

## Postpartum Hemorrhage Hypothetical Case Studies

*Wisconsin Association for Perinatal Care*

### Case 1: Identification and intervention

19-year-old G1 P0 female, admitted in active labor at 39 weeks with 3 cm dilatation after uncomplicated pregnancy. Patient has normal progress in cervical dilatation with a prolonged second stage requiring oxytocin augmentation and ultimately vacuum extraction (VE) delivery of a 4600-gram neonate. Placenta delivered within 5 minutes. Oxytocin was started by diluting 20 U in D<sub>5</sub>RL and running at 125 cc/hr. Patient passed large clots 20 minutes after delivery. BP 120/80, pulse 90. Uterus soft and up to the umbilicus.

- Teaching points:
  - Atony vs. cervical/vaginal tear
  - Placenta inspected/complete?
  - Pelvic exam vs. uterine exploration vs. trial of carboprost (Hemabate®)?
  - When to type and screen

Patient received 1 ampoule of carboprost every 15 minutes IM. Patient was typed and crossed. Patient was not examined. Oxytocin infusion was opened wide. Bleeding does not stop. BP 90/60, pulse 130.

- Teaching points:
  - Dosing carboprost
  - Stepwise identification of bleeding source by OB exam
  - What blood products to order and in what amount
  - What other lab studies other than hematocrit
  - Response time:
    - Blood bank
    - Anesthesia
    - Surgeon

Pelvic exam reveals bleeding from cervical os with no tears in cervix or vagina and “boggy” uterus. Clots expressed, patient “shocky.” BP 70/40, pulse 158.

- Teaching points:
  - Treatment of shock
  - Oxytocic algorithm

In spite of 6 ampoules of carboprost and IM methylergonovine (Methergine®), bleeding continues and there is “oozing” from IV site.

- Teaching points:
  - Consumption coagulopathy and DIC
  - Rapid fluid and blood/blood component replacement
  - Surgical therapy
  - Timetable

### Case 2: Identification and intervention

26-year-old G2P1 underwent cesarean at 11 pm for prolonged second stage and arrest of descent, after a 24-hour labor with dysfunctional labor, augmentation, and a 3-hour second stage. Birthweight was 4800 grams. Pre-op hematocrit was 37%. During surgery, blood loss reported to be 1000 cc and an extension of the transverse uterine incision was sutured while extending in the left broad ligament. Patient is now in the recovery room at midnight and complaining of abdominal pain. BP 120/60, pulse 120. Patient passing moderate amount of blood clots. Oxytocin running IV (125 cc/hr of D5RL with 20 U oxytocin). At 12:30 am, patient passing more clots. BP 70/40, pulse 150, urine output less than 20 cc since surgery. Abdomen seems distended.

- Teaching points:
  - Who should manage the patient?
  - Is exam or surgery required?
  - What is most likely cause?
  - What blood products should be readily available?
  - Who need to be mobilized?

Patient taken to surgery. Ten minutes prior to surgery, patient clearly in shock and oozing from IV sites and bleeding per vaginam.

- Teaching points:
  - In this scenario, shock no reason to delay surgery
  - Rapid fluid resuscitation
  - Coagulopathy
  - Prepare for what surgery?
  - Is embolization possible?

Surgery performed. Hemoperitoneum and large hematoma in broad ligament extending retroperitoneally. Bleeding from left corner uterine incision. Massive transfusion effort started in utero.

- Teaching points:
  - What type of surgery to do
  - Central line and arterial line placement
  - Postoperative care in ICU setting where?
  - How to “stay ahead”

### Case 3: Prevention

40-year-old G7P6 female admitted in active labor at 39 weeks gestation. History of postpartum hemorrhage during last delivery, requiring blood transfusions. Contractions every 2-3 minutes. Vaginal exam: Cervix 8 cm, bulging bag, vertex –1 station. Prenatal Hct 28 %. Within 4 minutes SROM and vertex crowning.

- Teaching points:
  - Risk for PPH
  - IV access

- 10 U IM oxytocin postpartum if no IV
- Active management third stage
- Availability of carboprost (Hemabate®)
- If patient presented at 3 cm, type and screen

#### **Case 4: Prevention**

34-year-old G5 P4 (2 previous cesareans) with known anterior placenta previa covering internal os. Patient scheduled for repeat cesarean. Prenatal US suggested increased blood flow in lower uterine segment.

