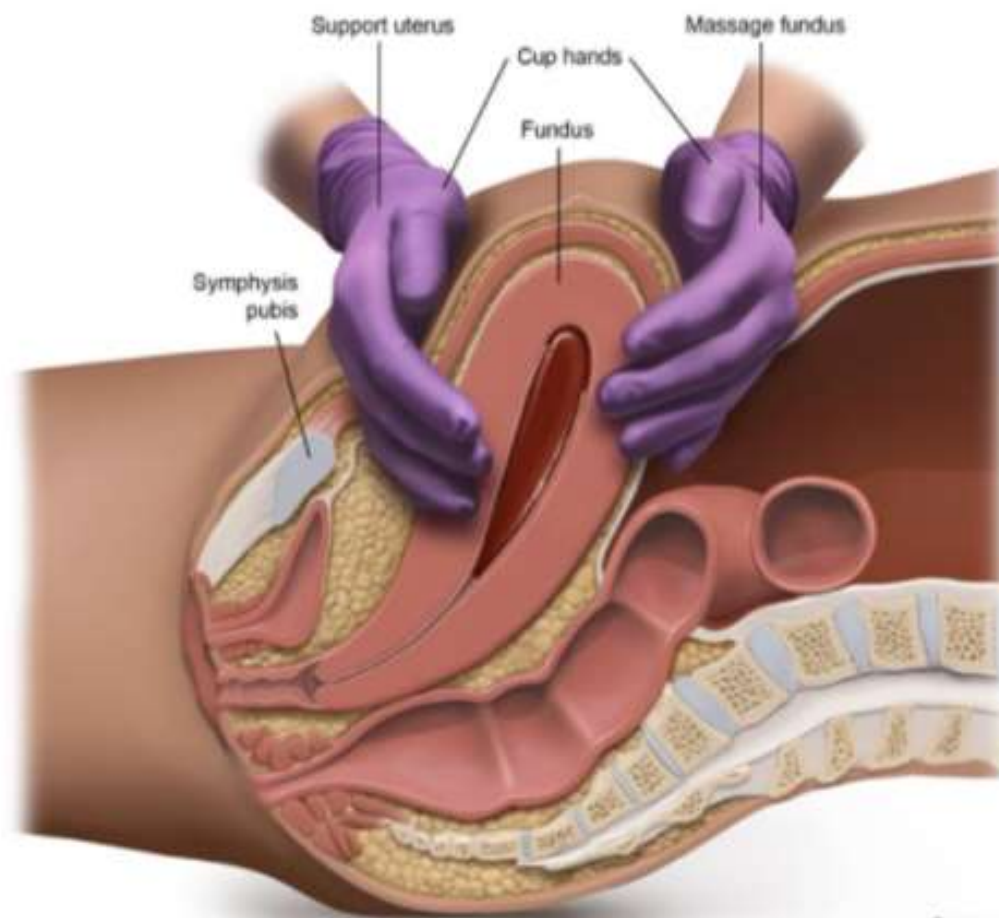
References

- [ACOG practice bulletin no. 183: postpartum hemorrhage.](#)

- Correction of bladder distension

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Uterine fundal massage



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A 30-year-old woman, gravida 1 para 0, is admitted to the hospital in active labor and undergoes a forceps-assisted vaginal delivery due to recurrent late fetal heart rate decelerations. The patient delivers a 4.2 kg (9.3 lb) infant with Apgar scores of 7 and 9 at 1 and 5 minutes, respectively. An hour after delivery, the patient begins to feel dizzy and lightheaded. She has no chest pain or shortness of breath and has had no loss of consciousness. Temperature is 37.2 C (99 F), blood pressure is 90/50 mm Hg, and pulse is 120/min. The patient appears pale and is diaphoretic. Cardiac examination shows sinus tachycardia but no rubs or murmurs. The lungs are clear to auscultation. The uterus is firm, nontender, and palpable at the umbilicus. On pelvic examination, there is minimal blood on the perineal pad. A large, purple mass protrudes medially into the vagina. Which of the following is the most likely diagnosis in this patient?

