ACEP Ultrasound Simulation Case Template

SIMULATION CASE TITLE: Hypovolemic Shock from Ruptured Ectopic
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PATIENT NAME: Rachel Smith
PATIENT AGE: 32 years old
CHIEF COMPLAINT: Abdominal Pain

Brief narrative description of case *Include the presenting patient chief complaint and overall learner goals for this case*	32yo healthy F comes to the Emergency Department with abdominal pain. The learner should obtain a thorough history in a female of childbearing age, including last menstrual period and sexual history. The learner should incorporate bedside ultrasound and be able to resuscitate a hypotensive patient while awaiting definitive treatment with OB/Gyn.
Primary Learning Objectives *What should the learners gain in terms of knowledge and skill from this case? Use action verbs and utilize Bloom's Taxonomy as a conceptual guide*	- Obtain a history of Pelvic Inflammatory Disease (PID), recognize that this is a risk factor for ectopic pregnancy - Resuscitate a hypotensive patient- IV access, crystalloids, transfusion if needed - Perform a bedside ultrasound- FAST and Pelvic - Consult appropriate service in expedited manner (OB/Gyn) for definitive treatment (OR)
Critical Actions *List which steps the participants should take to successfully manage the simulated patient. These should be listed as concrete actions that are distinct from the overall learning objectives of the case.*	- Elicit history of missed LMP, +/- history of PID - Bedside FAST; identify free fluid - 2 large bore IVs, cardiac monitor, bolus crystalloid fluids - Type and Cross pRBC - Consult OB/Gyn
Learner Preparation *What information should the learners be given prior to initiation of the case?*	32yo F self presents to ER with abdominal pain.
Required Equipment *What equipment is necessary for the case?*	Cardiac Monitor Bedside Ultrasound

INITIAL PRESENTATION	
Initial vital signs	HR: 95/min BP: 100/60 RR: 20/min O_2SAT: 99% T: 98°F
Overall Appearance *What do learners see when they first enter the room?*	32yo F in mild discomfort due to pain, initially stable
Actors and roles in the room at case start *Who is present at the beginning and what is their role? Who may play them?*	Male partner at bedside- played by any male Nurse to assist with orders- played by anyone
HPI *Please specify what info here and below must be asked vs what is volunteered by patient or other participants*	32yo F who had sudden onset of abdominal pain 1 hour ago (volunteered) Severe and constant pain, worse with walking or palpation (asked) No fevers, +nausea (asked) LMP 8 weeks ago, missed a period but not always regular (asked) Multiple sexual partners in the past, now in monogamous relationship (asked) No prior pregnancies (asked), prior hx of Chlamydia (asked)
ROS	Abdominal pain, nausea, malaise/fatigue
Past Medical History	PID
Past Surgical History	None
Family History	Non-contributory
Medications	None
Allergies	NKDA
PHYSICAL EXAMINATION	
General	Well developed F, mild discomfort due to pain
HEENT	Normal
Neck	Normal
Respiratory	Normal
Cardiovascular	Borderline tachycardia, no m/r/g
Abdomen	soft, ttp diffusely with rebound and guarding

Neurological	Normal
Skin	Cool to touch, mildly clammy
GU	no vaginal bleeding or discharge noted, ttp R adnexa > L adnexa
Extremities	Normal
Psychiatric	Anxious

SCENARIO STATES, MODIFIERS AND TRIGGERS

This section should be a list with detailed description of each step than may happen during the case. If medications are given, what is the response? Do changes occur at certain time points? Should the nurse or other participant prompt the learners at given points? Should new actors or participants enter, and when? Are there specific things the patient will say or do at given times?

