# Acute Abdominal Pain

Morning Report

September 2005

# Pathophysiology

- Visceral Pain
  - Tension, stretching, ischemia stimulate visceral pain fibers
  - Pain fibers bilateral and enter spinal cord at multiple levels
- Parietal Pain
  - Ischemia, inflammation or stretching
  - Stimuli to parietal peritoneum
  - Afferent fibers to dorsal root ganglia on same side and same dermatomal level as origin of pain
- Referred Pain
  - Remote areas supplied by same dermatome as organ
  - Shared central pathways for afferent neurons

# Pathophysiology

- Visceral Pain
  - Dull, aching, poorly localized, midline
  - Intestinal obstruction, cholecystitis, early appendicitis
- Parietal Pain
  - Sharp, well localized, discrete
  - Acute appendicitis with spread of inflammation to parietal peritoneum
- Referred Pain
  - Aching, perceived to be near surface of body
  - Inflammed gallbladder pain perceived in scapula

# Diagnostic Studies

- Laboratory tests:
  - CBC + differential help confirm infectious or inflammatory process but can be normal
  - Serum electrolytes for hydration
  - Liver function tests
  - Amylase/Lipase
  - UA
  - Pregnancy test

# Imaging

- Plain film of abdomen:
  - Useful in bowel perforation or obstruction
  - Typical series includes supine abdomen, upright abdomen, upright CXR
  - Evidence of free intraperitoneal air or air in structures (bile ducts, soft tissue) is consistent with perforated viscus
  - Free air on CXR as a crescent of lucency under the diaphragm

# Imaging

- Computed tomography
  - Most helpful when wide variety of diagnosis are considered
  - Sensitivity for diagnosing appendicitis > 90%, and specificity 85-90%
  - Inability to reliably visualize stone in biliary tree (misses 20-25%)

# Imaging

- Ultrasound
  - Role in acute abdominal pain depends upon location of pain
  - RUQ US is image of choice for acute cholecystitis
  - US useful for diagnosis of intussusception
  - Can be useful for appendicitis

# Appendicitis

- Most common surgical emergency in children and adolescents in US
- In 1999, 59,000 children < 15 years old were diagnosed with appendicitis
- Diagnosis can frequently be made from history, PE, and laboratory studies
- Delay in diagnosis increases risk of perforation and postop complications to as high as 39%
- Normal appendix is unnecessarily removed in 15% to 40% of cihldren

# CT in Appendicitis

- Most reliable imaging method in evaluating patients with suspected appendicitis
- Controversy regarding technique – PO and IV most commonly used in adults
- In children without intraperitoneal adipose tissue, it is more difficult to identify a normal appendix
- PO, IV and Rectal contrast facilitates recognition of a normal appendix

# Signs on CT for Appendicitis

- Wall thickness > 2 mm
- Appendicolith
- Enlargement of appendix
- Phlegmon
- Abscess
- Free fluid
- Thickening of mesentary, fat stranding

# Utility of Ultrasound

- Depends on sonographer
- 85-95% sensitivity and specificity
- Safe
- No radiation
- Useful for identifying pelvic disease in females

# Ultrasound findings in Appendicitis

- non-compressible tubular structure in RLQ
- wall thickness > 2 mm
- overall diameter > 6 mm
- free fluid in RLQ
- thickening of mesentary
- localized tenderness with compression

# Effect of an Imaging Protocol on Clinical Outcome Among Pediatric Patients with Appendicitis

**Pediatrics, December 2002**

- Introduced protocol for evaluating patients with equivocal History and P.E., involved US followed by CT if US negative
- 920 children evaluated prior to protocol

- 35% perforated, 14% had normal appendix

- 418 children evaluated after protocol in place

- 15% perforated, 4% had normal appendix

# Selective Imaging Strategies for the Diagnosis of Appendicitis in Children

## Pediatrics, January 2004

- Test guidelines to increase diagnostic accuracy and reduce unnecessary testing for children with suspected appy
- Risk-stratified: low, medium, high risk
- Low risk = neutrophils < 67%, bands < 5%, no guarding
- High risk = neutrophils > 67%, wbc > 10,000/mm3, guarding, abd pain > 13 hr
- Low risk patients no imaging, obs only (10% had appy)
- Medium risk – US, then CT
- High risk directly to appendectomy (90% had appy)
- Similar numbers in neg appendectomies and missed or delayed, fewer US and CT scans than other protocals

# Analgesia

- Controversy in use of analgesia prior to a definitive diagnosis and course of action
- Classic teaching is that opiates can alter exam findings, complicating diagnostic process
- Several prospective randomized studies have shown that judicious use of analgesics provide significant pain reduction without affecting exam and perhaps may enhance diagnostic accuracy by allowing a more detailed exam in a cooperative patient