ACEP Simulation Case Template

SIMULATION CASE TITLE: Appendicitis
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PATIENT NAME: Abby Payne
PATIENT AGE: 24 year old female
CHIEF COMPLAINT: Abdominal Pain

Brief narrative description of case *Include the presenting patient chief complaint and overall learner goals for this case*	24yo F G2P1011 with hx of kidney stones presents complaining of right sided abdominal pain. The goals for this case are to recognize potential causes of right sided abdominal pain and the utility of using bedside US to narrow your differential and ultimately obtain your diagnosis.
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*	- Formulate a differential diagnosis for right sided abdominal pain - Appropriately manage patient's pain - Perform bedside US to aide in determining cause of patient's pain - Consult the appropriate service (General Surgery) in an expedited manner for definitive treatment
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.*	- IV - Analgesia - Pregnancy testing / Pelvic exam - Bedside US of appendix, kidneys and uterus/ovaries - Consult General Surgery
Learner Preparation *What information should the learners be given prior to initiation of the case?*	24yo F presents to the ED with abdominal pain.

Required Equipment *What equipment is necessary for the case?*	Ultrasound

INITIAL PRESENTATION			
Initial vital signs	HR: 103/min BP: 113/62 RR: 18 / min O_2SAT: 99 % T: 99.8 ^oF		
Overall Appearance *What do learners see when they first enter the room?*	Young female in moderate discomfort from pain		
Actors and roles in the room at case start *Who is present at the beginning and what is their role? Who may play them?*	Female patient Nurse		
HPI *Please specify what info here and below must be asked vs what is volunteered by patient or other participants*	24yo F with 2 days of persistent right sided abdominal pain (volunteered) Generalized pain initially, now RLQ (asked) Nauseous but no vomiting (asked) Decreased PO intake, unsure if decreased appetite or due to nausea (asked) Mild urinary frequency without hematuria (asked) No vaginal discharge or irregular bleeding (asked) LMP 4 weeks ago (asked) Sexually active with 2 partners, no barrier contraceptives used (asked)		
Past Medical/Surg History	**Medications**	**Allergies**	**Family History**
Spont Ab Vaginal delivery Chlamydia	None	NKDA	HTN
Physical Examination			
General	Patient in moderate discomfort		
HEENT	Normal		

Neck	Normal
Lungs	Clear to auscultation, no respiratory distress
Cardiovascular	Mild tachycardia, regular rhythm, normal S1/S2, no murmur
Abdomen	Normal bowel sounds, soft, tenderness to RLQ with rebound, mild right CVA tenderness, positive psoas sign, negative Rovsing and obturator signs.
Neurological	Normal
Skin	Warm, no rash
GU	Scant vaginal discharge, no CMT, os closed, no adnexal tenderness
Psychiatric	Normal mood, concerned

1) **SCENARIO STATES, MODIFIERS AND TRIGGERS**
2) *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. At Presentation HR: 103/min BP: 113/62 RR: 18 / min O_2SAT: 99 % T: 99.8 ^oF	Learner Actions ● Obtain history from patient ● Elicit medical and social history ● Give analgesics ● Give IVFs	Modifiers *Changes to patient condition based on learner action* ● If analgesics not given, pt's pain worsens and begins vomiting preventing ability to perform abdominal exam and/or ultrasound ● If analgesics given, tachycardia improves and patient tolerates exam Triggers *For progression to next state* ● Analgesic given

2. HR: 84/min BP: 100/59 RR: 18 / min O_2SAT: 99 % T: 99.8 ^oF	<u>Learner Actions</u> ● Abdominal and pelvic exam completed (Verbalize differential; should include appendicitis, ectopic pregnancy and ureteral stone) ● Order pregnancy test, UA and labs (CBC, chem7, LTFs) ● Perform bedside ultrasound	<u>Modifiers</u> ● If CT ordered, nurse prompts learner that pt has not given urine sample for pregnancy test and that CT imaging is delayed due to multiple traumas in the ED. ● When requested, US shows dilated, non-compressible appendix, normal kidneys, and normal sized ovaries without cysts <u>Triggers</u> For progression ● Perform US: diagnosis of appendicitis
3. HR: 87/min BP: 99/64 RR: 18 / min O_2SAT: 95 % T: 99.8 ^oC	<u>Learner Actions</u> ● Start IV abx ● Consult general surgery	<u>Modifiers</u> ● If abx given and general surgery urged to take patient to OR, patient will undergo successful laparoscopic appendectomy ● If abx not started or CT ordered, pt's pain will become severe with associated tachycardia and fever. CT will reveal perforated appendicitis with prolonged hospital course. Repeat US shows FF in pelvis. <u>Triggers for progression</u> ● End of case

SUPPORTING DOCUMENTS, LAB RESULTS AND MULTIMEDIA	
Lab Results	CBC: 14.3/13.2/43/210 Chem7: wnl LFTs: wnl UA: trace blood, no nit, no LE Upreg: neg
Ultrasound Video Files	Appendicitis - longitudinal and transverse Normal Right Kidney - longitudinal and transverse Normal Uterus and ovaries - longitudinal and transverse Pelvic Free Fluid - longitudinal and transverse
CT imaging	CT image showing perforated appendicitis

SAMPLE QUESTIONS FOR DEBRIEFING

1) What is the differential diagnosis for RLQ pain in a female? How can bedside ultrasound be used to narrow this differential?

2) What are the sonographic findings of appendicitis?

3) What maneuvers can be used to aide in the identification of the appendix when using ultrasound?

4) Why is sufficient analgesia important when performing an ultrasound for suspected appendicitis?

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 patient who appears uncomfortable. She is in pain, is tachycardic and unable to provide a reliable exam due to her pain. The learners should do a thorough history. They should keep a broad differential for causes of this patient's abdominal pain. Bedside ultrasound should be used to narrow the differential and guide further management of this patient's pain. Pain should be controlled both to aid with the physical exam and to keep the patient comfortable during the ultrasound examination. If the learners request a CT to diagnose the RLQ pain, this should lead to delays in diagnosis of the appendicitis with eventual rupture.

After the diagnosis of appendicitis is made, the learners should consult Surgery and quickly start antibiotics, continue to manage the patient's pain and prepare the patient for the OR. Surgery will give pushback about evaluating the patient or taking them to the OR without a CT scan. Again, if a CT scan is ordered, definitive management of the appendicitis will be delayed and the patient will become more acutely ill due to rupture of the appendix.

Anticipated Management Mistakes

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

1. *Pain management: Failure to adequately control a patient's pain may lead to inability to perform a thorough history and exam. Poorly controlled pain also makes it more difficult to ultrasound patients to narrow their differential.*
2. *Failure to use ultrasound to evaluate poorly differentiated abdominal pain: In conjunction with the physical exam, bedside ultrasound can quickly be used to narrow down the broad differential associated with vague abdominal pain. It should also be used to rapidly diagnose suspected appendicitis.*
3. *Failure to stand by ultrasound diagnosis of appendicitis: Consulting surgeons often request confirmatory CT scans despite high specificity and positive predictive value of ultrasound. This leads to delays in definitive management. Learners should engage consultants in results of point-of-care ultrasound and review images with consultants to help them gain confidence and understanding of diagnosis.*