- A. Amniotic fluid embolism
- B. Cervical laceration
- C. Retained placenta
- D. Uterine inversion
- E. Uterine rupture
- F. Vaginal hematoma

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- A. Amniotic fluid embolism (0%)
- B. Cervical laceration (0%)
- C. Retained placenta (21%)
- D. Uterine inversion (25%)
- E. Uterine rupture (0%)
- F. Vaginal hematoma (49%)

Omitted

Correct answer

F



49%

Answered correctly



02 secs

Time Spent



06/07/2020

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Explanation

Vaginal hematoma	
Risk factors	<ul style="list-style-type: none"> • Operative vaginal delivery • Infant ≥ 4000 g (8.8 lb) • Nulliparity • Prolonged 2nd stage of labor
Clinical features	<ul style="list-style-type: none"> • Vaginal mass • Rectal or vaginal pressure • \pm hypovolemic shock
Treatment	<ul style="list-style-type: none"> • Nonexpanding: observation • Expanding: embolization, surgery

This patient's hypovolemic shock and protruding vaginal mass is most likely due to a **vaginal hematoma**, a potentially life-threatening postpartum complication. During delivery, stretching of the vaginal canal can injure the uterine artery, particularly in nulliparous patients undergoing **operative vaginal delivery** (eg, forceps-assisted) or delivering an **infant ≥ 4000 g** (8.8 lb). The resultant injury can cause massive postpartum bleeding, as the uterine artery during pregnancy enlarges and supplies the uterus with up to 30% of total cardiac output. Because the blood collects in the paravaginal space (a large potential space), patients often have **massive occult bleeding**, evidenced only by **hypovolemic shock** (eg, hypotension, tachycardia, diaphoresis) initially. However, as blood continues to collect within the paravaginal tissue, patients can develop a protruding **vaginal mass**, often associated with rectal or vaginal pressure and **minimal vaginal bleeding**.

Hematomas are managed based on hemodynamic stability and whether they continue to expand. Nonexpanding vaginal hematomas are observed whereas expanding hematomas require treatment (eg, arterial embolization, surgery).

(Choice A) Amniotic fluid embolism is a rare obstetrical emergency causing rapid hemodynamic instability and pulmonary edema. This patient has no chest pain or shortness of breath and her lungs are clear to auscultation, making this diagnosis unlikely.

(Choice B) A cervical laceration presents with heavy vaginal bleeding, not a vaginal mass.

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(Choice B) A cervical laceration presents with heavy vaginal bleeding, not a vaginal mass.

(Choice C) A retained placenta is associated with uterine atony (ie, enlarged, boggy uterus) and heavy vaginal bleeding, which is not seen in this patient with a firm uterus and minimal vaginal bleeding.

(Choice D) [Uterine inversion](#) is a rare obstetrical emergency that can present with a vaginal mass, massive hemorrhage, and hypovolemic shock. This patient's uterus is firm and palpable at the umbilicus, making this diagnosis unlikely.

(Choice E) [Uterine rupture](#) is an obstetrical emergency due to uterine wall rupture (eg, patients with prior myomectomy). It is typically associated with severe abdominal pain and heavy vaginal bleeding, not seen in this patient.

Educational objective:

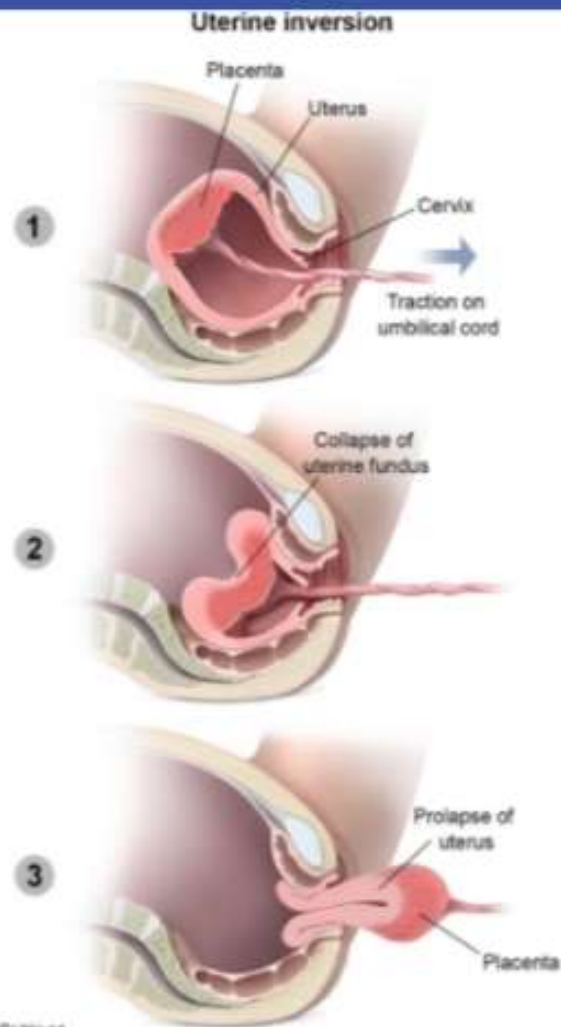
Vaginal hematoma is a potentially life-threatening postpartum complication that presents with a vaginal mass and possible hypovolemic shock due to massive occult bleeding.

