SOAP Society for Obstetric Anesthesia and Perinatology

Simulation Patient Design (October 2023)

Case of Delayed Post-Partum Hemorrhage in the Setting of Retained Products of Conception

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Introduction:

Retained products of conception (RPOC) is described as placental or fetal tissue that remains inside the uterus after a miscarriage or delivery. Even though cases of RPOC occur with normal placental implantation, other causes can be attributed to pathologic placental adherence, such as those related to the placenta accreta spectrum (PAS).[1] The incidence of RPOC is about 1% with full term deliveries and can be near 6% in earlier gestations.[2] Retained placenta is the leading cause of both primary and secondary post-partum hemorrhage (PPH). This risk increases significantly if the time between the 2nd stage and 3rd stage of labor exceeds 30 minutes. The bleeding associated with retained products/placenta can be self-limiting or severe enough to warrant transfusion.[3,4]

Risk factors for retained products of conception in the term delivery include previous history of retained placenta, preterm delivery, nulliparity, pre-eclampsia, and use of oxytocin during delivery.[3] Clinically, RPOC presents as abdominal pain, persistent dilated cervix, or PPH. Long term complications include endometritis or intrauterine adhesions that can be significant enough to cause infertility.[2,5]

Diagnosing RPOC can be challenging to the obstetrician as there are no set defined diagnostic criteria. More often, the diagnosis is made via ultrasound findings of heterogenous hyperechoic mass and loss of the endometrium-myometrium interface.[1,2,5] Obstetric treatment in the early postpartum period involves manual removal followed by augmentation of uterine contractions with oxytocin and other uterotonics. Curettage may be needed in severe bleeding.

RPOC may present as either primary PPH which occurs within 24 hours of delivery, or as secondary PPH, which occurs between 24 hours to 12 weeks postpartum. Here, PPH morbidity can present as anemia or hemorrhagic shock with possible DIC and the need for hysterectomy.[5,6] Treatment may include use of uterotonics or surgical intervention such as dilation and evacuation.[5] Anesthetic management can include small amounts of analgesics/sedatives to facilitate OB examination and manual evacuation of retained products. If the patient is hemodynamically stable, one may employ neuraxial anesthesia, whether in an already indwelling epidural catheter or placement of spinal anesthesia. On occasion, the obstetrician may need uterine relaxation to facilitate removal of the products, in which uterine relaxants such as nitroglycerin is needed. If the patient is hemodynamically unstable then general anesthesia is often necessary.

RPOC PPH may be severe enough to warrant blood and blood product transfusion. Early mobilization of PPH due to RPOC may need aggressive transfusion of packed red blood cells, fresh frozen plasma, and platelets for coagulopathy correction. In the obstetric patient population, survival of PPH has been noted to be >80% with fibrinogen values >300 mg/dL so cryoprecipitate availability is important for severe cases.[7] It is imperative for the anesthesiology provider to have a candid discussion with the obstetrician regarding clinical findings, expectations, and management of these patient to ensure safe and effective management.

Educational Rationale: To help improve early recognition of Retained Placenta and its complications (PPH) and employ effective treatment via efficient multidisciplinary communication

Target Audience: Obstetric Anesthesiology Team, Obstetric Team, Nursing Team

Learning Objectives: As per Accreditation Council for Graduate Medical Education (ACGME) Core Competencies

Upon completion of this simulation (including the debrief) learners will be able to:

- Medical Knowledge: Define Retained Products of Conception and associated complications in the setting of full-term delivery. Describe treatment options for such cases.
- Patient Care: Apply evidence-based interventions based on multidisciplinary discussion.
- Practice based Learning and Improvement: Analyze opportunities for improvement in the management of retained products of conception after full term delivery.
- Interpersonal and Communication Skills: Utilize a team approach to treatment guidance of said event, including clear communication and task distribution.
- Professionalism: Demonstrate mutual respect towards all members of the care team.
- Systems-Based Practice: Utilize a multidisciplinary protocol for management of retained products of conception.

Questions to ask after the Scenario:

1. Were the participant(s) able to identify the development of retained products of conception via effective communication with the care team?
2. What is the differential diagnosis for delayed PPH?
3. Did the participant(s) identify risk factors for delayed RPOC?
4. Did the participant(s) develop a sound anesthetic plan based on patient's clinical condition and vitals?
5. Did the participant(s) call for help early?

6. What went well and what can be improved upon in the management of this scenario?

Assessment Instruments:

1. Learner Knowledge Assessment form (Appendix 1)
2. Simulation Activity Evaluation form (Appendix 2)

Equipment Needed and Set up:

- Location: L&D surgical suite/OR setup
-Personnel: Parturient mannequin or actor/actress, labor and delivery nurse, obstetrician, obstetric anesthesiologist
-Equipment:
-Monitors: NIBP, EKG, pulse oximetry
-Airway equipment: NC/EtCO2, Ambu-bag, Anesthesia machine with suction, intubation supplies including laryngoscope, 6.0 ETT, and RSI medications
-IV fluids in situ, additional IV start kits (Optional: arterial line kit)
-Medications: phenylephrine, ephedrine, vasopressin, atropine, glycopyrrolate, epinephrine (Optional: code/crash cart, defibrillator)

Simulation Scenario:
Ms. Cece Delgado is a 38-year-old G7P2234 at 39.2 weeks who presented in spontaneous labor. She had a labor epidural placed at 6 cm and underwent an uncomplicated vaginal delivery shortly after. Placental delivery was prolonged, taking almost 45 minutes to deliver, and oxytocin infusion was started after the delivery. The patient had an uneventful postpartum course and was transferred to the post-partum unit with the neonate.

