

## **Case 307: Abdominal Pain**

❖ **Chief complaint**

- 34-year-old female presents with abdominal pain

❖ **Vital signs**

- HR: 90 BP: 98/40 RR: 16 T: 37.6°C Sat: 98% on RA Wt: 80kg

❖ **What does the patient look like?**

- Patient appears uncomfortable lying on the stretcher with notably gravid abdomen.

❖ **Primary survey**

- Airway: speaking normally
- Breathing: no respiratory distress, clear lungs
- Circulation: normal perfusion

❖ **Action**

- Place patient on the monitor
- One-two peripheral IV lines (draw rainbow top)
- 1 L NS bolus
- POC glucose (85, if asked for)

❖ **History**

- Source: Patient, brought in by husband at bedside
- HPI: a 24-year-old female presents with abdominal pain for the last 24hr, with worsening pain over the last few hours (currently 9/10). She is G1P0 at 26wks with a previously uncomplicated pregnancy. The pain started as a dull non-focal cramping, as it has become more severe it is more focused in the mid right abdomen. She has been eating normally until today when she developed nausea and non-bloody emesis worse than is usual for her pregnancy. ROS is otherwise negative.
- PMHx: gallstones, otherwise negative
- PSHx: none
- Allergies: none
- Meds: none
- Social: denies alcohol, smoking, or drugs
- FHx: non-contributory
- PCP: Dr Jones, OB: Dr. Fisher

❖ **Secondary survey**

- **General:** alert and oriented, unable to get comfortable due to pain
- HEENT: normal

- Lungs: normal
- Heart: normal
- **Abdomen:** gravid, diffuse tenderness to palpation, worse in the periumbilical area, no rebound or guarding, reduced bowel sounds, negative Murphy's sign, no tenderness at McBurny's point, negative Rosving, Psoas and Obturator signs
- \*If pt placed in L lateral decubitus position, more focal tenderness noted to right mid abdomen and RUQ with +rebound, no guarding
- Rectal: normal
- Sterile Speculum or Bimanual: os closed, no vaginal bleeding or discharge noted, no CMT
- Extremities: normal
- Back: normal
- Neuro: normal
- Skin: normal
- Lymph: normal

#### ❖ Action

- Instructor prompt: learners should discuss differential diagnosis
- Order Labs
  - CBC, BMP, LFT, lipase, UA, PT/INR, PTT, type and screen
  - Consider lactate
- Order Meds
  - 1 L NS bolus (if not given already, may consider 2<sup>nd</sup> liter)
  - IV analgesia (Morphine 4-8mg IV or Dilaudid 0.5-1mg IV, avoid NSAIDS)
  - IV antiemetic (Reglan 10-20mg IV or Phenergan 25mg IV)
- POCUS: Transabdominal for FHT, may consider RUQ
  - **Figure 307.1 (A-B)**- transabdominal view, late 2nd trimester/early 3rd trimester pregnancy, IUP, FHR: 167
  - **Figure 307.2**- RUQ: GB w septation, no stones, CBD WNL, no wall thickening, no pericholecystic fluid
  - If attempt to visualize appendix: unable to visualize
  - If FAST attempted: limited views, no apparent free fluid
  - If Renal US attempted: normal appearance of kidneys
  - If Pelvic US attempted: unable to visualize ovaries
- Consult OB/GYN and General Survey- express concern for acute abdomen with limited differential including appendicitis; discuss with consultants imaging options below
- Order Imaging
  - If formal US ordered (must be called for expedited exam and results), they will be unable to visualize the appendix
  - If CT A/P ordered, must have discussion with patient regarding risk/benefit and radiation exposure during pregnancy
  - If MRI A/P ordered (non-contrast), discuss management plan with patient

#### ❖ Nurse

- Patient reevaluation:
  - Still with significant pain (give additional IV narcotic)
  - Vitals after 1L IVF: HR: 88 BP: 105/60 (may give additional IVF)
  - Vitals if no IVF given: HR: 110 BP: 80/35 (Prompt: give IVF)
- **Case 307 Lab Results** (sig for WBC to 15.5, 80%N, UA with 2+ LE)
- Other Lab Results: **Lactate 3.8**, Blood type O negative
- Imaging Results (CT or MRI per orders, verbal report)- acute appendicitis without rupture

#### ❖ Action

- Surgery and OB consults
  - Recommend Zosyn IV preop
  - To OR with both teams for laparoscopy vs laparotomy for appendectomy
- Discussion with patient, family, PCP and primary OB of need for emergent OR and diagnosis of appendicitis

#### ❖ Diagnosis

- Acute Appendicitis in a Pregnant Patient

#### ❖ Critical actions

- Bedside US to confirm IUP and normal FHT
- Pain management with IV narcotic
- Discussion of imaging options and radiation risk in pregnancy
- CT or MRI of abdomen and pelvis
- Consultation of OB and General Surgery
- Disposition to the OR