References

- [Evaluation of risk factors in women with puerperal genital hematomas.](#)

(Choice A) Amniotic fluid embolism is a rare obstetrical emergency causing rapid hemodynamic instability and pulmonary edema. This patient

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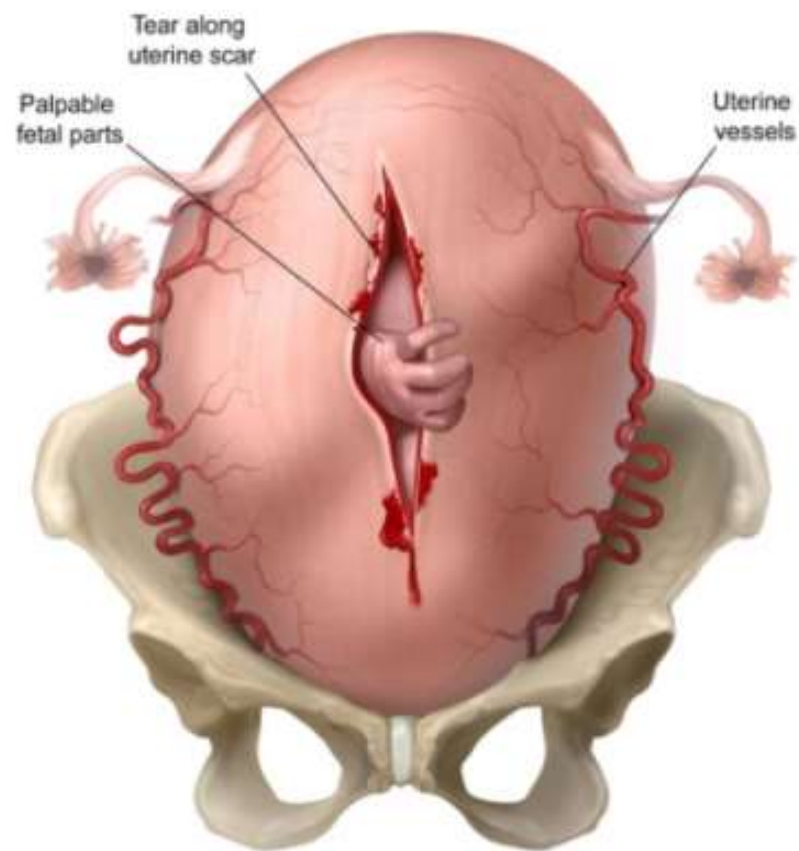
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Uterine rupture



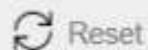
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A 28-year-old woman with sickle cell disease undergoes an induction of labor and has a spontaneous vaginal delivery. After delivery of the placenta, the patient begins to have heavy vaginal bleeding and passage of large, fist-sized clots. She is administered a high-dose oxytocin infusion and multiple uterotonic agents but continues to bleed heavily. Ten minutes later, the patient suddenly develops shortness of breath and chest pain. Blood pressure is 70/40 mm Hg, pulse is 118/min, and respirations are 28/min. Cardiac examination shows sinus tachycardia. Respiratory examination reveals tachypnea but clear lung bases. The uterus is soft and distended above the umbilicus, and the patient continues to have profuse vaginal bleeding. Laboratory results are as follows:

Complete blood count

Hemoglobin	6 g/dL
Platelets	80,000/mm ³
Leukocytes	8,200/mm ³

Liver function studies

Total bilirubin	3.3 mg/dL
Direct bilirubin	0.4 mg/dL

Coagulation studies

International Normalized Ratio (INR)	1.6
Prothrombin time	17 sec
Activated PTT	53 sec

Which of the following is the most likely cause of this patient's acute decompensation?

