Approach to Biliary Emergencies

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- I have no relevant financial disclosures/conflicts of interest
Overview

• Approach to Choledocholithiasis
  – Diagnostic testing for Choledocholithiasis
  – ERCP and Complications of ERCP
  – ASGE Clinical Predictors of Choledocholithiasis

• Acute Cholangitis

• Gallstone/Biliary Pancreatitis

• Bile Leaks
  – Post-cholecystectomy Bile Leaks
Case 1

• A 67 year old woman presents to your office with intermittent post-prandial right upper quadrant pain and nausea without vomiting. The patient is afebrile, denies jaundice and has normal vital signs. She has right upper quadrant tenderness without a Murphy’s sign. Sclera are anicteric and there is no evidence of jaundice on exam. CBC, LFTs, and Amylase/Lipase are normal. A right upper quadrant ultrasound demonstrates a gallbladder with stones and without pericholecystic fluid or wall thickening. CBD measures 9 mm in diameter without obvious common bile duct stones.
Case 1 Questions

• What is your clinical suspicion for choledocholithiasis in this patient?
• Is urgent or emergent ERCP indicated?
• Next step in evaluation/management?
Diagnostic Evaluation of Choledocholithiasis

- Laboratory Testing
- Imaging Modalities for Choledocholithiasis
  - ERCP
  - Abdominal Ultrasound
  - CT
  - MRI/MRCP
  - EUS
- ASGE Clinical Predictors of Choledocholithiasis
Laboratory Testing for Choledocholithiasis

• Liver Associated Enzymes
• Series of 1000 patients s/p Laparoscopic Cholecystectomy
• Negative predictive value of normal liver enzymes for choledocholithiasis: 97%
• Positive predictive value of any abnormal liver enzymes of: 15%

Liver Enzymes and Choledocholithiasis

• Total Bilirubin
  – T.bili ≥ 1.7: Specificity of 60 % for CBD stones
  – T.bili ≥ 4.0: Specificity of 75% for CBD stones

• Mean Bilirubin level of patients with choledocholithiasis
  – Between 1.5-1.9

• Less than 1/3 of patients with choledocholithiasis have T. bili ≥ 4

Imaging Modalities for Choledocholithiasis

- ERCP
- Abdominal Ultrasound
- CT Scan
- MRI/MRCP
- Endoscopic Ultrasound
- Intraoperative Cholangiography (IOC)
Endoscopic Retrograde Cholangiopancreatography (ERCP)
ERCP in Diagnostic Evaluation of CBD Stones

- Sensitivity 80-93%
- Specificity 100%
- Allows for removal of CBD stones
- Invasive procedure with risk of complications
  - Pancreatitis (5-7%)
  - Bleeding
  - Perforation

Prat F et al, Lancet 1996; 347: 75
ERCP

Major Papilla

Biliary Cannulation
ERCP

Wire in CBD

Stones/Filling Defects on Cholangiogram
ERCP

Biliary Sphincterotomy

CBD Stone Extraction
Complications of ERCP

• Pancreatitis: 5-7%
• Bleeding: 1.3%
  – Severe bleeding (> 5 Units transfusion): < 1/1000
• Perforation: 0.1-0.6 %
• Cholangitis: < 1%
• Cholecystitis: 0.2-0.5%
• Cardiopulmonary complications: 1%
• Mortality
  – Diagnostic ERCP: 0.2%
  – Therapeutic ERCP: 0.4-0.5%

Anderson MA et al, GIE 2012; 75: 467
Post-ERCP Pancreatitis

• Presents as abdominal pain, nausea/vomiting post-ERCP

• Causative Factors:
  – Mechanical injury from instrumenting PD
  – Hydrostatic injury from overinjection of PD
  – Chemical injury to PD from contrast
  – Thermal injury to pancreas from electrocautery from sphincterotomy
Post-ERCP Pancreatitis

• Risk Factors
  – History of Prior Post-ERCP Pancreatitis (OR 5.4)
  – Biliary Sphincter Balloon Dilation (OR 4.9)
  – Difficult Cannulation (OR 3.4)
  – Pancreatic Sphincterotomy (OR 3.1)
  – >1 injection of PD (OR 2.7)
  – Suspected SOD (OR 2.6)
  – Female Gender (OR 2.5)
  – Normal Serum Bilirubin (OR 1.9)
  – Pre-Cut Sphincterotomy