- Teaching points:
  - Risk for accreta
  - Risk for hemorrhage from previa
  - Implantation site
  - Blood product availability
  - Preparedness for hysterectomy
  - Preparedness for embolization
  - Preparedness for conservative management
  - Accreta

#### **Case 5: Out of Hospital**

A 37-year-old Amish woman with significant OB hx, who is G 11 P 8 SAB 2 LC 8 is planning a homebirth. Entry into prenatal care is late @ 36 weeks gestation. All her previous deliveries were homebirths. The client states that she usually bleeds “a little too much” after her deliveries. Prior to her last delivery her midwife controlled the bleeding with herbs. Following the last delivery she got a “shot” but thought it was unnecessary and doesn’t want one this time. She describes being weak for a long time after all her deliveries. Prenatal course is complicated by a varicosity in each leg with one episode prior to onset of prenatal care that is described by the patient as swelling, lump, pain, redness and heat in her R calf following a bump to the leg. The patient did not see a doctor, but stayed in bed for 3 days with vinegar soaked bread compresses applied to the leg. All signs and symptoms are resolved at this time. Patient does not have any records from previous care and is not sure that she can get them because her previous midwife has moved and she doesn’t have her new address.

The client agreed to the active management of the 3<sup>rd</sup> stage of labor. The prenatal exam was WNL. Hgb: 10.7. Strong irregular UC q 5-8 minutes. Cervix is 90% effaced, 8cm dilated, very soft, and the head is at -3 station with intact membranes and a bulging bag. FHR is 132-144. Blood pressure is 122/78 P 88. The midwife sets up for the delivery. A box of clotting factor is on the shelf in the bathroom. When asked, the client states, “Oh dear, I forgot to tell you that our oldest son has hemophilia.” Moments later there is ROM with a large amount of clear fluid. The baby is born with the next contraction, with the feet covered in blood. 10 units of oxytocin IM is given. The female infant has a very short cord. 200cc gush of blood with delivery. Placenta delivered with controlled cord traction. Approximately 500cc of free blood follows the placenta. BP is 118/80 P 100.

The fundus is boggy with a continuing brisk trickle of blood and continuous uterine massage is begun. Patient is alert and talkative. The placenta is intact and unremarkable except for a total cord length of 9 inches. The perineum is intact. Fundus has firmed slightly, @U+1 with a continuing moderate trickle bleed. Parents are informed that they will need to go to the hospital by ambulance. Midwife gives .2mg of methylergonovine (Methergine®) IM. Parents agree to transport when they learn the risks of her hemophilia carrier status combined with uterine atony. Following a prearranged emergency plan, the assistant alerts the EMS system, physician, and hospital. An IV of D5WLR with 2 units of oxytocin is initiated and run wide open. O2 is begun at 6L by nasal cannula. The fundus is now firm and there is only a minimal trickle of blood. Blood pressure is 132/84 Pulse is 108. The patient is alert and oriented X3 but c/o feeling cold. The ambulance arrives in 11 minutes and the mother is transported to a local hospital. The physician contacted the Hemophilia Center and is prepared to care for the patient who arrives in stable condition. No clotting factor is needed. Vital signs are stable; fundus remains firm at U-1, with minimal postpartum bleeding. The patient receives 2 units of IV fluids and is released later that afternoon. Her hgb is 8.9 and her recovery is uneventful. The woman, a possible carrier of Factor VIII defect (von Willebrand's disease), was referred to the Hemophilia Treatment Center. The client was found to have a clotting level at 45% of normal and advised that she would need to have clotting studies done during any future pregnancies and should plan to deliver in the hospital with clotting factor available.

- Teaching points: Provider
  - English is a second language for many Plainclothes (Amish, Mennonite, German Baptist, etc.) women who often have only a 9<sup>th</sup> grade education. Providers who are working with populations with a high risk for inherited diseases such as Factor VIII defect (von Willebrand's disease) need to ask specific questions when taking an OB history.
  - Get oral health history.
  - Short cords pose an increased risk for PPH because the placenta may fully or partially abrupt during descent.
  - It is essential for the midwife to provide a clear report of the patient's history and current condition, including prenatal, labor, delivery, and postpartum care to the EMS workers.
  - Perform regular vital signs checks throughout third stage and recovery.
  - Regularly assess uterine tone.
  - von Willebrand's carrier and clotting risks
- Teaching points: System
  - Make sure that obstacles are out of the way and that the EMS workers are able to find the house and the patient. Doing so saves valuable time during transfer.
  - Become familiar with the usual response time of local EMSs.
  - When should the provider recommend hospital delivery?