- A. Disseminated intravascular coagulation

Platelets 80,000/mm³

Leukocytes 8,200/mm³

Liver function studies

Total bilirubin 3.3 mg/dL

Direct bilirubin 0.4 mg/dL

Coagulation studies

International Normalized Ratio (INR) 1.6

Prothrombin time 17 sec

Activated PTT 53 sec

Which of the following is the most likely cause of this patient's acute decompensation?

- A. Disseminated intravascular coagulation
- B. Opioid withdrawal
- C. Oxytocin toxicity
- D. Splenic sequestration crisis
- E. Thrombotic thrombocytopenic purpura

Submit

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Leukocytes 8,200/mm³

Liver function studies

Total bilirubin 3.3 mg/dL

Direct bilirubin 0.4 mg/dL

Coagulation studies

International Normalized Ratio (INR) 1.6

Prothrombin time 17 sec

Activated PTT 53 sec

Which of the following is the most likely cause of this patient's acute decompensation?

- A. Disseminated intravascular coagulation (86%)
- B. Opioid withdrawal (0%)
- C. Oxytocin toxicity (2%)
- D. Splenic sequestration crisis (8%)
- E. Thrombotic thrombocytopenic purpura (3%)

Omitted

Correct answer



86%
Answered correctly



05 secs
Time Spent



02/28/2020
Last Updated

Disseminated intravascular coagulation	
Major causes	<ul style="list-style-type: none"> • Sepsis • Severe traumatic injury • Malignancy • Obstetric complications
Pathophysiology	<ul style="list-style-type: none"> • Procoagulant excessively triggers coagulation cascade → • Formation of fibrin-/platelet-rich thrombi & fibrinolysis → • Bleeding & organ damage (eg, kidneys, lungs)
Laboratory findings	<ul style="list-style-type: none"> • Thrombocytopenia • Prolonged PT & PTT • ↓ Fibrinogen • ↑ D-dimer • Microangiopathic hemolytic anemia (schistocytes)

This acutely decompensating patient has most likely developed **disseminated intravascular coagulation** (DIC). Obstetric complications (eg, postpartum hemorrhage, placental abruption) are a major cause of DIC due to the large volume of bleeding associated with these conditions.

Significant bleeding can cause release of tissue factor (thromboplastin), which leads to uncontrolled activation of the coagulation cascade and a **consumptive coagulopathy**. This leads to the formation of fibrin- and platelet-rich thrombi, which consume platelets (ie, **thrombocytopenia**), coagulation factors (evidenced by **prolonged PT/INR and PTT**), and fibrinogen. Fibrinolysis is then triggered to degrade the clots, which elevates D-dimer (a fibrin degradation product) and depletes antithrombin and proteins C and S. This results in a paradoxical **thrombosis**, as in this patient who has developed symptoms of pulmonary embolus (eg, dyspnea, chest pain, tachypnea). The thrombi in the vasculature also often shear red blood cells, leading to a **microangiopathic hemolytic anemia** (evidenced by elevated total bilirubin levels).

Patients with DIC require emergency supportive care, including treatment of the underlying etiology (eg, uterine atony causing postpartum hemorrhage) and resuscitation with blood products (eg, packed red blood cells, fresh frozen plasma).

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Patients with DIC require emergency supportive care, including treatment of the underlying etiology (eg, uterine atony causing postpartum hemorrhage) and resuscitation with blood products (eg, packed red blood cells, fresh frozen plasma).

(Choice B) Although patients with sickle cell disease may require chronic opioids to manage painful vasoocclusive episodes, opioid withdrawal typically presents with mydriasis, piloerection, and yawning, not thrombocytopenia or abnormal coagulation studies.

(Choice C) Oxytocin toxicity can occur in patients with prolonged or high-dose oxytocin administration (eg, induction of labor, postpartum hemorrhage). However, these patients have severe hyponatremia and related neurologic symptoms (eg, headache, seizure), not thrombocytopenia or abnormal coagulation studies.

(Choice D) Splenic sequestration crisis, a life-threatening complication of sickle cell disease, can cause acute anemia, thrombocytopenia, and hypovolemic shock due to splenic pooling of RBCs and platelets. However, this condition mainly affects children because adults with sickle cell disease are functionally asplenic due to recurrent splenic infarction.

