Gallstone Pancreatitis: Evaluation of the Common Bile Duct

Christopher Turner
July 5, 2012
Case Presentation

61yM with upper abdominal pain for several days radiating to back. Decreased appetite. Denied fever, chills, nausea, diarrhea, change in urine or stool color.
Case Presentation

- **PMH:** DM, HTN, HCV, CRF on HD, h/o CHF (EF 55% 2011), h/o Afib, h/o endocarditis
- **PSH:** exploratory laparotomy for trauma, renal transplant 12/2008, transplant nephrectomy for infection 1/2009, hip replacement
- **SH:** former smoker, drinker, drug user
- **Meds:** clonidine, nifedipine, pantoprazole, calcium, nephrocaps
Case Presentation

- T 98.3  HR 89  BP 174/95
- NAD
- No scleral icterus
- Heart regular
- Lungs clear
- Abdomen soft, tender upper abdomen
Case Presentation

- CBC 13.2/16/49/136
- BMP 141/6.6/99/29/24/9/93
- AST 45
- ALT 22
- Alkaline Phosphatase 81
- Total bilirubin 0.5
- Amylase 421
- Lipase 735
- Lactate Dehydrogenase not done
- PT13, PTT 33, INR 1.1
- EKG NSR
Case Presentation

- He refused CT scan and admission for pancreatitis
- Seen by primary care physician 2d later with persistent epigastric pain
- Admitted to medicine
- NPO, IVF
- US, CT
Case Presentation

• Surgery clinic visit
  – Admission for urgent EUS
  – If positive, then ERCP
  – If negative, then open cholecystectomy
Case Presentation

- EUS negative
- LFTs, amylase, lipase normal

- Open cholecystectomy performed
  - Significant adhesions in RUQ
  - Gallbladder adherent to duodenum
  - Distortion of porta hepatis
  - Single large gallstone
  - No CBD dilation, no palpable CBD stones
  - JP drain placed
Case Presentation

- POD#3 diet advanced
- POD#4 JP removed and discharged
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Overview

• Anatomy
• Natural History of CBD Stones
• Initial Evaluation
• Diagnostic Modalities

• Evaluation of CBD in Symptomatic Cholelithiasis
• Evaluation of CBD in Gallstone Pancreatitis
Natural History of Choledocholithiasis

• Unpredictable

• May appear in five ways
  – Without symptoms
  – Biliary colic
  – Jaundice
  – Cholangitis
  – Pancreatitis

• Last four may appear in all possible combinations
<table>
<thead>
<tr>
<th>Reference</th>
<th>Total Cases of Gallstones</th>
<th>Exploration of Common Duct (%)</th>
<th>Exploration Yielding Stones (%)</th>
<th>Overall Incidence of Common Duct Stones (%)</th>
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<tbody>
<tr>
<td>McSherry &amp; Glenn, 1980</td>
<td>8791</td>
<td>15.5</td>
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<td>Hampson et al, 1981</td>
<td>2889</td>
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<td>Doyle et al, 1982</td>
<td>4000</td>
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<td>Lygidakis, 1983</td>
<td>3710</td>
<td>11.5</td>
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<td>Coelho et al, 1984</td>
<td>908</td>
<td>21</td>
<td>72</td>
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<td>Ganey et al, 1986</td>
<td>1024</td>
<td>26</td>
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<td>DenBesten &amp; Berci, 1986</td>
<td>983</td>
<td>24.5</td>
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<td>Girard, 2000</td>
<td>10,471</td>
<td>11</td>
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<td><strong>Total</strong></td>
<td><strong>32,776</strong></td>
<td><strong>15</strong></td>
<td><strong>63</strong></td>
<td><strong>9.5</strong></td>
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Initial Evaluation

• History and Physical
• Serum chemistries
  – ALT
  – AST
  – GGT
  – Alkaline phosphatase
  – Total bilirubin
• Transabdominal RUQ US
Imaging Modalities

- **US**
  - 40-60% sensitivity

- **CT**
  - 65-88% sensitivity, 73-97% specificity
  - May exclude other diagnoses

- **MRCP**
  - 85-92% sensitivity, 93-97% specificity
  - Low sensitivity for small stones
Endoscopic Modalities

- **EUS**
  - Sensitivity 89-94%, specificity 94-95%
  - High sensitivity for smaller stones
  - Complications rare (0.1-0.3%)

- **ERCP**
  - Sensitivity 89-93%, specificity 100%
  - Risks include pancreatitis (1.3-6.7%), infection (0.6-5.0%), hemorrhage (0.3-2.0%), perforation (0.1-1.1%)
Endoscopic Modalities

• EUS-directed ERCP
  – EUS has a lower failure rate
  – EUS has a lower complication rate
  – Detects stones in 27-40% of cases
  – Avoid ERCP in 60-73% of cases
Operative Modalities

• Intraoperative US
  – Sensitivity 71-100%, specificity 96-100%
  – Successfully completed 88-100% of patients

• Intraoperative Cholangiography
  – Sensitivity 88-100%, specificity 59-100%
  – Successfully completed 88-100% of patients
Approach to CBD Stones in Symptomatic Cholelithiasis
TABLE 2. A proposed strategy to assign risk of choledocholithiasis in patients with symptomatic cholelithiasis based on clinical predictors.