## Case 6: Uterine atony

### Initial description of the patient

A 37-year-old black female P7007 at term admitted in early labor. Her prenatal course was significant for gestational diabetes controlled with diet. The patient's past obstetrical history was significant for a progressive increase in the size of her children at birth, with her last child weighing 9# 3 oz. Her past medical history was significant only for a strong family history of diabetes mellitus.

On admission, the patient's cervical exam was 4/C/VTX/-1/ AROM with clear fluid. Her contractions decreased in intensity and frequency after AROM. A Pitocin® augmentation was begun and the patient quickly progressed to C/C/VTX/+1. She delivered a 10# 2 oz baby with a moderate shoulder dystocia that was treated effectively with the McRobert's maneuver and suprapubic pressure after a left mediolateral episiotomy. The placenta delivered spontaneously without difficulty.

- Teaching points: Risk factors
  - Grand multiparity
  - Gestational diabetes
  - History of fetal macrosomia
  - Rapid labor

### Scenario A

The patient had persistent bleeding during the episiotomy repair that responded to fundal massage and intravenous Pitocin®. The placenta was examined by the attending physician and was noted to be complete. An inspection was also made for cervical and vaginal lacerations. Neither was found. On initial postpartum evaluation by the nurse, the patient had heavy bleeding with clots and a boggy, flaccid uterus.

- Teaching points:
  - This could be postpartum hemorrhage.
  - I need to think ahead and anticipate.
  - Uterine atony is the cause of 90% of all postpartum hemorrhages.
  - Massage fundus until firm
  - Check fundus and bleeding q 5 minutes
  - Take vital signs q 5 minutes
  - Save perineal pads and under pads
  - Do not position in Trendelenberg
  - Know how to set up oxygen equipment
  - Explain to the patient what is happening

The patient was given IM methylergonovine, but continued with a persistently atonic uterus. A type and screen was confirmed and the patient was given 0.25 mg 15-methyl prostaglandin F<sub>2</sub> IM (carboprost). Her uterus began to firm and the bleeding decreased significantly. No further bleeding ensued and the patient was transferred to the postpartum unit without incident.

- Teaching points:
  - Timely response to bleeding
  - Routine inspection of the placenta
  - Routine examination of the patient
  - Serial use of oxytocics

### **Scenario B:**

The patient had persistent bleeding during the episiotomy repair. The attending physician left after the episiotomy repair with instructions to the postpartum nurse to continue the IV oxytocin drip and to give methylergonovine if the bleeding persisted. No inspection of the cervix and vagina was performed prior to repair of the episiotomy. The placenta was not examined. The patient continued to bleed heavily despite the methylergonovine. The nurse called the attending physician, but there was no response. Despite aggressive fundal massage by the postpartum nurse, the bleeding persisted. The patient had an episode of hypotension and the attending physician was re-called.

- Teaching points:
  - Have an established chain of command [will the first person in the chain of command determine what the nurse does next??]
  - Initiate fluid resuscitation
  - Start oxygen per nasal cannula at 3 l/min
  - Have patient empty bladder
  - Position patient with legs elevated to xx degrees
  - Weigh pads
  - Labs [?]

The attending physician responded and gave another order for methylergonovine. There was no response to this treatment and the patient had another episode of hypotension after passing a large clot.

- Teaching points:
  - Providing information to the patient and family
  - Comfort and consoling gestures

The attending physician was called again with report of the patient's condition and returned to evaluate the patient. The patient was hypotensive, tachycardic, diaphoretic, and pale after passing another large clot. The physician ordered a dose of 15-methyl prostaglandin F<sub>2</sub> IM to be given and a type and cross for 4 units of packed red blood cells. The prostaglandin was not available on the obstetrical unit. The prostaglandin had not been re-ordered by the hospital pharmacy after its last use because of its expense and its infrequent use. The pharmacist, however, suggested the possibility of using misoprostol, which was available in the pharmacy. The patient was given 800 mg of misoprostol PR and had a rapid decrease in her bleeding with a concomitant firming of her uterus.

- Teaching points
  - Availability of oxytocics

- Alternative treatments
- When face-to-face evaluation is warranted

The patient had to have a specimen drawn for type and cross because no blood was available from the admission blood draw. Because of the patient's unstable status, 2 units of uncross-matched O(-) blood were given. She received a total of six units of packed red cells and left the hospital without further incident. Six months postpartum, however, the patient was diagnosed with Hepatitis C, which was traced back to her postpartum transfusion.