(Choice E) Thrombotic thrombocytopenic purpura causes microangiopathic hemolytic anemia and thrombocytopenia that can result in shortness of breathing and bleeding. However, it does not typically cause a consumptive coagulopathy; therefore, patients typically have normal coagulation studies.

Educational objective:

Significant obstetric bleeding (eg, postpartum hemorrhage) can cause disseminated intravascular coagulation. This condition typically presents with bleeding and/or thrombosis (eg, acute pulmonary embolus), thrombocytopenia, and prolonged PT and PTT.

A 34-year-old woman, gravida 2 para 2, is evaluated on the postpartum floor for nausea and lightheadedness. The patient developed these symptoms when she tried to ambulate to the bathroom, forcing her to immediately lie down. Earlier today, she underwent a repeat cesarean delivery at 39 weeks gestation; she is taking scheduled NSAIDs for incisional pain. The patient is fatigued and feels like she can barely keep her eyes open. She has no chronic medical conditions and takes no daily medications. Blood pressure is 80/50 mm Hg, pulse is 124/min, and respirations are 18/min. The patient appears pale and has cold skin. The uterine fundus is firm at the umbilicus, and the abdomen is tender but has no increased bleeding from the incision site. On pelvic examination, there is minimal lochia and no clots. Which of the following is the best next step in management of this patient?

- A. Antiemetics and serial examinations
- B. CT scan of the abdomen and pelvis
- C. Emergency laparotomy
- D. Oxytocin infusion and fundal massage
- E. Transvaginal ultrasound

Submit



A 34-year-old woman, gravida 2 para 2, is evaluated on the postpartum floor for nausea and lightheadedness. The patient developed these symptoms when she tried to ambulate to the bathroom, forcing her to immediately lie down. Earlier today, she underwent a repeat cesarean delivery at 39 weeks gestation; she is taking scheduled NSAIDs for incisional pain. The patient is fatigued and feels like she can barely keep her eyes open. She has no chronic medical conditions and takes no daily medications. Blood pressure is 80/50 mm Hg, pulse is 124/min, and respirations are 18/min. The patient appears pale and has cold skin. The uterine fundus is firm at the umbilicus, and the abdomen is tender but has no increased bleeding from the incision site. On pelvic examination, there is minimal lochia and no clots. Which of the following is the best next step in management of this patient?

- A. Antiemetics and serial examinations (6%)
- B. CT scan of the abdomen and pelvis (16%)
- C. Emergency laparotomy (63%)
- D. Oxytocin infusion and fundal massage (3%)
- E. Transvaginal ultrasound (10%)

Omitted
Correct answer
C

63%
Answered correctly

02 secs
Time Spent

01/14/2020
Last Updated

Explanation

This postpartum patient with hypotension, tachycardia, and signs of decreased end-organ perfusion (eg, fatigue, lightheadedness, cold skin) most likely has hypovolemic shock due to **postpartum hemorrhage**. Postpartum hemorrhage typically occurs within hours of delivery; uterine atony is the most common cause. Therefore, initial evaluation requires bimanual examination to assess for an enlarged, boggy uterus and heavy vaginal

This postpartum patient with hypotension, tachycardia, and signs of decreased end-organ perfusion (eg, fatigue, lightheadedness, cold skin) most likely has hypovolemic shock due to **postpartum hemorrhage**. Postpartum hemorrhage typically occurs within hours of delivery; uterine atony is the most common cause. Therefore, initial evaluation requires bimanual examination to assess for an enlarged, boggy uterus and heavy vaginal bleeding consistent with atony.

In contrast, post-cesarean delivery patients with hemorrhagic shock and **no signs of uterine atony** (such as this patient) most likely have **intraabdominal bleeding** from uterine artery injury. Because pregnancy increases uterine artery blood flow, an intrapartum **uterine artery injury** can lead to rapid and massive blood loss with subsequent hemodynamic instability. This patient's bleeding is most likely located in the retroperitoneum (ie, **retroperitoneal hematoma**), which is a rare but life-threatening cause of postpartum hemorrhage that typically presents with **no incisional bleeding** and **minimal abdominal or back pain**, as the retroperitoneum has a vast potential space for blood accumulation before built-up pressure causes peritoneal stretching and pain.