Freeman ML, GIE 2001; 54: 425
Post-ERCP Pancreatitis

• Grading
  • Mild
    – Serum Amylase > 3 x upper limit of normal > 24 hrs post procedure requiring admission for 2-3 days
  • Moderate
    – Hospitalization of 4-10 days
  • Severe
    – Hospitalization > 10 days, hemorrhagic pancreatitis, phlegmon/pseudocyst, intervention needed (drainage, surgery)

Cotton PB et al, GIE 1991; 37: 383
Post-ERCP Pancreatitis: Prevention

- Avoid marginal indications for ERCP
- Avoid diagnostic ERCP when less invasive imaging modalities present (MRCP, EUS)
- Pancreatic Duct Stenting in high-risk patients
- Wire-guided Cannulation
- Blended Current Electrocauterity during Sphincterotomy
- Indomethacin Suppository post/peri-procedure
Preventing Post-ERCP Pancreatitis

• Prophylactic Pancreatic Duct Stenting
• Systematic Review of 8 studies, 680 patients
• Post-ERCP pancreatitis reduced from 19% in controls to 6% in patients receiving PD stents (p< 0.001)
• NNT with PD stent placement of 8

Mazaki T et al, Endoscopy 2010; 42: 842
Prevention of Post-ERCP Pancreatitis

• Rectal Indomethacin 100 mg post-procedure
• N=602, randomized clinical trial
• Patients receiving Rectal Indomethacin had lower rates of post-ERCP pancreatitis compared to placebo (9% vs. 17 %, p=0.005)

Elmunzer BJ et al, NEJM 2012; 366: 1414
Post-ERCP Pancreatitis

- Management
- Same as for acute pancreatitis
- NPO, IVF Hydration, Analgesia
- Severe cases may require ICU level care
Perforation Post-ERCP

• Risk Factors
  – Sphincterotomy
  – Billroth II Anatomy
  – Intramural injection of contrast
  – Prolonged procedure
  – Biliary stricture dilation
  – SOD
## Stapfer Classification of Post-ERCP Perforation

<table>
<thead>
<tr>
<th>Type</th>
<th>Location</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>Medial/Lateral Duodenal Wall</td>
<td>Due to scope manipulation</td>
</tr>
<tr>
<td>Type II</td>
<td>Injury at level of Ampulla/Sphincter of Oddi</td>
<td>Related to sphincterotomy, sphincter manipulation</td>
</tr>
<tr>
<td>Type III</td>
<td>Distal Bile Duct</td>
<td>Guidewire related</td>
</tr>
<tr>
<td>Type IV</td>
<td>Retroperitoneal Air Only</td>
<td>Managed non-operatively</td>
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Post-ERCP Perforations

Indications for Surgery after Post-ERCP Perforation

Table 4. SURGICAL INDICATIONS AFTER ERCP-RELATED DUODENAL PERFORATION

1. Large extravasation of contrast at the time of ERCP defined as incomplete dissipation of contrast after 1 minute on follow-up plain film (see Fig. 3). If there is a small amount of contrast extravasation, defined as complete dissipation after 1 minute, at the time of ERCP, on follow-up plain film (see Fig. 4), then a UGI is performed in 2 to 8 hours. If this shows extravasation, we recommend surgical exploration.

2. Any follow-up CT scan that shows a fluid collection in the retroperitoneal or peritoneum consistent with perforation, not pancreatitis

3. Documented ERCP perforation with cholelithiasis, choledocholithiasis, or retained hardware

4. Massive subcutaneous emphysema after ERCP with what appears at endoscopy to be a large duodenal diverticulum

5. Failure of nonsurgical management.

CT, computed tomography; ERCP, endoscopic retrograde cholangiopancreato
graphy; UGI, upper gastrointestinal examination.

