Variants of Cholecystitis

David Radvinsky
Downstate University Hospital
November 12th 2015
ED consult

Hey, I’ve got a consult for something called pneumobilia that the radiologist called about for someone down here with abdominal complaints.
Hey, I’ve got a consult for something called pneumobilia that the radiologist called about for someone down here with abdominal complaints.

What are the vital signs? Any medical problems? Nevermind...
What’s the patients name? Where are they located?
Pneumobilia

• What is the differential?
Pneumobilia

- What is the differential?
- What is pneumobilia?
Pneumobilia

• What is the differential?

• What is pneumobilia?
  • Presence of gas in the biliary system
Pneumobilia

- What is the differential?
- What is pneumobilia?
  - Presence of gas in the biliary system

Portal Venous Gas

www.downstatesurgery.org
Pneumobilia

• What is the differential?

• What is pneumobilia?
  • Presence of gas in the biliary system

Portal venous gas = Peripheral
Common bile duct gas = Central
Pneumobilia

- Differential?
Pneumobilia

- Differential?
  - Biliary-Enteric fistula
  - Infection
  - Surgical Pneumobilia
  - Sphincter of Oddi Incompetence
# Pneumobilia

<table>
<thead>
<tr>
<th>Surgical Pneumobilia</th>
<th>Sphincter of Oddi Incompetence</th>
<th>Biliary-Enteric Fistula</th>
<th>Infection</th>
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<tbody>
<tr>
<td>Choledochoduodenostomy</td>
<td>Post-ERCP sphincterotomy</td>
<td>Passage of stone</td>
<td>Cholecystitis</td>
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<tr>
<td>Choledochojejunostomy</td>
<td>Passage of stone</td>
<td>Malignancy</td>
<td>Liver abscess</td>
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<tr>
<td>Pancreaticoduodenectomy</td>
<td>Endoscopy</td>
<td>Liver abscess</td>
<td>Ascariasis</td>
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<td></td>
<td>Blunt trauma</td>
<td>Peptic ulcer disease</td>
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<td>Ascariasis</td>
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Case presentation

• 44 yo male presents with 2 day history of epigastric/RUQ abdominal pain with associated diarrhea and nausea. Denies fevers, vomiting.

• PMHX: DM, HTN
• PSHx: appendectomy
• Allergies NKDA
• Meds: Lantus, Humalog, metoprolol
• SH: occasional EtoH, denies smoking

• Vitals: T 100.6  HR 113  BP 149/94  R 18  SpO2 100% on RA
• Abdomen: soft, distended, tender to palpation in epigastrium and RUQ, + murphy’s sign, well healed appendectomy scar

• Labs:

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<tbody>
<tr>
<td></td>
<td>4.1</td>
<td>30</td>
<td>66</td>
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</table>

Lipase - 3
UA - neg
What do you want to do next?
What do you want to do next?

- What’s on your differential based on the H&P?
What do you want to do next?

- What’s on your **differential** based on the H&P?
  - Cholecystitis
  - Choledocholithiasis
  - Pancreatitis
  - Gastritis
  - Peptic ulcer
  - Obstruction
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• What do you want to do next?
  • RUQ U/S
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- Cholecystitis
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What do you want to do next?
- RUQ U/S
- Review CT scan
What do you want to do next?

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  - Obstruction

- What do you want to do next?
  - RUQ U/S
  - Review CT scan
  - HIDA
Diagnosis?

- EMPHYSEMATOUS CHOLECYSTITIS
- R/O GALLSTONE ILEUS
Gallstone Ileus

- Rare cause of intestinal obstruction
- Large stone impacts neck of GB
- Leads to inflammation
- Pressure necrosis, erosion
- Obstructs at the ileocecal valve.
- Diagnosis - Rigler's triad
  - distended loops of small bowel
  - air in the biliary tree
  - A radiopaque stone in the right lower quadrant
- Proximal enterotomy in healthy-appearing bowel
- Removal of gallstone
- Enterotomy closed transversely.
- Leave biliary-enteric fistula alone
Bouveret's syndrome.

- Erosion of a large gallstone into the stomach
- Obstruction of the stone at the pylorus or proximal duodenum
- Causes gastric outlet syndrome
EMPHYSEMATOUS CHOLECYSTITIS

• Uncommon variant of acute cholecystitis
• Absence of abnormal biliary-enteric communication

• Caused by gas-producing organisms
  • *Clostridium perfringens*
  • *E. coli, enterococcus, Klebsiella*

• Predominance in elderly diabetic men
• 5X higher risk of gallbladder perforation
• Indication for emergent cholecystectomy
To OR

- Open Cholecystectomy
Post-op

- Fever, tachycardia improved
- WBC trended to normal
- Zosyn continued until POD#5
- Blood sugar control/ creatinine improved
- Discharged POD#5

Pathology:
- Acute necrotizing cholecystitis with focal hemorrhage; cholelithiasis
Questions?

hey, buddy - be a good helper and hold this for me for a while.