Hemodynamically unstable patients with a suspected retroperitoneal hematoma **require emergency laparotomy**.

(Choice A) A prolonged postoperative ileus or mild small bowel obstruction can be managed with antiemetics and serial examinations. These patients typically have vomiting and abdominal distension, which are not seen in this patient. In addition, postoperative gastrointestinal complications typically present several days to weeks after surgery unlike postpartum hemorrhage, which occurs within hours of delivery.

(Choice B) CT scan of the abdomen and pelvis can confirm the diagnosis of a retroperitoneal hematoma but is only appropriate for hemodynamically stable patients. Stable patients may then undergo arterial embolization for control of bleeding.

(Choice D) Oxytocin infusion and [fundal massage](#) are used to treat uterine atony, but this patient's fundus is firm and her lochia minimal, making this diagnosis unlikely.

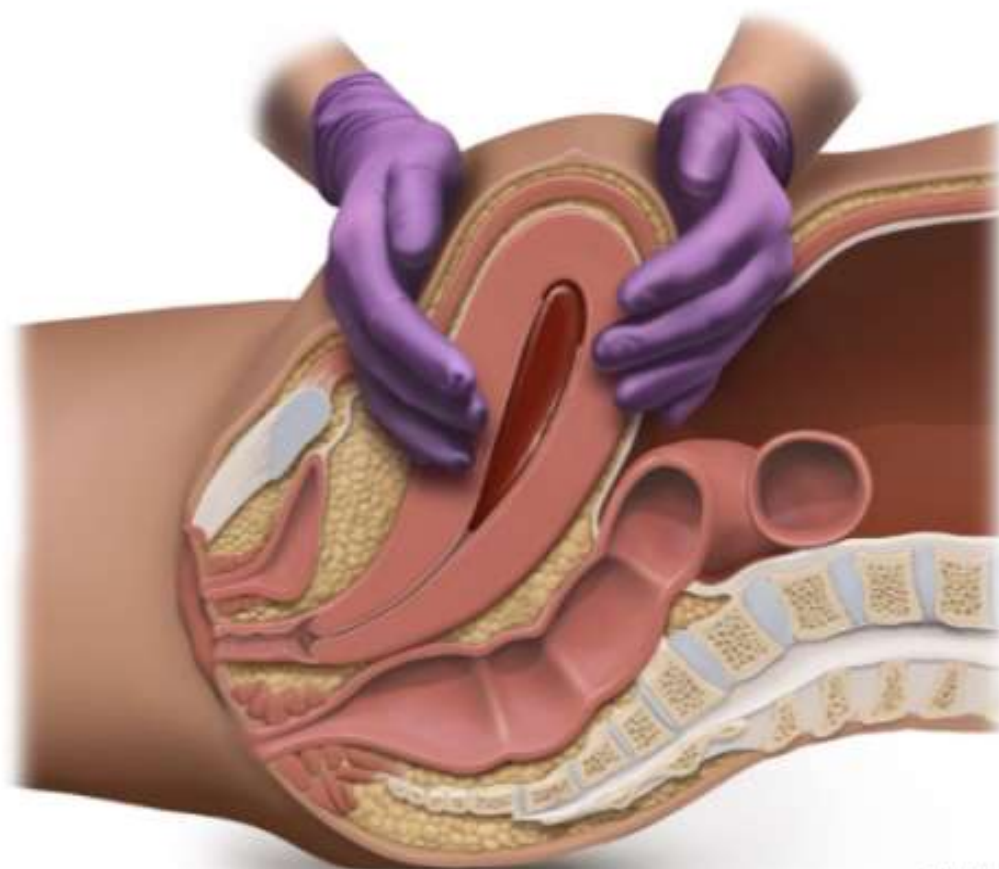
(Choice E) Transvaginal ultrasound can diagnose postpartum hemorrhage due to a retained placenta; however, patients typically have heavy vaginal bleeding, which is not seen in this patient.

Educational objective:

Retroperitoneal hematomas may occur postpartum due to uterine artery injury, leading to massive blood loss and hemodynamic instability despite minimal abdominal pain and no obvious source of bleeding. Hemodynamically unstable patients with a suspected retroperitoneal hematoma require emergency laparotomy.

bleeding consistent with atony.

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