#### ❖ Instructor Guide

- This is a case of appendicitis during the second trimester of pregnancy. This emergent diagnosis is complicated by normal physiologic changes that occur in pregnancy and an enlarging uterus that obscures the typical physical exam findings. Important early actions include administering IV fluids, bedside US to confirm a normal fetal heart rate, and early consult with OB and General Surgery to discuss the appropriate workup and imaging to aid diagnosis. Especially if a CT is ordered, it is important that the learner discuss the risks/benefits of radiation exposure during pregnancy and practice shared decision making with the patient. Once appendicitis is noted on imaging, IV antibiotics appropriate for pregnancy should be given and the patient should be dispositioned to the OR.

### ❖ Case Teaching Points

- The differential for acute abdomen in pregnancy should include all the common diagnoses (appendicitis, cholecystitis, SBO, bowel perforation, AAA, mesenteric ischemia, etc) in addition to common GYN complaints (ovarian torsion, cyst rupture) and complications of pregnancy (uterine rupture, placental abruption, preterm labor, HELLP); evaluation of FHT and fetal monitoring may help distinguish if the problem is primarily pregnancy related or pregnancy threatening.
- Normal physiologic changes in pregnancy include higher heart rate, lower blood pressure (with wide pulse pressure), elevated WBC (6,000-16,000/ $\mu$ L), lower Hb (13->12). Normal symptoms of pregnancy include nausea, vomiting, constipation, urinary frequency, GERD and pelvic or abdominal pain; must obtain thorough history to determine how symptoms differ from baseline.
- Appendicitis is the most common nonobstetric cause of surgical emergency in pregnancy (1 in 2-6000 pregnancies). The incidence of perforation is 25% in pregnancy and up to 66% if surgery is delayed for >24hr.
- In early pregnancy, the appendix is located near McBurny's point; however as pregnancy progresses it relocates towards to umbilicus and then closer to the gallbladder (may present with generalized or RUQ pain). Nausea and vomiting is commonly associated with appendicitis in pregnancy, anorexia is slightly less common in pregnant patients compared to non-pregnant patients.
- Peritoneal signs are often absent in pregnancy since the anterior abdominal wall is lifted from the peritoneum as pregnancy progresses. In late pregnancy, it may be helpful to examine the patient in R or L lateral decubitus to help distinguish uterine from extra-uterine tenderness.
- Medically indicated imaging (including CT) should be done regardless of pregnancy status if there is a high concern for emergent diagnosis. When possible, options without ionizing radiation should be considered, including US and MRI. For appendicitis, however, US is only 20% sensitive and MRI is 80% sensitive for diagnosis. Note that gadolinium crosses the placenta (effects unknown) and is a category C drug in pregnancy.
- Radiation exposure in pregnancy should be discussed with the patient and risks/benefits should be weighed. Exposure to less than 0.05 Gy is safe during pregnancy (CT A/P is well below this).
- If emergent surgery is indicated, it should be performed on a pregnant patient just as it would be on a non-pregnancy patient. General surgery and OB/GYN should both be closely involved with OR management.
- Associated complications to the pregnancy must be considered and identified, with preterm labor being the most common complication. In this case, tocolytics (Mg, terbutaline) may be considered. If preterm delivery is expected, IV steroids should be given to the mother as soon as possible to aid in fetal lung maturation (unless the mother has a severe infection).
- Avoid medications contraindicated in pregnancy- NSAIDS (3<sup>rd</sup>), Flagyl, Bactrim, Cipro

#### ❖ **POCUS Pearls** (time-permitting)

- While US is the preferred method of diagnostic imaging in pregnancy, if POCUS or comprehensive US is non-diagnostic, ionizing radiation should not be avoided in a patient with an acute abdomen.
- US for appendicitis is challenging but has been proven to be effective in the hands of an emergency physician; this study is more complicated in a pregnant patient given the variable location of the appendix.
- Two approaches to imaging the appendix:
  - Place the probe where the patient says it hurts (may not be RLQ in pregnant patient)
  - Systematically scan the RLQ in a “lawn mowing” pattern, identify and follow the cecum until you find a tubular blind ending non peristalsing structure (less helpful in the pregnant patient)
- The appendix is measured from outer wall to outer wall, size > 6mm is c/w appendicitis if non- compressible as well (sometimes normal appendices are >6mm, but compressible). Size <6mm rules out appendicitis.
- The appendix in appendicitis will appear targetoid, like a bulls eye, in the transverse view 2/2 a fluid filled lumen surrounded by echogenic layer of mucosa/submucosa and serosa all separated by hypoechoic layers of muscle
  - **Figure 307.3** (example below) Right lower quadrant: Appendix: nonperistalsing, noncompressible, blind-ending tubular structure, .9cm, c/w appendicitis
- Placing the pregnant patient in the left lateral decubitus position may help visualization
- Pitfalls
  - This study is very specific but not very sensitive and is very operator dependent
  - Ruptured appendices are very difficult to visualize on US
  - US exams are limited in patients with increased abdominal adipose tissue