Risk Factors for Mortality with Post-ERCP perforation

- Jin, YJ et al, Endoscopy 2013; 45 (10): 806-12
- N= 59 patients with perforation after ERCP
- Multicenter retrospective study between 2000-2007
- Mortality rate for post-ERCP perforation in this study group: 8.5%
- Factors associated with increased mortality
  - Injury detection time > 6 hours (p =0.0001)
  - Presence of peritoneal signs (p=0.0003)
Perforation Post-ERCP

• Management
• Early recognition key
• For peri-ampullary perforation, prompt drainage (stent placement, naso-biliary drains, NG tube placement), NPO, IV Antibiotics, Surgical Consultation
• Aggressive biliary and duodenal drainage can result in clinical resolution without need for operative intervention in up to 86% of cases

Enns R et al, Endoscopy 2002; 34: 293
ERCP: Anatomic Considerations

- ERCP scope designed for normal anatomy
- Post-surgical anatomy can affect feasibility of ERCP
- Billroth I: Reachable with ERCP scope but positioning can be awkward
- Billroth II: Reachable with ERCP scope, but papilla upside down; use special Billroth II tome, train conventional tome downward, or use needle knife or dilating balloon catheter for access
ERCP: Anatomic Considerations

• Whipple: Biliary and pancreatic anastomoses can be reached potentially with colonoscope, therapeutic endoscope, or single balloon enteroscope

• Roux-en-Y OLT: Not reachable with ERCP scope; consider PTC versus balloon enteroscope ERCP
ERCP: Anatomic Considerations

- Roux-en-Y Gastric Bypass
- Options include Laparoscopic Assisted ERCP, Balloon Enteroscopy ERCP, or PTC
- Long Roux + Pancreatico-biliary Limb > 150 cm: Lap Assisted ERCP or PTC
- Short Roux + Pancreatico-biliary Limb < 150 cm: Balloon Enteroscopy ERCP feasible
- Balloon Enteroscopy ERCP: requires skilled team, extra long accessories (600 cm wire, extra long tome (Cotton cannulotome), etc.)
ERCP in patient s/p Roux-en-Y Gastric Bypass: Lap-Assisted ERCP vs. Balloon Enteroscopy ERCP

• Schreiner et al, GIE 2012; 75(4): 748-56
• N=32 (n= 24 Lap Assisted, N= 8 Balloon Enteroscopy ERCP)
• Cannulation Rates
  – Lap-Assisted: 100%
  – Balloon Enteroscopy ERCP: 59%
• Therapeutic Success
  – Lap Assisted: 100%
  – Balloon Enteroscopy ERCP: 59%
• Patients with Roux limb + Pancreaticeo-biliary limb length < 150 cm had higher therapeutic success rates with Balloon Enteroscopy ERCP
Abdominal Ultrasound in evaluation of suspected CBD stones

- Detection of CBD stones
- Sensitivity: 22-55%
- Presence of bowel gas limits detection of distal CBD Stones

Vallon A et al, Gut 1979; 20: 51
Cronan J et al, Radiology 1986; 161
O’Connor H et al, Gastrointest Radiol 1986; 11: 161
Abdominal Ultrasound for the detection of CBD stones

• Detection of biliary ductal dilation
• Sensitivity: 77-87%
• CBD diameter > 8mm associated with biliary obstruction
• Study of 870 patients undergoing cholecystectomy, CBD diameter > 6mm as cutoff for dilated CBD
• Probability of CBD stone based on CBD diameter
  – 0-4 mm: 3.9%
  – 4.1-6 mm: 9.4%
  – 6.1-8 mm: 28%
  – 8.1-10 mm: 32%
  – > 10 mm: 50%

Baron R et al, Radiology 1982; 145: 91
Mitchell S et al, Am J Roentgenol 1984; 142: 729
CT Scan in the Evaluation of CBD Stones

- Sensitivity: 65-88%
- Specificity: 73-97%
MRCP in evaluation of CBD stones

- Sensitivity 85-92%
- Specificity 93-97%
- Sensitivity drops to 33-71% for CBD stones < 6mm and CBD sludge
- Helps delineate pancreatic-biliary ductal system and can identify anatomical variants

Romagnuolo J et al, Ann Intern Med 2003; 139: 547
Verma D et al, GIE 2006; 64: 248
Zidi S et al, Gut 1999; 44: 118
Sugiyama M et al, Am J Gastro 1998; 93: 1886
Endoscopic Ultrasound (EUS) for evaluation of CBD stones

- Sensitivity 94%
- Specificity 95%
- As MRCP may miss small stones < 6 mm in size, EUS a good option in cases with a negative MRCP and clinical suspicion for a CBD stone
- Stones on EUS appear echogenic (bright) with an area of acoustic shadowing (darkness)

Tse F et al, GIE 2008; 67: 235
Intraoperative Cholangiography (IOC)