OTAY!

I'm helping!

BIG HELPER!

I's a good helper.
Pathophysiology

- Cystic duct obstruction
- Gallbladder distension
- Venous outflow obstruction
- Arterial insufficiency
- Ischemic necrosis
- Perforation
Hydrops of the Gallbladder

- Accumulation of mucus in an obstructed gallbladder
- Sterile
Empyema of the Gallbladder

- Gallbladder neck obstruction in the presence of infection
Gangrenous Cholecystitis

- Ischemic necrosis of the wall of the gallbladder
- 2-30% in various surgical series
- Emergency cholecystectomy
- US: Heterogeneous, striated thickening and irregularity of the gallbladder wall and intraluminal membranes.
Hemorrhagic Cholecystitis

- Transmural inflammation, mural necrosis and ulceration
  - Hemorrhage into the gallbladder lumen
- US: Blood in the gallbladder lumen can be recognized as hyperechoic material that demonstrates greater echogenicity than sludge
Gallbladder perforation

- Trauma, neoplasm, steroid use, or vascular compromise
- Occurring in approximately 8% to 12% of cases
- Mortality of 25%
  - (1) acute free perforation into the peritoneal cavity
  - (2) subacute perforation with pericholecystic abscess
  - (3) chronic perforation with cholecystenteric fistula formation
Mirrizi’s syndrome

- Stone embedded in the neck of the gallbladder or cystic duct
- Extrinsically compresses the common hepatic duct
- Jaundice, bile duct obstruction, and in some cases a fistula

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<th>Csendes type</th>
<th>Characteristics</th>
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<td>Type I</td>
<td>Extrinsic compression in the common hepatic duct by stones generally impacted in the cystic duct or in the infundibula of the gallbladder</td>
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<tr>
<td>Type II</td>
<td>Presence of cholecystobiliary fistula with a diameter one third of the circumference of the common hepatic duct wall</td>
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<tr>
<td>Type III</td>
<td>Presence of cholecystobiliary fistula with a diameter over two thirds of the circumference of the common hepatic duct wall</td>
</tr>
<tr>
<td>Type IV</td>
<td>Presence of cholecystobiliary fistula which involves the entire circumference of the common hepatic duct wall</td>
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Gallbladder Volvulus

- Rotation of the gallbladder on its mesentery
- Mesenteric redundancy – congenital anomaly vs. liver atrophy
- Rare, usually diagnosed at the time of surgery
- Case reports
- Elderly females (70-80’s)
Xanthogranulomatous cholecystitis

- Rare inflammatory disease of the gallbladder
- Extravasation of bile into the gallbladder wall
- Rupture of Rokitansky-Aschoff sinuses
- Focal or diffuse destructive inflammatory process
- Lipid laden macrophages, fibrous tissue
- Marked wall thickening with intramural nodules
- Not distinguishable from GB carcinoma
Porcelain Gallbladder

- Intramural calcification of the gallbladder
- Variant of chronic cholecystitis
- Inflammatory scarring of the wall + dystrophic calcification
- Development of carcinoma in up to 15% of cases
Acalculous Cholecystitis

- Ischemia from hypotension
- Bile stasis increases luminal pressure
- Bacterial invasion of ischemic tissue
- 10 percent of all cases of acute **cholecystitis**

**Risk Factors**
- Trauma
- Sepsis
- Burns
- TPN
- Immunodeficiency

- Associated with high morbidity and mortality rates
- Cholecystectomy vs. percutaneous cholecystostomy
Tokyo Guidelines

TG07 diagnostic criteria for acute cholecystitis

A. Local signs of inflammation, etc.:
(1) Murphy’s sign, (2) RUQ mass/pain/tenderness

B. Systemic signs of inflammation, etc.:
(1) Fever, (2) elevated CRP, (3) abnormal WBC count

C. Imaging findings: imaging findings characteristic of acute cholecystitis

Definite diagnosis
(1) One item in A + one item in B are positive
(2) C confirms the diagnosis when acute cholecystitis is suspected clinically
Tokyo Guidelines

- Diagnostic criteria and severity assessment

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<th>TG07 severity assessment criteria for acute cholecystitis</th>
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**“Severe”** (Grade III) acute cholecystitis is accompanied by dysfunctions in any one of the following organs/systems:

1. **Cardiovascular dysfunction**
   - Hypotension requiring treatment with dopamine \( \geq 5 \text{ \mu g/kg per min, or any dose of dobutamine} \)
2. **Neurological dysfunction**
   - Decreased level of consciousness
3. **Respiratory dysfunction**
   - \( \text{PaO}_2/\text{FiO}_2 \text{ ratio < 300} \)
4. **Renal dysfunction**
   - Oliguria, creatinine \( >2.0 \text{ mg/dl} \)
5. **Hepatic dysfunction**
   - PT-INR > 1.5
6. **Hematological dysfunction**
   - Platelet count \(<100,000/\text{mm}^3\)

