Ultrasound First: Pelvic Pain

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Acute Pelvic Pain

- RLQ pain: acute appendicitis
- Acute pelvic pain in non-pregnant female
  - Hemorrhagic ovarian cyst
  - Ruptured cyst
  - Endometriosis
  - PID (endometritis, salpingitis, TOA)
  - Ovarian torsion
  - Ovarian Thrombophlebitis
  - Degenerated fibroid
  - Renal colic, distal ureteral calculus

Chronic Pelvic Pain

- Chronic pelvic pain in female (6 months of pain)
  - Fibroids
  - Endometriosis
  - Adenomyosis
  - Pelvic congestion
- Chronic bowel conditions (inflammatory bowel diseases)
  - Crohn’s disease
  - Ulcerative colitis

Ultrasound First

- No preparation
- Safe
  - No radiation (cumulative)
  - No iodinated contrast
- Less expensive (imaging costs)
- Dynamic, interactive

Acute Appendicitis in Pelvis

Blind-ending, non-peristaltic, tubular structure with gut signature
TVS disadvantage: cannot compress

Acute Pelvic Appendicitis

- Pelvic adhesions, prior surgery, infection
Acute Salpingitis Mimicks Appy
- False positive

Perforated Pelvic Appendicitis
- Phlegmonous change, appendicolith, tip abscess, echogenic mesoappendix

Perforated Pelvic Appendicitis
- Phlegmon, RLQ collection extends into right adnexa

Perforated Appendicitis with Abscess
- Large complex RLQ collection = abscess
- Interventional Radiology for catheter drainage

Pelvic Abscess
- Ruptured appendicitis
- PID
- Perforated diverticulitis
- Perforated cancer
- Post-op abscess

Hemorrhagic Ovarian Cyst
- Usually the corpus luteum
- Most common appearance of HOC:
  - Thin, linear strands (fishnet, lacy, reticular)
  - Retracting blood clot
  - No blood flow in clot on Doppler
Hemorrhagic Ovarian Cyst
- Unusual appearances due to blood clots that assume unusual shapes and mimic solid components in ovarian tumors
- Blood clot is gelatinous

Ruptured Ovarian Cyst
- Severe pain, non-febrile
- +/- hypotension
- Often a diagnosis of exclusion
- Collapsed, deformed cyst +/- internal debris
- Hemoperitoneum

Ovarian Cyst Rupture
- Collapsed, deformed cyst
- Hemoperitoneum
  – May be very large

PID: Acute Salpingitis/Pyosalpinx

Bilateral TOA
- Echogenic debris
- Multiloculated
- Ill-defined borders
- Gas in mass
- Hyperechoic perienteric fat

Ovarian Torsion
- Uncommon event (< 3% gyn emergency surgeries)
- Common in differential diagnosis
  – yet often missed
- Ovarian salvage rate is poor
  – <10%
- Early detection to prevent irreversible damage & preserve fertility
Ovarian Torsion

- Most are adnexal torsions +/- mass
- Prepubertal, adolescent, child-bearing
- Risk factors:
  - pregnancy (20% cases)
  - hyperstimulation
  - prior surgery (postmenopausal)

Ovarian Torsion Delayed Diagnosis

- Differs from testicular torsion in males
- Symptoms are variable, mimics other conditions
  - Onset to presentation: 0-210 days (mean 7.8 days) (Houry)
- Intermittent or incomplete torsion
- Ovary has dual blood supply

Ovarian Torsion Sonographic Findings

- Morphologic features
  - More important in diagnosis
- Abnormal location of ovary
- Doppler findings
  - Variable

Doppler in Ovarian Torsion

- Variety of Doppler findings
  - Normal, diminished, absent flow
  - Increased resistance
  - Loss of diastolic flow
- Doppler findings are variable
  - depending on how much blood is still flowing in and out of the twisted ovary, before arterial blood flow ceases
- May be technical
  - Normal ovaries may show no flow
Ovarian Torsion

Problems With Doppler Diagnosis
• Doppler may show normal blood flow, but there is ovarian torsion
  – Sequence of vascular events is not complete
• Doppler may show no blood flow, but there is no torsion
  – Physiologic
  – Technical reasons
    » Sampling error
    » Faulty machine settings
    » Insensitivity to slow flow
    » Difficult patient

Ovarian Vein Thromophlebitis

27 yo nurse w/ RLQ pain 9 months post delivery

Distal Ureteral Calculus

Flank pain radiates into lower quadrant
Transvaginal US identifies calculus
Obviates CT scan in a young woman

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Abdominal Wall Endometriosis

• Seeds abdominal scars in 1% pts with C-section & other scars
• US is best imaging technique
  – CT, MRI nonspecific
• Most are solid masses with irregular borders
• Cyclic pain
• CDUS +
• FNA

Periumbilical Endometriosis

• Periumbilical endometrial implants bleed with each menstrual cycle
Pelvic Varices

- Mimics hydrosalpinx
- Use CDUS on tubular masses

Large Pelvic AVM

US Findings Abnormal Bowel

- Hyperechoic perienteric fat
  - inflammation, infiltration
- Enlarged lymph nodes

Crohn Disease Terminal Ileitis

- Transmural destructive process, skip areas
- Wall thickening of the distal ileum
- Mild fat stranding
- Fistulas, collections, strictures

Crohn Disease Terminal Ileitis

Colitis

- Infectious colitis: C. diff, neutropenic typhilitis
- Inflammatory: Ulcerative colitis, Crohn dz
- Ischemic colitis

Early colitis: wall thickening, hyperemia
Ulcerative Colitis in Rectum
- Thick-walled, hyperemic rectum
- UC usually begins in rectum, progresses retrograde without skip areas

Ulcerative Colitis in Sigmoid
- Wall thickening, mucosal destruction
- Loss of gut signature
- Loss of haustral markings: lead pipe colon

Ulcerative Colitis
- Mucosal ulcerations and destruction
- Bowel wall thickening

Toxic Megacolon: Acute Toxic Colitis
Life-threatening complication of fulminant colitis (systemic illness)
Dilated colon, mucosal edema, thumbprinting, pseudopolyps