- Involves insertion of small catheter into cystic duct or via GB during cholecystectomy with injection of contrast
- Technical success rate: 88-100%
- Sensitivity for CBD stones: 59-100%
- Specificity for CBD stones: 93-100%
- Pro: Delineates biliary anatomy and may identify bile duct injury
- Cons: May add time and cost to surgical procedure, Operator dependent
- 2008 survey of 1417 Surgeons: 27 % use IOC routinely

ASGE Predictors of Choledocholithiasis in Patients with Symptomatic Cholelithiasis

• Very Strong Predictors
  – CBD stone on Abdominal Ultrasound
  – Clinical Ascending Cholangitis
  – Bilirubin > 4mg/dL

• Strong Predictors
  – Dilated CBD on U/S (> 6mm with gallbladder in situ)
  – Bilirubin 1.8-4 mg/dL

• Moderate Strength Predictors
  – Abnormal liver function test other than bilirubin
  – Age > 55 y
  – Clinical Gallstone Pancreatitis

Maple J et al, GIE 2010; 71(1): 1
Assigning Likelihood of Choledocholithiasis Based on ASGE Clinical Predictors

- **High Likelihood**
  - Presence of at least one very strong predictor
  - Presence of both strong predictors

- **Low Likelihood**
  - No predictors present

- **Intermediate Likelihood**
  - All other patients

Maple J et al, GIE 2010; 71(1): 1
Application of ASGE Clinical Predictors for Choledocholithiasis

• High Likelihood of CBD stone
  – Proceed to ERCP

Maple J et al, GIE 2010; 71(1): 1
Application of ASGE Clinical Predictors of Choledocholithiasis

- Intermediate Likelihood of CBD stone
  - Offer non/less-invasive imaging (MRCP or EUS)
  - If non/less-invasive testing positive → ERCP
  - Often offer MRCP first, if negative and still clinical suspicion for CBD stone → can offer EUS and if positive → ERCP
  - In candidate for cholecystectomy, can offer non/less-invasive imaging first, consider pre-op ERCP versus IOC if available, if IOC positive → post-op ERCP

Maple J et al, GIE 2010; 71(1): 1
Strategy for Patients with Intermediate Likelihood for CBD Stone

- Imransheh P et al, JAMA 2014; 312(2): 137-44
- N=100 patients
- Patients with Intermediate Strength ASGE Predictors for Choledocholithiasis
  - T. bili 1.8-4
  - CBD > 6 mm
  - Elevated Liver Enzymes
  - Age > 55
  - Biliary Pancreatitis
Cholecystectomy with IOC vs. Pre-op EUS for Patients with Intermediate Likelihood for CBD Stone

- Imransheh P et al, JAMA 2014; 312(2): 137-44
- N=50 patients cholecystectomy with IOC
- n=50 patients with initial EUS, if + for CBD stone → ERCP, if – for CBD stone → to CCY
- Cholecystectomy first strategy associated with:
  - Shorter length of stay (median 5 days vs. 8 days, p<0.001)
  - Fewer common bile duct investigations (25 vs. 71, p<0.001)
  - Number of patients in both arms with confirmed CBD stones not significantly different (11 vs. 10, p=0.81)
Application of ASGE Clinical Predictors of Choledocholithiasis

• Low Likelihood of CBD stone
  – Offer non/less-invasive imaging (EUS/MRCP)
  – If imaging negative, consider other diagnosis
  – If gallstones on imaging but otherwise unremarkable CBD consider proceeding to laparoscopic cholecystectomy

Maple J et al, GIE 2010; 71(1): 1
Evaluation for CBD stones in post-cholecystectomy patients

- CBD often dilated post-cholecystectomy
- Initially start with Abdominal Ultrasound and LFTs
- If U/s and LFTs normal, low probability of choledocholithiasis
- Incidence of CBD stones in patients with suspected choledocholithiasis post-CCY is 33-43%
- If LFTs and U/s data diagnostic of CBD stone → proceed to ERCP
- If LFTs and U/s data abnormal but not diagnostic offer MRCP or EUS, if abnormal, then offer ERCP

Maple J et al, GIE 2010; 71(1): 1
Case 2

• 80 year old man presents with right upper quadrant pain, fever (T 39.4), and jaundice. T.bili is 5.4, ALT 160, AST 140, Alk Phos 300. Right upper quadrant ultrasound shows a gallbladder full of stones and a common bile duct measuring 10 mm in diameter with no clear CBD stone. On exam patient is hypotensive with a bp of 85/50 and slightly confused.
Case 2 Questions