**“Moderate”** (Grade II) acute cholecystitis is accompanied by any one of the following conditions:

1. **Elevated WBC count** (\( >18,000/\text{mm}^3 \))
2. Palpable tender mass in the right upper abdominal quadrant
3. **Duration of complaints** \( >72 \text{ h}^a \)
4. **Marked local inflammation** (gangrenous cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)

**“Mild”** (Grade I) acute cholecystitis does not meet the criteria of “Severe (Grade III)” or “Moderate (Grade II)” acute cholecystitis. Grade I can also be defined as acute cholecystitis in a healthy patient with no organ dysfunction and only mild inflammatory changes in the gallbladder, making cholecystectomy a safe and low-risk operative procedure.
Early Cholecystectomy for Acute Cholecystitis

A Prospective Randomized Study

HEIKKI J. JÄRVINEN, M.D., JUNNO HäSTBACKA, M.D.

• 1980
• Randomized prospective study
• Early cholecystectomy (<72 hrs) for acute cholecystitis is as safe as delayed cholecystectomy
• Equivalent morbidity and mortality
• Decreased hospital stay, lower costs, and rapid recovery
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Early versus delayed laparoscopic cholecystectomy for people with acute cholecystitis (Review)
Tokyo Guidelines

**Diagnosis and Severity Assessment by TG13 Guidelines**

- **Grade I (Mild)**: Antibiotics and General Supportive Care
- **Grade II (Moderate)**: Antibiotics and General Supportive Care
- **Grade III (Severe)**: Antibiotics and General Organ Support

**Treatment According to Grade and According to Response**

- Observation
- Early LC
- Emergency Surgery
- Delayed/Elective LC
- Urgent/early GB drainage

Advanced laparoscopic technique available
Failure therapy

†
Antibiotics for cholecystitis

- Pre-op broad-spectrum antibiotics
  - *Escherichia coli, Klebsiella, Enterobacter,* and Bacteroides species
  - Cefazolin, cefoxitin, or ceftriaxone for mild-moderate cholecystitis
  - Cefepime + flagyl or zosyn for severe cholecystitis
- Antibiotics discontinued 24 hours post-op
  - without infection outside gallbladder
  - Infectious Disease Society of America guidelines
- Antibiotics discontinued within 4 days
  - moderate acute cholecystitis
  - resolution of clinical signs of infection
  - no septic complications.
Tokyo Guidelines

- Rodriguez-Sanjuan et al. 2013
  - SSI vs. duration
  - Grade II severity
  - Operated within 72 hours
  - No difference in SSI risk among 3 groups
    - (0-4) vs. (5-7) vs (>7)
- Regmbeau et al. 2014
  - Grade I or II acute calculous cholecystitis
  - Surgical site or distant infections
  - Incidence of infection 4 weeks out
  - No difference in incidence of post-op infection
  - 0 vs. 5 days – no increase in incidence
Emergent Cholecystectomy

- Grade II (moderate) cholecystitis
- Gangrenous cholecystitis
- Pericholecystic abscess
- Emphysematous cholecystitis
- Perforation with peritonitis
- Gallbladder torsion
Scenario #1

An 80-year-old female remains intubated after aortic valve replacement due to her history of severe COPD. On post-op day 5, she develops a temperature of 38.6°, pulse is 119, and white blood cell count is 14,000. Right upper quadrant ultrasound demonstrates pericholecystic fluid and a thickened gallbladder wall. What is the recommended treatment?

A. Intravenous broad-spectrum antibiotics
B. Percutaneous cholecystostomy and intravenous broad-spectrum antibiotics
C. Early cholecystectomy and intravenous broad-spectrum antibiotics
D. Transpapillary endoscopic drainage of the gallbladder
E. Percutaneous abscess drainage and intravenous broad-spectrum antibiotics
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- E. Percutaneous abscess drainage and intravenous broad-spectrum antibiotics
A 69-year-old man presents with nausea, vomiting, abdominal distension, and obstipation. An abdominal x-ray shows multiple air-fluid levels in the small bowel, absence of colonic or rectal gas, air in the biliary tree, and a 3 cm stone in the right lower quadrant within the lumen of the distal small bowel. The most appropriate management for this patient is:

A. Observation until the obstruction spontaneously resolves
B. CT imaging to better define the abdominal anatomy
C. MRCP in order to better define the biliary anatomy
D. Exploratory laparotomy with enterolithotomy, and delayed takedown of the cholecystenteric fistula with cholecystectomy as a second-stage procedure at a later date
E. Exploratory laparotomy with enterolithotomy and simultaneous takedown of the cholecystenteric fistula with cholecystectomy
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References


• Rodríguez-Sanjuán JC et al. How long is antibiotic therapy necessary after urgent cholecystectomy for acute cholecystitis? J Gastrointest Surg. 2013 Nov;17(11):1947-52