On postpartum day #2, Ms. Delgado was noted to have heavy ongoing bleeding that started in the morning as she was getting up to use the restroom. Since the morning, she has had 900-1000 cc estimated blood loss based on the pads used. A bimanual exam done at the bedside by the OB resident reveals large clots. A bedside ultrasound shows possible clots and RPOC.

Height: 162.6 cm
Weight: 100kg
BMI: 37.8
Access: 18 G Right hand
VS: HR 112 bpm, BP 104/53 mmHg, RR 18/min, Temp 36.4 C
General: Patient appears uncomfortable and pale. OB team informs you they just removed about 300 cc additional clot.
Airway: MP 2, Full neck ROM with adequate distances.
CV: RRR
Neuro: Alert and oriented with no focal deficits
Resp: CTAB

Baseline labs upon presenting today: Hb 8.6 g/dL, Plt 209 $x10^3$
Labs when patient presented for labor: Hb 11.5 g/dL, Plt 212 x 10^3

Simulation Pre-Brief:

1. Orient the participant(s) to the OR/simulation suite and allow time to review the supplies and equipment
2. Review the scenario as a team and assign roles for each team member during the simulation (anesthesiologist, circulating RN, OB surgeon)
3. Encourage the suspension of disbelief and the treatment of the mannequin as a real patient
4. Encourage thinking "out loud" and verbally describing any interventions, medication dosages, or equipment being used
5. Optional: Show the participant(s) how to employ closed-loop communication and ask for help if needed

Scenario Details

Trigger	Patient Condition	Action	Done	Time	Comments
In Post-partum room	Patient is anxious but awake and alert HR 112 bpm, BP 104/53 RR 18/min Temp 36.4 C Labs: Hb 8.6 g/dL Plt 209 x10^3	1. Discuss the patient's condition with the OB team. Include amount of estimated blood loss and planned intervention. 2. Consider general anesthesia due to continued bleeding and hypotension. 3. Place large bore IV access. 4. Send CBC, Coags, cross match, and/or ABG.			
Patient arrives in OR for Emergent D&E	Patient complaining of nausea and dizziness Vitals show increasing sinus tachycardia HR 120 bpm	1. Identify patient and procedure during time-out. 2. Discuss resuscitation goals. 3. Place monitors and obtain baseline vitals. 4. Ensure adequate IV access and initiate fluid bolus.			

	BP 100/58 mmHg SpO2 98% RR 18/min T 36.8 C Chuck noted to have moderate amount of blood.	5. Consider having blood available in the room based on continued bleeding and increasing tachycardia.			
Beginning of Induction.	Patient is nervous. HR 127 bpm BP 104/60 mmHg SpO2 99% Post-intubation: Tachycardia continues (HR=130's) with hypotension (BP=90's/50's) Labs (ABG): Hb 6.6 g/dL	1. Ensure IV fluids running on pressure bag. 2. Adequate Preoxygenation 3. Ask circulating RN or OB to provide cricoid upon induction. 4. Induction of General Anesthesia with cricoid via use of either propofol or ketamine and succinylcholine 5. Airway secured via either DL or videolaryngoscopy 6. Call for 2 units of blood in the room if did not earlier.			Note: the GETA with Cricoid anesthetic can be simulated or verbally described to avoid having to move the manikin
Patient moved down the bed and into lithotomy position.	Patient is intubated. HR 132 bpm BP 90/59 mmHg SpO2 99% RR 20/min (ventilated)	1. Continue fluid bolus (on pressure bag or wide open) 2. Start vasopressor infusion in conjunction with resuscitation. 3. Discuss with OB and start transfusion of 1 or 2 unit of PRBC's. 4. Notify obstetrical team of maternal hypotension. 5. Send additional ABG and consider arterial line set-up			

		6. Consider sending TEG/ROTEM			
Worsening SBP's.	OB performs cervical exam and notes another 500-cc blood evacuated. NIBP cuff cycles without reporting a number. HR 133 bpm BP (cycles) SpO2 94% RR 20/min	1. Administer vasopressor bolus. Start pressor drip (phenylephrine); draw up dilute epinephrine 2. Increase frequency of NIBP measurement (q1 min or STAT) if no arterial line. Call for arterial set up and place arterial line if none 3. Call for additional units of blood and FFP.			
BP continues to be low. OB notes 500 cc clot removed on exam	OB proceeds with Dilation and Evacuation HR 127 bpm BP 80/48 mmHg SpO2 100% QBL: 935 cc (Excluding previous blood loss in OB triage) Labs (ABG): Hb 8.0 g/dL	1. Continue resuscitation efforts with transfusion and vasopressors as needed. Check additional units of blood. Consider calling for other blood products: FFP, platelets, and cryoprecipitate. 2. Address anesthetic goals that are consistent with continued bleeding. 3. Follow up lab work. 4. Discuss assessment of on-going blood loss/qualitative blood loss 5. As patient is transfused, attempt to wean pressor support.			

BP improving and stabilizing. D&E procedure completed.	OB completes procedure and reports retained placental products evacuated successfully. Bleeding is now minimal. HR: 101 bpm BP 101/52 mmHg SpO2 99%	1. Patient weaned off pressor support 2. Complete transfusion as hemodynamics improve. Discuss continued transfusion goals. a. Hgb > 8-10 g/dl b. Plt >75k c. Fibrinogen >300 mg/dL 3. OGT suction 4. Help move patient out of lithotomy to supine position 5. Obtain hemoglobin level once transfusion completed 6. Begin wake up and extubation 7. Patient to L and D PACU for recovery and monitoring after extubation			

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