• What is going on with this patient?
• Next steps in management?
• Is urgent/emergent biliary decompression indicated?
Acute Cholangitis

- Pathophysiology
- Bacteria from GI tract and/or portal circulation ascend into biliary tree
- Biliary obstruction or stasis increases intra-biliary pressure
- High pressure promotes migration of bacteria into biliary tree and bloodstream
- Stones in CBD serve as nidus for bacterial colonization and increase intra-biliary pressure
Acute Cholangitis

• Bacteriology
• Gram negative Rods most common organisms
  – E.coli (25-50%)
  – Klebsiella (15-20%)
  – Enterobacter sp. (5-10%)
• Enterococcus the most common Gram positive organism (10-20%)
• Bacteroides/Clostridium species seen in mixed infection
• Anaerobes seen more often in post-op patients

Acute Cholangitis: Clinical Features

• Charcot’s Triad
  – Right Upper Quadrant Pain
  – Jaundice
  – Fever

• Seen in 50-75% of patients with cholangitis

Acute Cholangitis: Clinical Features

• Reynolds Pentad
  – Charcot’s Triad + Hypotension and Altered Mental Status
• Patients with Reynolds Pentad/Severe Cholangitis have increased mortality
• Hypotension may be the only presenting sign in elderly or immuno-compromised patients

Acute Cholangitis: Diagnosis

- Liver Enzymes elevated
- Rarely transaminases may be in the 1000’s (hepatocyte necrosis)
- Blood Cultures should be obtained to identify causative organism and guide antibiotic therapy
- Right Upper Quadrant Ultrasound a good first imaging test
- Negative in 10-20% of cases (small stones)
- In patients with Charcot’s triad/Reynolds Pentad and supporting imaging/labs ➔ can proceed to therapeutic ERCP if stable, not otherwise contraindicated
- PTC can be offered if lack of availability of ERCP or failed ERCP
- In mild cases of cholangitis and/or high-risk patient for ERCP can offer non-invasive imaging ➔ MRCP

Acute Cholangitis: Initial Management

• IV Antibiotics
  – No consensus on optimal regimen
• Fluid Resuscitation for patients with hypotension
Acute Cholangitis: Antibiotic Options

• First Line Therapy
  – Beta-Lactam with Beta-Lactamase Inhibitor
    • Piperacillin-Tazobactam 3.375 or 4.5 g IV q 6’
    • Ticarcillin-Clavulanate 3.1 g IV q 4’
  – 3rd Generation Cephalosporin + Metronidazole
    • Ceftriaxone 1 g IV q 24’ or q 12’ + Metronidazole 500 mg IV q 8’
Acute Cholangitis: Antibiotic Therapy

- **Alternate Regimens**
  - Quinolone plus Metronidazole
    - Ciprofloxacin 400 mg IV q 12’ or Levofloxacin 500 mg or 750 mg IV daily + Metronidazole 500 mg IV q8’
  - Monotherapy with a Carbapenem
    - Meropenem 1 g IV q 8’
    - Ertapenem 1 g IV daily (lacks Psuedomonal coverage)
    - Imipenem-cilastatin 500 mg IV q6’
    - Doripenem 500 mg IV q8’
Acute Cholangitis

- 80% of cases respond to conservative management and antibiotic therapy
Risk Factors for Acute Suppurative Cholangitis

• Age > 70
• Impacted CBD stone
• Active smoker
• Additional stones within the gallbladder
• Mortality associated with Cholangitis and sepsis estimated as high as 24%

Yeom D et al, Gut Liver 2010; 4: 363
Acute Cholangitis

• Indications for Urgent Biliary Decompression
  – Persistent Abdominal Pain
  – Hypotension despite adequate fluid resuscitation
  – Fever > 39 degrees C (102 degrees F)
  – Confusion/Altered Mental Status
  – No improvement after 24 hours of conservative therapy alone
Establishment of Biliary Drainage

- ERCP
- Treatment of choice
- Endoscopic Sphincterotomy with stone extraction +/- stent placement
- 90-95% of CBD stones can be removed successfully
- Stones > 2 cm in size may require lithotripsy
- Try to avoid occlusion cholangiography in acute suppurative cholangitis as can promote septicemia
- PTC offered in cases of unsuccessful ERCP or if ERCP not available
ERCP and Clinical Outcomes from Cholangitis