#### ❖ **References**

- **Author:** Dr. Kristen Grabow Moore
- **Editors:** XXX
- **Expert content by:** XXX
- **Ultrasound content by:** Dr. Rachel Haney
- **References:** Rosen’s Emergency Medicine (7<sup>th</sup> Ed) Chapters 91, 175; Medscape emedicine, “Acute Abdomen in Pregnancy” (Author: Dana Taylor, MD); Ma & Mateer’s Emergency Ultrasound (3<sup>rd</sup> Ed): Chapters 15, 20; Northwestern Emergency Medicine POCUS Image Bank

## Case 307 Lab Results

<b>Complete blood count:</b>		<b>Liver function panel:</b>	
WBC	15.5 x 10 <sup>3</sup> /uL	AST	32 U/L
Hb	12.1 g/dL	ALT	14 U/L
Hct	37.5%	Alk Phos	90 U/L
Plt	200 x 10 <sup>3</sup> /uL	T bili	1.1 mg/dL
<b>Basic metabolic panel:</b>		D bili	0.3 mg/dL
Na	132 mEq/L	Amylase	30 U/L
K	3.5 mEq/L	Lipase	40 U/L
Cl	95 mEq/L	Albumin	4.5 g/dL
CO <sub>2</sub>	21 mEq/L	<b>Urinalysis</b>	
BUN	10 mEq/dL	SG	1.019
Cr	0.7 mg/dL%	pH	7.0
Gluc	92 mg/dL	Prot	Neg
<b>Coagulation panel:</b>		Gluc	Neg
PT	13.1 sec	Ketones	Neg
PTT	26 sec	Bili	Neg
INR	1.0	Blood	Neg
		LE	2+
		Nitrite	Neg
		Color	Yellow

Figure 307.1 (A-B)- POCUS

A - Transabdominal



B – Fetal Heart Rate

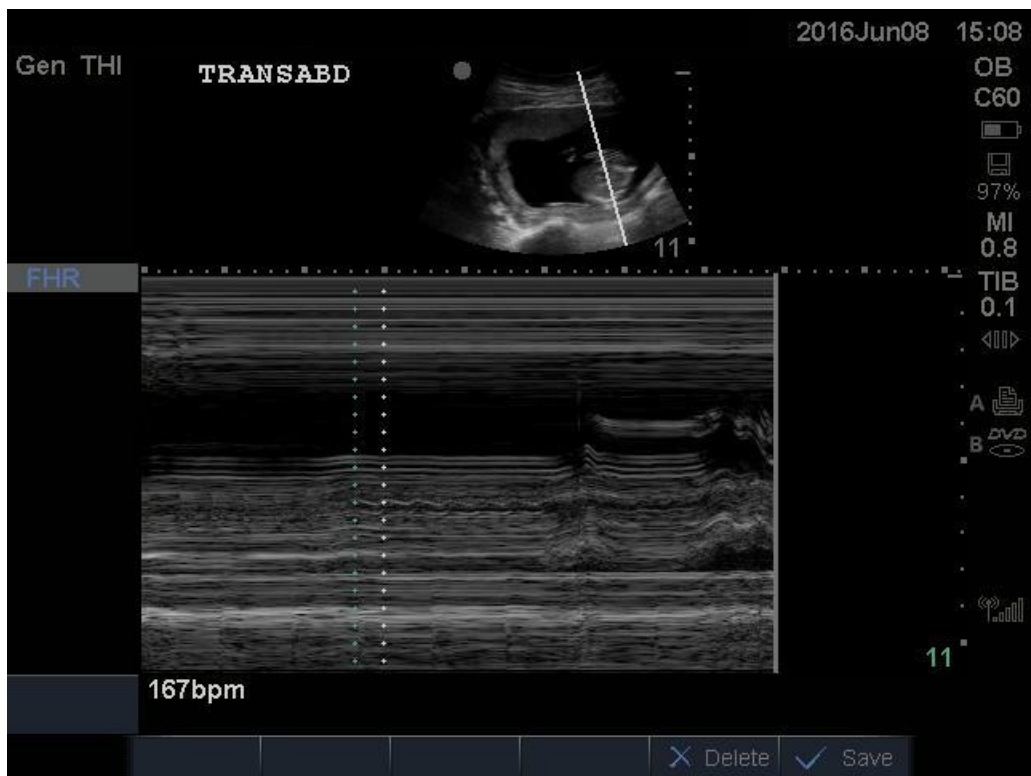


Figure 307.2 - POCUS RUQ





Figure 307.3 - POCUS RLQ Appendix

