

# Simulation Patient Design (August, 2022)

## Case of Vaginal/Labial Hematoma

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### Introduction

While postpartum hemorrhage (PPH) most commonly results from intrauterine processes such as uterine atony and retained tissue (placenta or membrane), genital trauma involving the vagina, labia, vulva, and perineum are frequently overlooked sources of PPH. The genital tract is highly vascular during pregnancy and direct or indirect trauma can lead to the development of clinically significant hematomas, with the potential for as much as 2-3 liters of blood concealed within the fascial compartments in the pudendum. The incidence of genital obstetric hematomas is approximately 1/1000 deliveries.<sup>1</sup>

Several risk factors for obstetric genital trauma have been identified that are also likely associated with an increased risk for genital hematomas. These risk factors include prolonged second stage of labor, instrument-assisted vaginal delivery, fetal macrosomia, and primigravida. Associations between episiotomy, newborn head circumference, and multiple gestations have also been identified.<sup>2-4</sup> However, the majority of instances of genital hematoma do not include any of these risk factors.

Perineal hematoma should be suspected in postpartum patients with unexplained vital sign changes (i.e., hypotension and tachycardia), or an unexplained drop in hemoglobin, particularly in the setting of any of the aforementioned risk factors. Exquisite vaginal, labial, or perineal pain, typically out of proportion to the discomfort normally experienced after a vaginal delivery, should prompt an evaluation for a perineal hematoma. Urinary retention, due to mechanical obstruction, can also be a sign of genital hematoma. Diagnosis can often be made via manual inspection of the vagina, labia, vulva, and perineum; however, imaging modalities such as CT or ultrasound may be necessary to identify deeper hematomas, including hematomas in the retroperitoneal space.<sup>5</sup>

Treatment depends on the severity and tissue planes involved. For small, superficial hematomas, vaginal packing and adequate analgesia may suffice. Larger hematomas, particularly expanding hematomas that result in hemodynamical instability, may require surgical evacuation and repair. Rarely, interventional radiology may be required to perform selective angiographic embolization of arteries supplying the hematoma.<sup>6</sup>

**Educational Rationale:** To teach team skills in the diagnosis and treatment of significant obstetric genital hematomas precipitating refractory hypotension secondary to hypovolemia

**Target Audiences:** 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:* Recall occult bleeding, specifically vaginal/labial hematoma, as a differential

diagnosis in the setting of refractory hypotension after delivery along with associated signs, symptoms, diagnosis, and treatment

- *Patient care*: Identify genital hematoma early in treatment course to mitigate associated morbidity and mortality
- *Practice-based learning and improvement*: Identify hematoma formation through multidisciplinary discussion, evaluation, and management
- *Interpersonal and communication skills*: Recognize the utility in notifying other care team providers when a patient is hemodynamically unstable without a clear source
- *Professionalism*: Value the input from nursing and obstetrician colleagues when evaluating and treating patients in the peripartum period
- *Systems-based practice*: Examine the institutions current multidisciplinary approach to patient care to improve patient safety and patient care

### Questions to ask after the scenario:

- 1.) What are signs and symptoms of an obstetric genital hematoma?
- 2.) When should obstetric genital hematoma be more strongly considered in a differential diagnosis for refractory hemodynamic instability?
- 3.) How can we improve the time to diagnosis of occult bleeding from obstetric genital hematomas after delivery?
- 4.) What was the response like during this crisis?
- 5.) Did each member of the team have well-defined roles?

### Assessment Instruments:

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

### Equipment Needed and Set-up:

#### In-situ set-up

- Personnel: Labor and delivery nurse, obstetrician, obstetric anesthesiologist
- Location: Standard labor and delivery room (LDR) setup
- Equipment:
  - Mannequin with epidural catheter in situ
    - Labor analgesia: Lumbar epidural, epidural infusion bag and pump, institution specific drugs available for redosing epidural catheter (e.g., 0.125% bupivacaine, 1% lidocaine, 3% 2-chloroprocaine)
  - Standard monitors: HR, Pulse oximetry, NIBP monitor (invasive BP monitoring supplies available)
  - IV catheter and IV fluids
  - Diagnostic equipment: ultrasound machine (with curvilinear probe), supplies to send labs
  - Resuscitation medications: additional crystalloid, colloid, vasoactive drugs (phenylephrine, ephedrine)

## Simulation Scenario Set-up:

### Case

Ms. Luka Bellow, is a 31-year-old female, G2P1 at 40 weeks' gestation who presented in spontaneous labor and is now 30 minutes status-post a normal spontaneous vaginal delivery (NSVD) with a lumbar epidural in-situ for labor analgesia. She has a history of hypothyroidism and GERD. Obstetric history is notable only for A1GDM in this pregnancy.

