Pelvic Pain in the Emergency Department: Think Soundly

Deborah Levine, MD

A patient presents to the Emergency room with pelvic pain and bleeding,

If the patient is of menstrual age, what is the first question to ask?

#1 Answer:
Is there a chance you could be pregnant?
- Even if she is 12 years old!
- Even if she is 52!
- Even if she has an IUD…

Acute Pelvic Pain
- Negative Pregnancy Test
  - Gynecologic etiology
    - Non-gynecologic etiology
      - Gastrointestinal - appendicitis
      - Urologic
  - Positive Pregnancy Test
    - Obstetric
    - Non-obstetric conditions

Gynecological Acute Abdomen
- Common
  - hemorrhagic ovarian cysts
  - ruptured ectopic pregnancy
  - PID
- Less common
  - adnexal torsion
  - endometriosis
  - degenerating leiomyomas

Clinical case
- A woman 35 year old woman comes in to the ER with severe RLQ pain and the ER physicians order a CT scan to r/o appendicitis. What should you do?
<table>
<thead>
<tr>
<th>Clinical Condition: Acute Pelvic Pain in the Reproductive Age Group</th>
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Clinicians order CT: ANSWER

- Is she pregnant? If yes, the answer is get an ultrasound
- Is gyn etiology suspected? If yes, the answer is get an ultrasound
- If non-gyn etiology is suspected AND she is not pregnant, either ultrasound or CT are rated highest by ACR. I recommend ULTRASOUND given lack of radiation exposure
**Appendicitis**
- Graded compression RLQ
- Elongated tubular structure connects to the cecum
- Noncompressible
- Region of the patient’s pain

**Accuracy of US for appendicitis**
- Operator dependent
  - Follow cecum down
  - Normal appendix = no appendicitis
  - Non-visualization of the appendix ≠ appendicitis
- Excellent specificity (positive appendicitis)
- Poor sensitivity in most hands
  - Retrocecal appendix

**What is the size criteria?**
- Some use 6 mm, some use 8 mm.
- Look for ancillary signs
- Pain is a good indicator (rebound tenderness) in patients who have not been pain medicines
- If you don’t see the appendix, this does not exclude appendicitis

**What might mimic appendicitis sonographically?**
- Crohn’s disease
  - Abnormal terminal ileum
  - Can mimic appendicitis

**Answer:**
- Crohn’s disease
What if the pain is in the left lower quadrant?

**Diverticulitis**
- Left lower quadrant pain
- Transvaginal sonography
  - Abnormal loop of bowel
  - Thickened wall
  - With or without peri-diverticular abscess

**Urinary Causes**
- Renal obstruction
  - flank pain, pelvic pain
    - if the stone is at UVJ
  - Small stones at UVJ
    - echogenic
    - TAS or TVS
- UTI
- Cystitis

**Hemorrhagic ovarian cysts**
- Acute hemorrhage - echogenic
  - rarely visualized
  - mimic a solid mass
- Subacute hemorrhage
  - thick walled cyst
  - strands of internal density
  - complex appearance

**Corpus luteum cyst**
- Large size of the cyst
- Hemorrhage within the cyst
- Cyst rupture

**Cyclic causes of pelvic pain**
- Normal menstruation
- *Mittelschmerz*
- Development of the corpus luteum cyst
- Cyst rupture
Complex cyst - Unsure if hemorrhagic
- A follow-up examination in 6 weeks will allow for the patient to be at a different phase of the menstrual cycle

Functional cysts other than the corpus luteum can also hemorrhage and rupture
- Free fluid with debris is consistent with hemorrhage
- A large amount of free fluid (be sure to check up by the kidneys)
- Needs f/u to ensure resolution of cyst

Pelvic inflammatory disease
- Pain in both lower quadrants
- Cervical motion tenderness
- Elevated white count
- +/- rebound tenderness
- +/- metrorrhagia

