Biliary Tract Imaging

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Objectives

- Review the anatomy of the biliary tree
- Discuss clinical indications for imaging the biliary tree
- Consider imaging options based on indication
Clinical Presentation of Biliary Pain

- Steady, severe pain in epigastrium or RUQ
- Episodic
- Lasts for more than just a few minutes
- May have positive Murphy’s sign
- Fever and leukocytosis present only if cholecystitis
- Liver enzymes may normal unless severe inflammation or obstruction
Obstructive Symptoms Due to Stones, Tumor, Stricture

- RUQ pain
- Jaundice
- Acholic stools
- Dark urine
- Pruritus
- Elevated liver enzymes, bilirubin
Imaging: Ultrasound

• Advantages:
  – No radiation, no IV contrast
  – Portable
  – Can use Doppler to assess vascular flow
  – Good at identifying gallstones (sensitivity 97%, specificity 95%) and choledocholithiasis (most common cause of benign obstruction)
  – Excellent at detecting acute gallbladder inflammation – gallbladder distension, pericholecystic fluid, wall thickening
Imaging: Ultrasound

- Disadvantages:
  - Not accurate in differentiating benign from malignant causes of obstruction
  - May not visualize the ampulla or distal CBD
  - Difficult in obese patients

- Cost: $1000
Ultrasound: Dilated Bile Ducts

Dilated ducts

Flow in vessels
Cholelithiasis

Abdominal x-ray (only 20% gallbladder stones are visible)

Ultrasound (test of choice)
Choledocholithiasis

- Found in 10% of pts with cholelithiasis
- Most were initially GB stones or “secondary” duct stones
- Primary duct stones often secondary to inflammation in bile ducts leading to obstruction
- Complications: obstruction, pancreatitis, cholangitis, hepatic abscess, secondary biliary cirrhosis
Imaging: CT

- Advantages:
  - Good survey of abdominal organs
  - Can assess blood vessels and vascularity of lesions when contrast used
  - Very good at detecting liver masses and fluid collections (infected collections have wall enhancement, mass effect)
  - Useful for obese patients
  - Shorter evaluation than MRI, claustrophobic patients can complete
Imaging: CT

- Disadvantages:
  - Radiation
  - Need for intravenous contrast (contrast allergies, renal toxicity)
  - Not as accurate as US in detection of stones

- Cost: $3000
CT: Dilated Bile Duct and Pancreatic Duct
Imaging: MRI

• Advantages:
  – No radiation
  – Can assess other abdominal structures
  – Contrast given can assess blood vessels and vascular nature of tumors, 88% accurate at differentiating malignant strictures from benign
  – Can assess for hepatic iron, steatosis, cirrhosis
Imaging: MRI

- Disadvantages:
  - Expensive
  - Contrast can result in nephrogenic systemic fibrosis in patients with renal insufficiency
  - Claustrophobic patients need sedation or large bore machine

- Cost: $4000-5000
MRCP With No Extrahepatic Duct Stricture
MRCP With Biliary Stricture

Stricture

Distal common bile duct
Advantages:

- Direct visualization of biliary tree
- Diagnostic and therapeutic: can remove stones, perform sphincterotomy, allow for sampling, stenting
Endoscopic Retrograde Cholangiopancreatogram (ERCP)

• Disadvantages:
  – Invasive, endoscopy
  – Uses fluoroscopy
  – Risk of pancreatitis (approx 4%), bile duct perforation, bleeding
  – Dependent on skill set

• Cost: $$$$$
Endoscopic Retrograde Cholangiopancreatogram (ERCP)
Pancreatic Adenocarcinoma “Double Duct” Sign

- Dilated CBD
- Strictures
- Dilated PD
Summary

• Consider clinical indication, cost and risks when selecting imaging

• Tests may be complimentary

• Reserve ERCP for diagnostic and therapeutic purposes
Thank You