The patient delivered a baby boy, weighing 4082 grams and measuring 21.5 inches. Delivery was complicated by a third-degree perineal laceration requiring neuraxial supplementation for pain control with a total of 10cc of 3% 2-chlororprocaine. Uterine tone and hemostasis status-post repair were noted to be excellent by the obstetrician with a final QBL of 400mL. Thirty minutes after the obstetrician finishes the repair, the patient calls out for assistance due to new onset nausea.

Luka Bellow, 31-year-old female

Weight: 70 kg (154 lbs.); Height: 167 cm (5'6"); BMI: 24.9

Access: 18G L forearm

Airway: MP-II, 6cm mouth opening and thyromental distance

Baseline labs (drawn at admission): Hct 33%, Hb 11.2 g/dL, Plt  $176 \times 10^3/\mu\text{L}$ , with an active Type and Screen

### Simulation Pre-brief

- Simulation leader will instruct all participants on their role during the simulation session (Anesthesiologist, Obstetrician, Nursing Staff)
- All participants will read the case
- Patient calls out to the unit coordinator to ask for her nurse to start the scenario. The nurse will enter the room first to evaluate the patient.

### Scenario Details

Trigger	Patient Condition	Action	Done	Time	Comments
Patient in labor room post repair complaining of nausea.	Patient is awake and alert but nauseated. Pain is 0/10 pain. Pt received ondansetron, but still c/o nausea.  HR 98 bpm BP 92/49 mmHg (MAP: 63 mmHg) SpO <sub>2</sub> 98% (room air) Resp 18/min Temp 36.8°C  On initial assessment, QBL is	1. L&D nurse performs initial patient evaluation and examination. <ul style="list-style-type: none"><li><input type="checkbox"/> Call anesthesia to assess the patient's nausea and hypotension</li><li><input type="checkbox"/> Assess neuraxial level to ice: T7 b/l</li><li><input type="checkbox"/> Confirm QBL since delivery and repair</li><li><input type="checkbox"/> Call OB team at bedside to perform vaginal exam.</li><li><input type="checkbox"/> Confirm starting Hb and check status of blood product availability</li></ul>			

	<p>still only 400mL. There has been no appreciable blood loss on her last two fundal checks. 1L crystalloid has been administered.</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Initiate 500cc IV fluid bolus and/or vasoactive medication IV push</li> <li><input type="checkbox"/> Place additional PIV access</li> <li><input type="checkbox"/> Anesthesia provider notifies nurse to call if ongoing issues s/p fluid bolus. Patient's symptoms improve with interventions.</li> </ul>			
<p>30 minutes later- Patient calls out again complaining of light-headedness. s/p 500cc fluid bolus and 200 mcg phenylephrine IV push over prior 30 minutes.</p>	<p>Patient is no longer nauseated but stated she feels light-headed. The patient endorses slight pressure in her lower abdomen and pelvis but no pain.</p> <p>HR 110 bpm BP 89/52 mmHg (MAP: 64 mmHg) SpO<sub>2</sub> 97% (room air) Resp 16/min Temp 36.7°C</p> <p>L&amp;D nurse reports only an additional 50 cc added to QBL.</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Anesthesia provider assesses the patient</li> <li><input type="checkbox"/> Neuraxial level to ice: T9 b/l</li> <li><input type="checkbox"/> Abdomen is soft</li> <li><input type="checkbox"/> POCUS to assess volume status (contractility, wall motion abnormalities, B-lines) and abdominal FAST exam to look for free fluid in abdomen. Unremarkable, but maybe a little dry, no B-lines</li> <li><input type="checkbox"/> 2<sup>nd</sup> 500cc crystalloid bolus</li> <li><input type="checkbox"/> 10 mg ephedrine IV push given with appropriate BP response (HR 90 BP 108/65; MAP: 79 mmHg)</li> <li><input type="checkbox"/> Cross match 2 units PRBCs</li> </ul>			
<p>The patient's blood pressure continues to decrease (78/52 now). Pt s/p 2<sup>nd</sup> 500cc fluid bolus and 10 mg ephedrine IV push.</p>	<p>Patient is nauseated and vomiting.</p> <p>HR 115 bpm BP 78/52 mmHg (MAP: 60 mmHg) SpO<sub>2</sub> 97% (air) Resp 22/min Temp 36.8°C</p>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Anesthesia provider assesses the patient</li> <li><input type="checkbox"/> Additional IV phenylephrine bolus (100-200 mcg) given with appropriate BP response (BP increases to 104/63; MAP: 77 mmHg)</li> <li><input type="checkbox"/> Send labs (CBC,</li> </ul>			