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Pelvic inflammatory disease Sonographic findings
• Endometritis
  • thickened heterogeneous endometrium
  • fluid and/or gas

Pelvic inflammatory disease Sonographic findings
• Salpingitis
  • thick-walled hyperemic dilated tube

PID - Sonographic findings
• TOA
  • enlarged tender adnexae
  • ovary is not clearly defined
  • with or without focal abscess collection
**Endometriosis**
- Functioning endometrial glands and stroma develop in an ectopic site
- Small implants may not be seen with ultrasound
- "Chocolate" cyst
- Thick wall
- Layering of debris
- Septations
- Low resistance flow in septations
- Punctate calcifications in wall

**Torsion**
- 4-8 cm mass
- Enlarged ovary with small peripheral cysts
- This may be the only sonographic finding!!!

**Torsion - Blood flow analysis**
- Check settings - compare the blood flow in the contralateral ovary
- Beware!!! ovarian flow, venous and arterial, may be present
  - pain with an enlarged ovary
- Presence of central venous flow is predictive of ovarian viability

**Pearls for assessment of torsion:**
- A normal sized and normal appearing ovary is NOT torsed. Torsion causes edema and edema enlarges the ovary.
- If a mass is the lead point of torsion you may not see the edematous ovary, but you will see the mass
- If you don’t see flow in a normal sized ovary (in a woman of reproductive age) you should check Doppler parameters

**Degenerating fibroids**
- Degenerating fibroids can cause severe pelvic pain
  - Enlarged fibroid uterus
  - Lucency within a fibroid is consistent with necrosis but not necessarily acute necrosis
  - Pain is localized over fibroid

**Pelvic Pain with Positive Pregnancy Test**
- Non-obstetric conditions
  - appendicitis
  - urinary tract infection
  - torsion
- Obstetric
Pelvic Pain with Positive Pregnancy Test

- Look for the appendix in pregnant women with right lower quadrant pain

Ovarian Hyperstimulation Syndrome

- Ovarian enlargement due to multiple ovarian cysts
- Acute fluid shift out of the intravascular space
  - Hemoconcentration
  - Third-space accumulation of fluid (ascites, pleural effusion)
    - Renal failure
    - Hypovolemic shock
    - Thromboembolic episode
    - Acute respiratory distress syndrome
    - Death

What is the differential diagnosis?

Answer: there is blood in the pelvis

- Lots of blood
  - Ruptured hemorrhagic cyst
  - Ruptured ectopic
- It doesn't matter what the etiology: she is likely hemodynamically unstable and likely needs to go to OR
- If hct is normal, she might just not have been hydrated, and might not have re-equilibrated after blood loss

Clinical case

- A 33 yo woman in the emergency department has a negative pregnancy test has RLQ pain. Is it possible for her to have an ectopic pregnancy?

Note...

- Urine hcg was negative x 2
- So we said, OK get blood hcg
- It was 726 mIU/mL
Diagnosis:
- Ruptured right ectopic
- 800 cc hemoperitoneum

Clinical case answer
- Yes – but this is very rare!
  - Urine hcg is less sensitive than serum hcg
  - Lab error could give a negative serum hcg
  - An ectopic pregnancy could have been growing and then died, with interval decrease in hcg, and the ectopic still could be present and cause problems

Ectopic Pregnancy
- Pain
- Bleeding
- Adnexal mass - 20% of the time
  - don’t confuse normal corpus luteum cyst with ectopic pregnancy
    - corpus luteum cyst in ovary
    - ectopic pregnancy in the tube

In Summary
- Is the patient pregnant?
  - If not
    - think of kidneys, GI tract, ovaries, and uterus
  - If so
    - Think of all the things pregnancy can do…
    - Then think of everything else that causes pain
- What imaging modality is best?
  - Use ultrasound to screen
  - Try to avoid CT, especially in women of menstrual age
  - Use the ultrasound probe to look where the patient hurts – tailor the exam to patient symptoms