PATIENT STATUS	LEARNER ACTIONS, MODIFIERS & TRIGGERS TO MOVE TO THE NEXT STATE	
1. Baseline Rhythm: NSR HR: 95/min BP: 100/60 RR: 20/min O_2SAT: 99% T: 98°F	Learner Actions: ● Obtain history, including LMP and sexual history ● Perform physical exam ● Start IV and crystalloid bolus	Modifiers: *Changes to patient condition based on learner action* ● If no IV or crystalloid started, pt becomes more tachycardic and hypotensive ● If crystalloid started via IV, vitals stable during history and exam but eventually drops to 90/50 when H&P complete Triggers: *For progression to next state* ● BP drops to 90/50
2. Rhythm: NSR HR: 100/min BP: 90/50 RR: 22/min O_2SAT: 95% T: 98°F	Learner Actions: ● Start 2nd large bore IV and more crystalloid ordered ● Bedside FAST reveals pelvic free fluid ● Order CBC, Chem7, coags, pregnancy test ● Type and Cross at least 2u pRBC	Modifiers: ● If 2nd bolus of crystalloid started, BP stays at 90/50 ● If no more fluids ordered, BP drops to 80/50 ● If a CT scan is ordered, the CT tech states they won't take the patient without a resulted negative pregnancy test ● If OB consulted before bedside US done, they are unavailable Triggers: ● FAST done and recognized as positive ● pRBC ordered

3. Rhythm: NSR HR: 100/min BP: 80/50 RR: 24/min O_2SAT: 95% T: 98°F	Learner Actions: ● Consult OB for concern of ruptured ectopic ● Insist that OB come down based on findings of bedside US (rather than radiology US)	Modifiers: ● After 2nd bolus of crystalloid, start pRBC ● Order more pRBC to be on standby Triggers: ● OB en route to ED
4. Rhythm: HR: 100/min BP: 85/60 RR: 24/min O_2SAT: 95% T: 98°F	Learner Actions: ● Continue resuscitation with pRBC ● Update pt and partner at bedside ● OB takes patient to OR	Modifiers: ● If pt not updated yet, pt and partner should become very anxious/agitated about what is going on Triggers: ● OB takes patient to OR

SUPPORTING DOCUMENTS, LAB RESULTS AND MULTIMEDIA	
Lab Results	CBC: 13.5/9/27/250 Chem7: wnl Coags: wnl hCG qualitative: positive hCG quantitative: 12,850
EKG	Normal sinus rhythm with no ST elevations
CXR CT imaging	N/A

Ultrasound Video Files	FAST with free fluid Pelvic US with adnexal mass noted in addition to pelvic free fluid

SAMPLE QUESTIONS FOR DEBRIEFING
1) What is your differential diagnosis for a young healthy female with sudden onset abdominal pain? **2) What are risk factors for ectopic pregnancy?** **3) What is the role of a quantitative hCG in diagnosing pregnancies? What is the discriminatory zone?**

Ideal Scenario Flow
Provide a detailed narrative description of the way this case should flow if participants perform in the ideal fashion.

The learners enter the room to find a young female in mild distress due to pain, but otherwise relatively stable. They have time to elicit a thorough history from the patient, including a missed menstrual period and a history of PID. The patient's vital signs begin to worsen with increasing tachycardia and hypotension; this deterioration is temporized with IV crystalloid resuscitation. A bedside FAST and/or Pelvic US needs to be done to make the diagnosis of free fluid in the abdomen +/- adnexal mass suggesting ectopic pregnancy in the setting of a positive pregnancy test. pRBC needs to be ordered and ready for transfusion in addition to a stat OB consult so that the patient may be taken to the OR for definitive treatment. The urgency of the consult needs to be conveyed to the consultant, or else the patient's condition will continue to deteriorate.

Anticipated Management Mistakes
Provide a list of management errors or difficulties that are commonly encountered when using this simulation case.

For example:

1. *<u>Difficulty with bedside monitors</u>: We found when using this case with medical students that many of our learners did not know how to properly connect EKG leads to the bedside monitor. We modified our sessions to include an introduction to simulation cases that includes a tutorial for connecting patients to bedside monitoring.*

2. *<u>Failure to recognize the chance of pregnancy in this patient with a missed LMP:</u> It is important to elicit a thorough history with patients when the patient is stable. Without the information that the patient missed her most recent menstrual cycle, and/or has a history of PID and thus is at risk for ectopic pregnancies, the diagnosis will be difficult to make.*
3. *<u>Delay in treatment with relatively stable initial vital signs</u>: Patients with ectopic pregnancy can lose a lot of blood into their abdomen, and they can lose it quickly. These patients are usually young and can compensate well initially. However, one needs to be prepared for the worst and aggressive with resuscitation from the beginning. pRBC should always be ready either for transfusion in the Emergency Department or in the OR.*