SOAP
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Simulation Patient Design (November, 2020)
Case of Placental Abruption in L&D

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Introduction: Antepartum vaginal blood loss can range from spotting to massive obstetric hemorrhage and can be attributed to placental abruption, placenta previa, abnormal placentation, vasa previa, and/or early labor, for example. Placental abruption, defined as complete or partial separation of the placenta from the decidua basalis layer of the uterine endometrium, occurs progressively or suddenly prior to delivery and leads to utero-placental insufficiency.[1] 7-12 of every 1000 pregnancies in North America terminate due to placental abruption, with the highest incidence reported in African-American women.[2]

Risk factors and diagnosis of placental abruption: History of cesarean delivery (CD) has been identified as a risk factor for placental abruption.[3] Other associated conditions include hypertensive diseases of pregnancy, premature rupture of membranes, chorioamnionitis, cocaine abuse and trauma.[4] Pre-eclampsia, placental abruption and intrauterine growth restriction have similar pathophysiologic processes and these conditions have been termed as the 'syndrome of ischemic placental disease'.[5] Historically, women with placenta previa were found to be 13-14 times more likely to have a placental abruption compared to women without placenta previa.[6]

A diagnosis of abruption is considered when a patient presents with vaginal bleeding, uterine tenderness, and increased uterine activity.[4] If there is a concealed abruption, vaginal bleeding (which may be painless if present) may be absent leading to gross underestimation of maternal hypovolemia.[4] One-third of coagulopathies in pregnancy may be attributable to abruption, and coagulopathy can lead to fetal demise.[1] Release of pro-coagulant factors such as placental tissue factor can result in consumptive coagulopathy and disseminated intravascular coagulation (DIC). Diagnosis is primarily clinically based on maternal and fetal status but ultrasonography can assist with diagnosis, albeit with low sensitivity.[7] Abruption is classified as: Grade 0, asymptomatic and retrospectively diagnosed; Grade 1, mild; Grade 2, moderate; and Grade 3, severe abruption.[8]

Management: Grade 1 can be managed conservatively, especially if pre-term. The patient should be admitted to the obstetrical unit for monitoring until either maturity is reached, or there is a change in fetal and/or maternal status. In Grade 2 or 3 (with a viable fetus) delivery becomes necessary. An unplanned vaginal birth may occur rapidly due to hypertonic contractions, and in fact a vaginal delivery could be associated with less morbidity compared to a CD when coagulopathy is present. The clinical team caring for a patient with Grade 2 or 3 placental abruption need to anticipate and plan for potential hemodynamic and hematologic consequences of abruption including massive obstetric hemorrhage and DIC.

Educational Rationale: Teach team skills in recognizing and managing placental abruption
Target Audience: Anesthesiology, Obstetrics, Neonatology, Nursing, and OR personnel
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:

1. *Medical knowledge*: Recognize clinical signs and symptoms, and describe treatment options for placental abruption
2. *Patient Care*: Understand risk factors that predispose patients to placental abruption in order to prioritize management strategies
3. *Practice-based learning and improvement*: Identify the setting, equipment and medications necessary to manage an obstetric patient who develops placental abruption including sequelae such as massive obstetric hemorrhage, shock and coagulopathy
4. *Interpersonal and communication skills*: Designate a team leader who will coordinate the team to provide optimal care to the patient and maintain ongoing communication about the evolution of the clinical situation among the providers
5. *Professionalism*: Understand and demonstrate mutual respect for team members
6. *System-based practice*: Ensure all resuscitation equipment, medications, and protocols are readily identifiable and available in delivery locations including airway management, anesthesia induction/emergency medications, vascular access, massive transfusion; include identification of barriers within the hospital system such as staffing, medication and equipment/protocols

Questions to Ask After the Scenario:

- Was the emergency response team appropriately activated?
- Did each member of the team have well-defined roles?
- Were the next steps for management clearly outlined by the care team?
- Were there any barriers or system issues identified when caring for the patient?
- Were opportunities for improvement(s) identified during the scenario?