Predictors of choledocholithiasis\textsuperscript{13,14,29,31,32}

Very strong
- CBD stone on transabdominal US
- Clinical ascending cholangitis
- Bilirubin $> 4$ mg/dL

Strong
- Dilated CBD on US ($> 6$ mm with gallbladder in situ)
- Bilirubin level 1.8-4 mg/dL

Moderate
- Abnormal liver biochemical test other than bilirubin
- Age older than 55 y
- Clinical gallstone pancreatitis

Assigning a likelihood of choledocholithiasis based on clinical predictors\textsuperscript{12-14,28,29,31,32}

| Presence of any very strong predictor | High |
| Presence of both strong predictors   | High |
| No predictors present               | Low  |
| All other patients                  | Intermediate |
Symptomatic Patient with Cholelithiasis

Likelihood of CBD Stone Based on Clinical Predictors (Table 2)

- Low
  - Laparoscopic Cholecystectomy
  - No Cholangiography
- Intermediate
  - Laparoscopic IOC or Laparoscopic Ultrasound
  - Pre-operative EUS or MRCP
  - OR*
- High
  - Pre-operative ERCP
  - If Positive, or If Unavailable

*Depending on costs and local expertise
Approach to CBD Stones in Gallstone Pancreatitis
Gallstone Pancreatitis (GSP)

- Gallstones most common cause of acute pancreatitis in western world, 35-50%
- Frequently caused by small silent stones
- Probable mechanism transient obstruction leading to intracellular proenzyme activation
- Gallstones recovered in stool of 85% of patients with GSP compared to 10% of patients with symptomatic cholelithiasis
Approach to CBD Stones in Mild GSP

• Controversial
• Most stones will pass, 90-95%

• May rely on US and LFTs only
• May image preoperatively with MRCP or EUS
• May image intraoperatively with US or IOC
Approach to CBD Stones in Severe GSP

• Controversial

• One RCT comparing early ERCP versus conservative management found no benefit in morbidity and mortality

• Failure to respond to aggressive resuscitation in 24h with SIRS, persistent pain, or elevated bilirubin → urgent ERCP
Approach to CBD Stones in GSP and Jaundice

- Controversial

- Two RCT comparing early ERCP versus conservative management were conflicting in their outcomes

- Moderate persistent elevation total bilirubin (>3.0mg/dL) → ERCP/EUS

- Mild transient elevation total bilirubin → MRCP
  - If MRCP positive, then ERCP
  - If ERCP fails (5%), then CBD exploration
Approach to CBD Stones in GSP and Cholangitis

- NOT controversial

- 3 RCT comparing early ERCP versus conservative management

- Urgent ERCP to decompress CBD regardless of severity of pancreatitis
EUS and Gallstone Pancreatitis

- Sensitivity 85-100%, Specificity 85-100%
- Lower failure rate than ERCP
- Avoids ERCP in 31-74%
- Lower morbidity
- More cost effective

- Strategy based on EUS before ERCP may be effective alternative
Summary

- Mild GSP → consider MRCP, EUS or IOC
- Severe GSP → consider urgent ERCP
- Persistent elevated bilirubin → EUS/ERCP
- Mild transient elevated bilirubin → MRCP
- Cholangitis → ERCP
Question #1

Which of the following has the the highest sensitivity for detecting small stones in CBD?

- Transabdominal US
- CT
- MRCP
- Endoscopic US
Question #2

On the Ranson Scale, how many points are awarded to a 61yM with gallstone pancreatitis and the following labs: WBC 13, Glucose 93, LDH 60, AST 45?

• 0
• 1
• 2
• 3
• 4
<table>
<thead>
<tr>
<th></th>
<th>Biliary Pancreatitis</th>
<th>Nonbiliary Pancreatitis</th>
</tr>
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<tbody>
<tr>
<td><strong>Admission</strong></td>
<td></td>
<td></td>
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<tr>
<td>Age</td>
<td>&gt;70</td>
<td>&gt;55</td>
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<tr>
<td>WBC (mm$^3$)</td>
<td>&gt;18,000</td>
<td>&gt;16,000</td>
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<tr>
<td>Serum glucose (mg/dL)</td>
<td>&gt;220</td>
<td>&gt;200</td>
</tr>
<tr>
<td>Serum LDH (U/L)</td>
<td>&gt;400</td>
<td>&gt;350</td>
</tr>
<tr>
<td>Serum AST (U/L)</td>
<td>&gt;250</td>
<td>&gt;250</td>
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<tr>
<td><strong>Within 48 Hours</strong></td>
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<tr>
<td>Hematocrit fall (%)</td>
<td>&gt;10</td>
<td>&gt;10</td>
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<td>BUN increase (mg/dL)</td>
<td>&gt;2</td>
<td>&gt;5</td>
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<td>Serum calcium (mg/dL)</td>
<td>&lt;8</td>
<td>&lt;8</td>
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<tr>
<td>PaO$_2$ (mm Hg)</td>
<td>—</td>
<td>&lt;60</td>
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<tr>
<td>Base deficit (mEq/L)</td>
<td>&gt;6</td>
<td>&gt;4</td>
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<tr>
<td>Fluid sequestration (L)</td>
<td>&gt;4</td>
<td>&gt;6</td>
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</table>
Question #3

• You are consulted for 64yM on medical service with gallstone pancreatitis HD#5. Ranson score 2. Currently pain free and tolerating regular diet. Normal amylase and lipase. Total bilirubin stable 2.5mg/dL. US shows gallstones and CBD 4mm. What do you want to do?
References

• Netter Atlas
• Cameron’s Current Surgical Therapy, 10th ed.
• Blumgart’s Surgery of the Liver, Biliary Tract and Pancreas, 4th ed.