- Teaching points:
  - Routine type and screen vs. extra "red top" on admission
  - Availability and risks of blood products

### **Scenario C:**

The patient had persistent bleeding after repair of her episiotomy. An immediate re-inspection of her cervix and vagina by her attending physician revealed no occult lacerations. She was treated with continued IV Pitocin® and given multiple doses of 15-methyl prostaglandin F<sub>2</sub> as well as a course of rectal misoprostol without response. A type and cross was ordered after the initial failed response to prostaglandin. The patient was taken to surgery after counseling regarding the possible need for hysterectomy. An exploratory laparotomy was performed. The uterus was persistently atonic. There was no evidence of occult lacerations or other cause for the bleeding. Hemostatic B-Lynch sutures were placed to stop the bleeding. The bleeding decreased markedly with this procedure and the patient's abdomen was closed. She received a total of 8 units of packed red blood cells during and after the surgery. She left the hospital without further incident.

- Teaching Points:
  - Decision points in determining cause
  - Notifying support team for impending surgery
  - Definitions of failed medical treatment
  - Surgical interventions for postpartum hemorrhage
  - Ability to get blood that is typed and cross-matched

## **Case 7: Retained products of conception**

### **Scenario A:**

25 yr. old white female P1001 at term admitted in early labor. Her prenatal course was uneventful. Her past medical history was also unremarkable. The patient cervical exam on admission was 4 cm/100/VTX/0/Intact. AROM was accomplished and an epidural was placed. The patient went to C/C/VTX/+2 without problems and after a 30 minute 2<sup>nd</sup> stage of labor had a normal spontaneous vaginal delivery over a midline episiotomy. Intravenous oxytocin was given. The placenta delivered with some difficulty.

- Risk Factors
  - Previous retained POC
  - Abnormal placentation

### **Scenario B:**

The placenta was examined by the attending physician and was found to have vessels extending to and off the placental edge. With the epidural still functioning, a manual exploration of the uterus revealed a succenturiate lobe of the placenta that was manually removed without difficulty. The patient's episiotomy was repaired. The patient had an uneventful postpartum course.

- Teaching Points
  - Prompt and appropriate intervention
  - Routine inspection of the placenta

### **Scenario C:**

The patient's episiotomy was repaired. The placenta was not examined. The patient was transferred to the postpartum floor after initial recovery on the OB unit. Prior to transfer, the patient's IV and epidural catheter were removed. One hour after transfer, the postpartum nurse, a new graduate, was called by the patient's partner who said the patient had just had a large gush of blood with clots. The nurse assessed the bleeding and performed vital signs, which showed a slight tachycardia and decreased systolic BP. The attending physician's standing orders called for oral methylergonovine for postpartum bleeding. The patient continued to bleed passing several larger clots, which were duly noted by the nurse. The patient's condition continued to deteriorate and the attending physician was called. The patient was pale, diaphoretic, hypotensive, and tachycardic when the attending physician arrived. Her uterus, however, was firm and U-0. She was given 0.25mg 15-Methyl F<sub>2</sub>-IM (carboprost) and the bleeding decreased, but \_ hour later, the patient passed another large clot.

After an argument between the attending physician and the anesthesia staff regarding the need for general anesthesia, the patient was taken to surgery. A uterine exploration was performed which showed evidence of retained products of conception. Using a large sharp curette, large amount of POC was removed as well as multiple strips of apparent myometrial tissue. The patient's postpartum course was then uneventful with the exception of the need for transfusion of 2 units of packed red blood cells. Postpartum, the patient reinstated her menses, but they were very scant and an evaluation of subsequent secondary infertility showed evidence of significant intrauterine synechia consistent with Asherman's syndrome.

- Teaching Points
  - Prompt and appropriate intervention
  - Routine inspection of the placenta
  - Appropriate surgical intervention
  - Anesthesia availability and appropriate management
  - Complications

### Scenario D:

During the episiotomy repair, a moderate amount of bleeding ensued. With the epidural still functioning, a manual exploration of the uterus revealed retained products of conception that were removed with much difficulty. The bleeding decreased significantly after re-administration of oxytocin. Approximately one hour postpartum the patient had an episode of heavy vaginal bleeding and clotting. Her uterus was noted to be firm and U-0. She was taken to surgery and a suction D and C was performed with a large suction cannula. A large amount of clots were aspirated but little tissue. Again the bleeding decreased with re-administration of oxytocin. Further heavy bleeding ensued in the recovery room and the patient became hypotensive. She was given 2 units of packed red blood cells and with continued bleeding was taken back to surgery for an exploratory laparotomy. A placenta percreta was discovered at the time of surgery and despite attempts to control the bleeding with hemostatic uterine suture placements a postpartum hysterectomy was eventually done. The patient received another 6 units of packed red blood cells during the surgery, but her postpartum course was otherwise uneventful.

