GALLBLADDER DISEASE, PATHOLOGY, AND IMAGING

DISCLAIMER

- I have no financial relationships to disclose.
- I am not currently part of any research projects related to any pharmaceuticals or technology related to this presentation.

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OBJECTIVES

- Identify Gallbladder Anatomy
- Identify Appropriate Lab and Diagnostic Tests
- Formulate Diagnosis Based on Labs and Diagnostic Tests
- Recommend Treatment Options
- Appropriate Referrals for Treatment
GALLBLADDER ANATOMY

TERMINOLOGY

- **Cholelithiasis**: Gallstones formation from different substrates
- **Choledocholithiasis**: Stones in the ducts
- **Biliary Dyskinesia**: Contraction incoordination of GB. Low GB EF predominates etiology
- **Biliary Colic**: Acute gallbladder attack from stone blocking neck of GB.
**TERMINOLOGY**

- **Cholecystitis** - Inflammation of the gallbladder. Calculi is the source in 85-95% of cases.
- **Acute Cholecystitis** - obstruction of the cystic duct.
- **Acalculous Cholecystitis** - gallbladder inflammation without stones.
- **Cholangitis** - Inflammation of the biliary duct system.

**Mirizzi's syndrome:** Uncommon condition where a gallstone becomes impacted in the cystic duct or neck of the gallbladder and compresses the common bile duct or common hepatic duct, resulting in obstruction and jaundice.

**SYMPTOMS**

- Abdominal pain starts after eating and can last up to 4 hours.
- Consumption of fatty, oily, fried, greasy food will precipitate pain episodes.
- Pain can start in the epigastric region then move to RUQ.
- Often begins as colicky pain then may become constant pain.
- Can develop nausea and vomiting.
- May develop fever or jaundice.
- May have had recurrent episodes over an extended period of time.

***Caution in elderly/diabetic*** May have minimal signs/symptoms like localized tenderness.

Can deteriorate quickly into acute cholecystitis.
EXAM FINDINGS

• RUQ or epigastric tenderness on palpation.
• +/- Murphy’s sign
• Right CVA tenderness
• Right shoulder pain (Collins Sign)
• Jaundice

Warning
• Peritoneal signs
• Grey Turner’s or Cullen’s

**Lack of physical exam findings does not rule out cholecystitis

DIAGNOSTIC IMAGING

CT Scan: frequently done for abdominal pain but poor diagnostic test for detection of sludge, ductal dilatation, choledocholithiasis, or cholelithiasis.

Helpful to r/o other abdominal pathology as cause of pain.
CT Scan:
Plain CT scan is acceptable for GB disease
** How you order the test does matter.
- IV contrast
- Oral contrast
- Specific organ protocol

Gallbladder Ultrasound
- Much more sensitive for changes in GB wall, stone identification, ductal caliber, detection of ductal abnormality.
- Has a 5% false negative rate (5% will have stones not seen on US)
- Sonographic Murphy’s sign is + in about 70% cases of Acute Cholecystitis

HIDA Scan
- Nuclear medicine scan for detection of contrast uptake into the gallbladder and flow through bile ducts. **Best test for Acute Cholecystitis**
- Cholecystokinin (CCK) contraction study: detect gallbladder ejection fraction. Check for chronic acalculous cholecystitis
** GB EF < 35% abnormal.**
LABS

Hepatic Panel
- Alkaline Phosphatase – released from Kupffer cells in bile duct. Can have delayed trend back down by 2-3 days compared to other hepatic markers.
- AST ALT can be elevated but non-specific from localized inflammation.
- Bilirubin (Direct/Indirect) a higher direct bilirubin may be concerning for bile duct obstruction and warrant additional testing.
- Lipase/Amylase can be elevated with concerns for biliary pancreatitis where stone in bile duct impedes pancreatic enzyme flow.

LABS

CBC
- WBC’s
  - Can be normal in cholecystitis, biliary dyskinesia/colic, acalculous cholecystitis.
  - Elevated WBC’s may warrant further testing to r/o Acute Cholecystitis, Cholangitis, or pancreatitis.
- Differential Diagnosis
  - Urinalysis r/o pyelonephritis or renal stone.
  - Pregnancy test r/o pregnancy complications.
CASE STUDY 1

43yr female who presents to office for epigastric pain and nausea without vomiting that starts shortly after she eats and usually lasts 2-3hrs. This has been her 3rd episode in past 4 months. Nothing helps it get better but it does go away on its own.

ROS
No fever or any concerns of food borne illness. No weight loss or weight gain. No blood in stool or change in color/consistency. No abd pain. Denies GERD symptoms. No difficulty swallowing. No chest pain, sob, or palpitations. No other symptoms of concern.