Assessment Instruments:

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

Equipment Needed and Set-up:

1. Mannequin set-up in OB triage using standard admission set-up
2. One 18G IV with fluids running and multiple access ports
3. Standard monitors (e.g. EKG, NIBP, SpO_2)
4. Transfer to OR where standard anesthesia setup is ready

Simulation Scenario Set-up: Ms. Anne Parroty is a 29-year-old female, G3P2 at 27 weeks gestation who presented to OB triage with sudden onset lower abdominal pain at rest, not associated with vaginal bleeding. She reported decreased fetal movements 12 hours previously and a single episode of vomiting with no precipitating events such as abdominal trauma or recent illness. No past medical history and the pregnancy has been uncomplicated with an unremarkable fetal anatomy scan performed at 19 weeks gestation. No history of drug abuse or domestic violence, however she is a smoker of cigarettes (1 pack/day for 10 years). On presentation, the patient was hemodynamically stable with a soft non-tender uterus and bedside ultrasound revealed a single live intrauterine fetus with an unremarkable FHR tracing. Lab results within normal limits.

Two hours later, while getting ready to be discharged home, she complains of recurrence of the acute abdominal pain and examination reveals vaginal bleeding and a tender, firm uterus and the FHR tracing shows a non-reassuring pattern.

Simulation Pre-brief:

1. Read the scenario and instruct team members on their role during the simulation
2. The participants take their places outside/inside the OR
3. Patient (embedded participant)
4. Support person at bedside (participant or learner)

Placental Abruption Scenario

Trigger	Patient Condition	Action	Done	Time	Comments
Patient in L&D triage ready to be discharged home but complains of acute severe abdominal pain associated with vaginal bleeding	Patient awake and responsive HR 95 bpm BP 127/85 mm Hg SpO_2 97% (air) Resp 16/min	1. L&D triage nurse performs initial patient evaluation and examination ☐ Calls the OB to assess the patient's abdominal pain and vaginal bleeding ☐ Informs the anesthesiology team ☐ Places 18G IV + sends repeat labs (CBC, Coag screen, Fib) ☐ Initiates IV fluid infusion			
Non-reassuring fetal heart trace Abdominal pain and vaginal bleeding increasing	Lab results from initial presentation (2 h ago): Hb 11.2 g/dL Plt 130 $x10^9$/L INR 1.0 Fib 295 mg/dL	1. OB team decide to proceed with an emergency CD ☐ OR team informed + OR prepped			

Patient in OR and neuraxial anesthesia (CSE) placed	Supine (with left uterine displacement), awake and oriented HR 101 bpm BP 106/67 mm Hg SpO_2 97% (air) Resp 15/min	1. Prepare and plan for obstetric hemorrhage ☐ Place 2nd IV (16G) ☐ Order massive transfusion protocol (MTP) ☐ Patient warming ☐ Arterial line (on stand-by)			
Delivery of fetus which requires resuscitation by NICU OB describes poor uterine tone, with moderate bleeding	Repeat lab results (from triage): Hb 9.8 g/dL Plts 98 x10^9/L INR 1.3 Fib 208 mg/dL	1. Uterotonic drugs administered ☐ Oxytocin bolus and infusion ☐ Methlyergonovine administered 2. Send repeated stat labs (include TEG/ROTEM/ABG) 3. MTP arrived ☐ Ask nurses (x2) to check the units ☐ Order cryoprecipitate 4. Increase IV fluid rate (pressurized) 5. Additional nursing assistance called 6. Neonate transferred to NICU			
OB reports that the uterine tone has improved very slightly, but still poor Diffuse oozing from surgical field Patient hemodynamically unstable EBL 1.8 L	Patient looks pale and is restless HR 122 bpm BP 88/55 mm Hg SpO_2 94% (air) Resp 20/min	1. Support person escorted out of OR 2. Administer oxygen 10 L/min via non-rebreather facemask 3. Administer second 2nd-line uterotonic drug (carboprost) 4. OB places B-Lynch suture 5. OB and anesthesia teams discuss differential diagnoses 6. Initiate transfusion of PRBCs/FFP/Plt (don't wait for lab results) 7. Transfuse cryoprecipitate (or fibrinogen concentrate) 8. Vasopressors as indicated			
Patient very drowsy EBL 2.6 L	Deterioration in patient's mental status HR 138 bpm BP 78/45 mm Hg SpO_2 98% (intubated)	1. Patient is intubated emergently 2. OB and anesthesia teams discuss differential diagnoses 3. Order cryoprecipitate ☐ Consider consulting Gyn-Onc/trauma/vascular surgeons for surgical assistance ☐ Consult with ICU for			