	L&D room nurse says that there has been no additional bleeding but states that maybe the initial EBL wasn't accurate, and the patient needs more fluids	<p>coags, consider ROTEM/TEG)</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Anesthesia provider notifies OB that patient persistently hypotensive despite adequate fluid resuscitation with a normal POCUS scan and asks them to evaluate the patient</li> <li><input type="checkbox"/> OB provider comes to evaluate the patient</li> </ul>			
On vaginal exam, the OB provider notes a large, tense, palpable hematoma superolateral to the perineal laceration and estimates this hematoma to be 7 x 8 cm.	<p>HR 113 bpm BP 85/50 mmHg (MAP: 62 mmHg) SpO<sub>2</sub> 98% (air) Resp 24/min Temp 36.8°C</p> <p>Labs: - Hb: 6.9 g/dL - Plt: 153x 10<sup>3</sup>/μL - Fib: 243 mg/dL - INR: 0.9 - PTT: 25s</p>	<p>1. Obstetric, anesthesia, and nursing discuss exam results, labs, and plan</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Transfuse 1-2 units PRBCs. Obstetric team places vaginal packing and plans to recheck in 4 hours unless otherwise indicated</li> <li><input type="checkbox"/> Repeat labs in 4 hours unless otherwise indicated</li> <li><input type="checkbox"/> Labor epidural infusion continued to maintain patency in the event patient needs to go to the OR for evacuation</li> <li><input type="checkbox"/> IR notified in the event of selective arterial embolization</li> <li><input type="checkbox"/> Patient and care partner updated on diagnosis and care plan</li> </ul>			
On repeat examination, hematoma has evolved and is now measuring 9 x 11 cm. Decision made to proceed to the OR for evacuation and source control.	<p>HR 85 bpm BP 105/65 mmHg (MAP: 78 mmHg) SpO<sub>2</sub> 98% (air) Resp 24/min Temp 36.8°C</p> <p>Labs (after transfusion of 2u pRBC's): - Hb: 7.8 g/dL</p>	<p>1. Anesthesia provider:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Cross for additional 2u pRBCs</li> <li><input type="checkbox"/> Consider ROTEM/TEG and ordering FFP</li> <li><input type="checkbox"/> Administer aspiration prophylaxis</li> <li><input type="checkbox"/> Begin to dose lumbar</li> </ul>			

	<p>- Plt: <math>149 \times 10^3/\mu\text{L}</math> - Fib: 194 mg/dL</p>	<p>epidural for surgical anesthesia</p> <ul style="list-style-type: none"><li><input type="checkbox"/> Reassess patient's airway in the event of general anesthesia (conversion to or if patient becomes hemodynamically unstable prior to the case or if epidural non-functional)</li><li><input type="checkbox"/> IR notified patient proceeding to the OR for evacuation</li></ul>			
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## Appendix 1

### Learner Knowledge Assessment Labor and Delivery Multidisciplinary Team Simulation

Name of simulation: \_\_\_\_\_

Date: \_\_\_\_\_

OB Nursing Anes

Each item has two components. The “Before the simulation” column (left side) examines your perspective at the beginning of the simulation. The “End of Simulation” column (right side) is to evaluate your perspective at the completion of the simulation.

#### 1. How would you rate your knowledge of risk factors for obstetric genital hematomas?

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

#### 2. How would you rate your knowledge of differential diagnosis of obstetric genital hematomas?

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

#### 3. How would you rate your knowledge of signs and symptoms of significant obstetric genital hematomas?

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

#### 4. How would you rate your knowledge of immediate management of obstetric genital hematomas?

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

#### 5. How would you rate your overall confidence when confronted with obstetric genital hematomas involving significant blood loss and resultant hemodynamic instability?

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

## Appendix 2

### Simulation Activity Evaluation

DATE OF SIMULATION: \_\_\_\_\_

OCCUPATION: 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

Use "N/A" if you did not experience or otherwise cannot rate an item

#### **INTRODUCTORY MATERIALS**

Orientation to the simulator	1	2	3	4	5	N/A
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#### **PHYSICAL SPACE**

Realism of the simulator space	1	2	3	4	5	N/A
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#### **EQUIPMENT**

Satisfaction with the mannequin	1	2	3	4	5	N/A
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#### **SCENARIOS**

Realism of the scenarios	1	2	3	4	5	N/A
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Ability of the scenarios to test technical skills	1	2	3	4	5	N/A
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Ability of the scenarios to test behavioral skills	1	2	3	4	5	N/A
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Overall quality of the debriefings	1	2	3	4	5	N/A
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#### **DID YOU FIND THIS USEFUL?**

To improve your clinical practice?	1	2	3	4	5	N/A
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To improve your teamwork skills?	1	2	3	4	5	N/A
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To improve your VERBAL communication?	1	2	3	4	5	N/A
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To improve your NONVERBAL communication?	1	2	3	4	5	N/A
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#### **FACULTY**

Quality of instructors	1	2	3	4	5	N/A
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Simulation as a teaching method	1	2	3	4	5	N/A
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#### **COMMENTS/SUGGESTIONS:**



## References:

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