- Teaching Points:
  - Abnormal placentation diagnosis and management
  - Surgical management of postpartum hemorrhage

### Case 8: Uterine rupture

#### Scenario A:

30-yr-old Hispanic female P1001 at term admitted in early labor. Her prenatal course was unremarkable. The patient's past obstetrical history was significant for a previous cesarean for CPD. Her past medical history was unremarkable. She was counseled regarding a trial of labor vs. a repeat cesarean during her prenatal course and a trial of labor. The patient's initial pelvic examination showed the cervix to 4/90/VTX/0/intact membranes. AROM was undertaken and an epidural was placed for patient analgesia. Her contractions decreased in quality and intensity and an oxytocin augmentation of labor was begun. She progressed slowly to C/C/VTX/+2.

A vacuum extraction was performed after a prolonged second stage of labor.

#### Risk Factors

- Previous uterine surgery
- Prolonged labor
- Overdistended uterus
- Grand multiparity
- Instrumental delivery

### Scenario B

A moderate amount of bleeding ensued after delivery of the placenta. Upon inspection of the cervix and palpation of the lower uterine segment, a laceration was noted in the cervix extending into an apparent rent in the lower uterine segment at the area of a previous cesarean. There was active bleeding from this area above the cervical laceration. The patient was taken to the operating room by the attending physician where a uterine rupture was confirmed. The areas of bleeding were controlled with hemostatic sutures and the uterine defect was closed without incident. The patient's post-operative course was significant for a symptomatic anemia treated with transfusion of 4 units of packed red blood cells. The patient left the hospital on the 4<sup>th</sup> postoperative day.

- Teaching Points
  - Prompt diagnosis and intervention
  - Appropriate surgical management

### Scenario C:

The placenta was delivered and a midline episiotomy was repaired. A moderate amount of bleeding occurred during the episiotomy repair that slowed with fundal massage. The lower uterine segment, cervix, and vagina were not inspected by the attending physician. A large amount of bleeding ensued after the attending physician left and a call was made to report this to the physician. The attending physician was no longer on call. After locating the on-call physician (who was unaware of the patient and her history) an order was given to increase the IV oxytocin drip and to give a dose of methylergonovine. The bleeding continued and the patient became hypotensive, tachycardic, diaphoretic, and less responsive. The attending physician was called again and returned to evaluate the patient. An examination of the patient revealed a large defect in the lower uterine segment with active bleeding. The anesthesia staff was reluctant to take the patient to surgery due to her "unstable status." The patient was eventually taken to surgery where an emergency postpartum hysterectomy was performed. She was significantly hypotensive throughout the procedure receiving 6 units of O(-) blood during the procedure and another 4 units after surgery. Her post operative course was complicated by evidence of acute renal failure which responded to conservative treatment, but did require placement of a dialysis catheter for temporary hemodialysis until her renal function improved. The patient left the hospital 4 weeks after the delivery. Her postpartum course was further complicated by a neck mass and multiple syncopal episodes. An endocrine evaluation demonstrated multiple endocrine failure consistent with Sheenan's syndrome.

- Teaching Points
  - Physician call/communication issues
  - Prompt diagnosis and intervention
  - Routine examination of patient
  - Emergent anesthesia issues
  - Blood banking issues

**Scenario D:**

The placenta was delivered and a large amount of bleeding ensued. An examination revealed a large tear in the cervix extending into lateral vaginal fornix. The patient was taken to surgery where the above laceration was confirmed extending from an area of rupture in the previous cesarean scar into the parametria with a large hematoma distorting the broad ligament. A tear was also noted in the lateral aspect of the bladder base. A postpartum hysterectomy was performed as well as a repair of the bladder laceration. Bleeding continued from the parametrial area and a hypogastric artery ligation was performed on the affected side without a significant decrease in the bleeding. The area was packed tightly with laparotomy sponges and the surgery was completed. During the procedure the patient received 15 units of packed red blood cells, 5 units of fresh frozen plasma, and 4 liters of crystalloid. She remained very unstable in the intensive care unit with persistent moderate vaginal bleeding and evidence of disseminated intravascular coagulopathy. An interventional radiologist was called to evaluate the patient for a possible selective pelvic arterial embolization, but the patient had a cardiopulmonary arrest and could not be resuscitated.

- Teaching Points
  - Surgical management of persistent pelvic hemorrhage.
  - Modern treatment of hemorrhage

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