Cholecystic Disease

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10–15% of U.S. adults have gallstones necessitating more than 600K annual cholecystectomies.

Biliary disease is a major consideration in a patient with acute abdominal pain.

Clinical differentiation of RUQ tenderness due to hepatobiliary disease versus multiple other causes, is extremely difficult.

Imaging therefore plays a key role in the evaluation of acute RUQ pain.
Risk Factors

- The 6 “F’s”:
  1. Fat
  2. Female
  3. Forty
  4. Fertile
  5. Fatty food intolerance
  6. Flatulence
Classic Signs & Symptoms

1. RUQ or epigastric pain
2. N/V
3. Anorexia
4. Fatty food ingestion ≈ 1 hour before the onset of pain
5. Fever
6. Leukocytosis with a left shift
7. ↑ AST/ALT, ↑ TB, ↑ amylase, ↑ lipase
Gallbladder & Ductal Anatomy

Online reference. Virtual Hospital: The apprentice’s assistant.
http://www.vh.org
Menu of tests for imaging RUQ pain

1. Plain abdominal film
2. RUQ Ultrasound
3. Hepatobiliary Scintigraphy
4. Abdominal CT
Algorithm for the Diagnosis of Acute Cholecystitis

Acute biliary pain

Short lived, no fever or leukocytosis

Suspect biliary colic

Analgesics and/or NSAIDs

Elective ultrasound

Gallstones

Elective management of gallstones

Evaluate nonbiliary sources of abdominal pain

No gallstones

Gallstones with GB edema or U/S Murphy’s sign

Cholescintigraphy +

Acute calculous cholecystitis

- Look for other causes

Gallstones without GB edema or U/S Murphy’s sign

Cholescintigraphy -

Look for other causes

GB edema and Murphy’s sign without gallstones

- Look for other causes

+ Acute acalculous cholecystitis

Plain film, CT
Plain Abdominal Film

- Gallstones often found incidentally on abdominal radiograph
- Abdominal radiographs demonstrate 15-20% of all gallstones
  - Radio-opaque: calcium bilirubinate
  - Radiolucent: cholesterol stones
RUQ Ultrasound

Advantages:

1. Sensitivity: 96%  Specificity: 95%
2. Lack of ionizing radiation
3. Inexpensive
4. Speed, safety, flexibility, & portability
5. Real time imaging
6. Multiple organ examination
Normal Gallbladder Ultrasound

Online reference. GE Medical Systems.
Hepatobiliary Scintigraphy – HIDA Scan

- Sensitivity: 95%  
- Specificity: 99%
- Reveals anatomy & physiologic function
- Most specific for diagnosing Cystic Duct obstruction
- Tc-99m labeled hepatic iminodiacetic acid (HIDA)
- IV administration & selective hepatocyte uptake with subsequent excretion into bile
  - ≈ 20% is conjugated and excreted by the kidneys
HIDA Scan

- One hour: visualization of gallbladder rules out acute cholecystitis

- 1-4 hours: delayed visualization
  - prolonged fasting, pancreatitis, alcoholism, hepatocellular dysfunction, chronic cholecystitis

- > 4 hours: non-visualization of the gallbladder
  - 95% sensitive and specific for acute cholecystitis with CD obstruction from edema or a stone
Morphine Cholescintigraphy

- Useful in the acute setting, critically ill patients
- Differentiates acute from chronic cholecystitis
- ↑’s sphincter of Oddi pressure → favorable pressure gradient allowing tracer to enter CD
  - < 30 minutes: chronic cholecystitis
  - > 30-60 minutes: acute cholecystitis
Normal HIDA Scan showing the visualized gallbladder, common bile duct, and filling of the duodenum

Salam FZ, MD, FACP, Nezam HA, MD. Clinical Features and Diagnosis of Acute Cholecystitis. 2001 UpToDate
Morphine Scintigraphy

Last line shows radioactive tracer uptake by the gallbladder 20 minutes after the administration of morphine.

Salam FZ, MD, FACP, Nezam HA, MD. Clinical Features and Diagnosis of Acute Cholecystitis. 2001 UpToDate
Abdominal CT

- Advantages:
  - High sensitivity
  - Useful when complications of acute cholecystitis are suspected
  - Evaluates for a wide range of abdominal diseases so particularly helpful with confusing clinical presentations.
Acute Cholecystitis

- Confirmation based upon a combination of physical findings, lab studies, & imaging tests

- Characteristic findings on:
  1. US
     a. Cholelithiasis
     b. + Murphy’s sign
     c. wall thickening (> 4-5mm)
     d. wall edema

- PPV: 92% with + Murphy’s sign & cholelithiasis
Cholelithiasis

I. Major sonographic criteria
1. Echogenic focus
2. Acoustic shadowing
3. Gravitational dependence

II. CT
- Reveals $\approx 80\%$ of all gallstones
Characteristic appearance of Acute Cholecystitis on US

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Acute Cholecystitis on US

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Acute Cholecystitis on CT

Characteristic findings:

- Thickened wall with low attenuation areas of edema
- Distended gallbladder, cholelithiasis, and pericholecystic fluid
Acute Cholecystitis on CT

- distended gall bladder with a thickened wall

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markedly thickened wall due to edema

Salam FZ, MD, FACP, Nezam HA, MD. Clinical Features and Diagnosis of Acute Cholecystitis. 2001 UpToDate
Let's introduce our patient:

Clinical Presentation

CC

RUQ pain, SOB

HPI

83 year-old moderately obese Caucasian male with an 8-day history of confusion, RUQ pain associated with fevers, poor PO intake, & fatigue

PMH

Heavy EtOH abuse, COPD, CAD, afib
Differential Diagnosis based on clinical observation

**Common**
1. Biliary colic & cholecystic disease
2. Appendicitis
3. Dyspepsia/gastritis/PUD
4. SBO
5. Acute pancreatitis

**Uncommon**
1. Acute hepatitis
2. Right-sided pneumonia
3. Fitz-Hugh-Curtis syndrome
4. Subhepatic or intra-abdominal abscess
Our patients RUQ US

No normal GB visualized. Inhomogeneous echogenicity with areas of distal shadowing noted on region in GB fossa

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Our patient RUQ US

Hyperechoic structure with shadowing
Our patients abdominal CT

fluid collection with air likely representing an abscess due to a necrotic gallbladder

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Necrotic Gallbladder on CT

Gas in Pericholecystic abscess

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Our patient has a Necrotic Gallbladder with an adjacent abscess
Necrotic Gallbladder

- Incidence: 2-38% in patients with acute cholecystitis
- 10% of cases associated with perforation
  - mortality in 19-24% of cases

1. Murphy’s sign
   - less common due to denervation of the gallbladder

2. Sonography
   - asymmetric wall thickening, intraluminal membranes (sloughed mucosa), striated wall edema

3. Cholescintigraphy – rim sign
   - increased tracer accumulation in the liver parenchyma adjacent to the gallbladder
Patient Treatment:

Cholecystostomy drain placement s/p percutaneous drainage

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Complications of acute Cholecystitis

- Common in the elderly, diabetics

1. Necrosis (gangrene) & subsequent perforation
   - Patients feel transiently better as bile leaks from the distended gallbladder but rapidly deteriorate if/when bile peritonitis should develop
   - Localized perforation – pericholecystic abscess
   - Free perforation – generalized peritonitis

2. Fistula formation of duodenum & jejunum
   - Gallstone ileus
References

- Salam FZ, MD, FACP, Nezam HA, MD. Clinical Features and Diagnosis of Acute Cholecystitis. 2001 UpToDate.
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