What is your next step?
A  Send her home and tell her not to worry about it
B  Tell her to go to the ER something must be wrong
C  Send her for CT scan of Abdomen with IV and Oral contrast
D  Send her for Gallbladder Ultrasound
E  Send her for HIDA scan with ejection fraction (CCK)

Correct Answer
You send her for GB US
Results
Normal Intra/Extrahepatic ducts
GB wall <3mm
No pericholecystic fluid + cholelithiasis
CASE STUDY 1

43yr female with RUQ after eating
GB US shows + cholelithiasis.
No s/s of acute cholecystitis
Referral to general surgery for symptomatic cholelithiasis
SAGES (Society of American Gastrointestinal and Endoscopic Surgeons)
GRADE II, Level A (Symptomatic Cholelithiasis)

Instructions for home
Food Avoidance
If pain last >4hrs need ER evaluation
ER evaluation if develops N/V, jaundice or fever.

CASE STUDY 2

43yr female who presents to office for epigastric pain and nausea without vomiting that starts shortly after she eats and usually last 2-3hrs. This has been her 3rd episode in past 4 months. Nothing helps it get better but it does go away on its own.

ROS
No fever or any concerns of food borne illness. No weight loss or weight gain.
No blood in stool or change in color/consistency. No abd pain. Denies GERD symptoms. No difficulty swallowing.
No chest pain, sob, or palpitations.
No othersymptomsof concern.
CASE STUDY 2

Correct Answer
You send her for GB US

Results
Normal Intra/Extrahepatic ducts
GB wall <3mm
No pericholecystic fluid
No cholelithiasis

CASE STUDY 2

What’s your next step in work up?

A You send her for repeat GB US because you know there is a 5% false negative rate
B You tell her test is normal and nothing is wrong
C You send her for CT scan
D You send her for HIDA scan with ejection fraction

You send her for a HIDA scan with an ejection fraction of 14%

SAGES recommends cholecystectomy
GRADE II, Level A
Biliary Dyskinesia
CASE STUDY 3

32yr diabetic female who presents to ER with 2 days of increasing abdominal pain after eating fried chicken and French fries at cookout. Started as colicky epigastric pain but now is mainly constant RUQ pain 8/10. She has been nauseated but no vomiting.

**Pertinent Exam**
- Mildly overweight
- RUQ pain to palpation
- Murphy's sign
- No HSM
- Negative right CVA tenderness
- Abdomen otherwise soft, non-tender with active bowel sounds

**Diagnostics**
- CT scan: Normal appearing Gallbladder. No stones. + pericholecystic fluid. No ductal dilation
- RUQ US: 5mm GB wall thickening with cholelithiasis. + pericholecystic fluid. No ductal dilation.

** Labs**
- WBC 16
- Alk Phos 40
- AST 21
- ALT 30
- T Bili 1.0
- D Bili 0.6
- Glucose 257

**Vitals**
- Temp 101.6
- BP 164/88
- HR 102
- RR 20
- Sats 97%

What is the Diagnosis?

Acute Cholecystitis
CASE STUDY 3

Admit and consult general surgery for cholecystectomy
- Broad spectrum antibiotics (Unasyn, Zosyn, Invanz, Levaquin/Flagy)
- IVF and supportive care
- Control hyperglycemia to prevent post-op complications
- Keep NPO for surgery

SAGES recommends early cholecystectomy within 24-72hrs to prevent conversion to open. Level 1, Grade A

CASE STUDY 4

78yr female presents to ER with "not feeling well". She has been having abd pain that started a week ago and hasn't been eating well. Now she is having fever with nausea and vomiting.

Vitals
- Temp 102.8
- HR 130
- BP 98/62
- RR 26
- Sats 89%

LABS
- WBC's 24
- Trop 2.5
- Cr. 3.1
- GFR 24
- K+ 2.8
- Mag 1.5
- ALT 567
- AST 628
- Alk Phos 168
- T Bil 1.8
- D Bil 1.0

PMHx:
- Chronic A-Fib
- Systolic CHF with EF 25%
- Pacemaker
- CKD III
- Mild CVA 3mo ago

Pertinent Medications
- Xarelto
CASE STUDY 4

CT Scan

+ GB wall emphysema with extensive inflammation
+ pericholecystic fluid
+ stones/sludge

Ductal inflammation
Some ascites

What would you like to do next?

A Call cardiology for surgical clearance
B Call general surgery for cholecystectomy
C Start antibiotics, IVF, O2 and replace electrolytes
D Hold her anticoagulant medications for possible surgery
E Consult IR for percutaneous cholecystectomy tube
CASE STUDY 4

Cardiology consult - Revised Cardiac Risk Index - High risk for surgery
Started on Unasyn and given supportive care
Xarelto held for possible intervention
General Surgery consult - recommends IR drainage
IR consulted for percutaneous cholecystectomy tube.

SAGES recommends percutaneous cholecystostomy for those not able to undergo surgical intervention
Level II, Grade B

SUMMARY

Special Considerations
Cirrhosis - Acceptable for surgical intervention on Childs Pugh A and B
Level I, Grade B
Cirrhosis - Childs Pugh C surgery is not recommended. Level III, Grade C
Percutaneous Cholecystectomy is reasonable alternative
Pregnancy - Laparoscopic cholecystectomy is a safe treatment of choice during any trimester of pregnancy.
Biliary Pancreatitis - Pre-operative ERCP is preferred over post-op ERCP. Intra-operative cholangiogram may be utilized with possible bile duct exploration