	Repeat lab results (from earlier in OR): Hb 7.8 g/dL Plt 88 x10^9/L INR 1.6 Fib 170 mg/dL	postoperative admission 4. Arterial line placed 5. Rapid infuser set up and connected to large bore IV access 6. Vasopressors continued as indicated 7. Active warming 8. Replete calcium			
Patient under general anesthesia	Vital signs stabilizing HR 122 bpm BP 95/48 mm Hg SpO_2 98% (intubated)	1. Surgery completed 2. Patient transferred to ICU (intubated) 3. Family updated			

Appendix 1

Learner Knowledge Assessment
Labor and Delivery Interdisciplinary Team Simulation

Name of Simulation: _____ Date:

OB Nursing Anesthesia Other

Each item has two components. The "before the simulation" column on the left examines your perspective at the beginning of the simulation. The "end of simulation" column on the right is to evaluate your perspective at the completion of the simulation.

1. How would you rate your knowledge of risk factors for placental abruption?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none						Knowledgeable	Little/none						Knowledgeable

2. How would you rate your knowledge of differential diagnosis of placental abruption?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none						Knowledgeable	Little/none						Knowledgeable

3. How would you rate your knowledge of signs and symptoms of placental abruption?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none						Knowledgeable	Little/none						Knowledgeable

4. How would you rate your knowledge of delivery planning for placental abruption?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none						Knowledgeable	Little/none						Knowledgeable

5. How would you rate your overall confidence when confronted with placental abruption involving massive obstetric hemorrhage and coagulopathy?

BEFORE THE SIMULATION							END OF SIMULATION						
1	2	3	4	5	6	7	1	2	3	4	5	6	7
Little/none						Knowledgeable	Little/none						Knowledgeable

Appendix 2

Simulation Activity Evaluation

Date:_____

Designation: Consultant PG Yr 1 2 3 4 Student Nurse Midwife Other

Specialty:_____ Years in Practice:

Please rate the following aspects of this training program using the scale listed below:

1 = Poor, 2 = Suboptimal, 3 = Adequate, 4 = Good, 5 = Excellent * N/A= not applicable

Introductory Materials						
Orientation to the simulation	1	2	3	4	5	N/A
Physical Space						
Realism of the simulation space	1	2	3	4	5	N/A
Equipment						
Satisfaction with the set-up	1	2	3	4	5	N/A
Scenarios						
Realism of scenario	1	2	3	4	5	N/A
Ability of scenario to test technical skill(s)	1	2	3	4	5	N/A
Ability of the scenario to test behavioral skills	1	2	3	4	5	N/A
Overall quality of debriefing	1	2	3	4	5	N/A
Did you find this useful?						
To improve clinical practice?	1	2	3	4	5	N/A
To improve teamwork skills?	1	2	3	4	5	N/A
To improve verbal communication?	1	2	3	4	5	N/A
To improve nonverbal communication?	1	2	3	4	5	N/A
Faculty						
Quality of instructors	1	2	3	4	5	N/A
Simulation as a teaching method	1	2	3	4	5	N/A

COMMENTS/SUGGESTIONS:

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