- Chak A et al, GIE 2000; 52(4): 484-9
- N=116 patients with Cholangitis
- ERCP performed in 71 patients
- ERCP vs. PTC/Surgical Common Bile Duct Exploration
  - Decreased length of stay associated with ERCP (median 5 days vs. 9.5 days, p=0.01)
  - Lower Rates of ICU admission noted with ERCP (11.4% vs. 28.6 %, p=0.09)
- Early ERCP (<24 hrs) vs. Delayed ERCP
  - Decreased length of stay associated with Early ERCP (median 4 days vs. 7 days, p<0.005)
ERCP and Mortality From Cholangitis

• James PD et al, CGH 2014;12(7):1151-59
• N=166,438 Patients undergoing ERCP for acute biliary conditions (Cholangitis, CBD stone, Pancreatitis) from 1998-2008
• Mortality in patients undergoing ERCP decreased over time (1.1% at beginning of study vs. 0.6 % at end of study)
• Risk Factors Associated with Mortality
  – Age > 60 (aOR 4.6, 95% CI 3.0-7.3)
  – Open Cholecystectomy (aOR 3.4, 95% CI 2.7-4.3)
  – Medicare Insurance (aOR 2.1, 95% CI 1.7-2.6)
  – Cholangitis (aOR 1.9, 95% CI 1.5-2.3)
  – Unsuccessful ERCP (aOR 1.7, 95% CI 1.4-2.2)
  – Delayed ERCP > 3 days (aOR 1.3, 95% CI 1.2-1.5)
Case 3

• A 75 year old woman presents with post-prandial epigastric pain, nausea, and vomiting. Her labs demonstrate an Amylase level of 500, Lipase level of 850, T. bili of 4.2, ALT 150, AST 120, Alk Phos of 300. She does not drink alcohol. Her RUQ U/s shows gallstones and a CBD measuring 10 mm in size. On exam, she is febrile (T 38.4), sclera are icteric, and she is tender in the epigastric area and RUQ.
Case 3: Questions

• What is going on with this patient?
• Next steps in management?
Gallstone Pancreatitis

• Acute Pancreatitis secondary to an obstructing CBD stone
• Initial management same as for acute pancreatitis
  – NPO
  – IVF Hydration (LR or NS at 250-300 cc/hr x 48 hrs cardiac status permitting; LR may be better than NS)
  – Analgesics (Hydromorphone/Meperidine preferred over Morphine)
Gallstone Pancreatitis

• Role of ERCP
• If cholangitis present → proceed to ERCP
• If high clinical suspicion for CBD stone, ERCP has greatest benefit if performed within 72 hours
• In the absence of CBD stones, early ERCP is controversial
  – Meta analysis, 5 trials, 702 patients
    • Early ERCP reduced complications but not mortality for severe pancreatitis
    • No benefit observed in predicted mild pancreatitis
• In patients with low-intermediate clinical suspicion, offer other imaging modalities (MRCP, EUS)

Fan S et al, NEJM 1993; 328: 228
Moretti et al, Dig Liver Dis 2008; 40: 379
Gallstone Pancreatitis

• Cholecystectomy
  – Should be performed after recovery from acute episode in patients with gallstone pancreatitis
  • Failure to perform cholecystectomy associated with 25-30% risk of recurrent acute pancreatitis, cholecystitis, and cholangitis within 6-18 wks.

Hernandez V et al, Am J Gastro 2004; 99:2417
Gallstone Pancreatitis: Cholecystectomy Timing

- For mild pancreatitis, can be safely performed within 7 days of acute episode
  - Randomized, prospective study of 50 patients with mild gallstone pancreatitis
  - Patients receiving cholecystectomy within 48 hours of admission had shorter length of stay than those in which surgery performed after resolution of pain/normalization of labs

- For severe cases, delaying cholecystectomy for at least 3 wks is reasonable

- In elderly/critically ill patients, cholecystectomy is controversial and may not be advisable

Aboulian A et al, Ann Surg 2010; 251: 615
Gallstone Pancreatitis and Timing of Cholecystectomy (PONCHO Trial)

- Multi-center, randomized control trial
- Patient population: Inpatients with mild acute gallstone pancreatitis
- N=137 interval cholecystectomy within 25-30 days
- n=129 same-admission cholecystectomy
- Primary endpoint: readmission for recurrent gallstone-related complications (pancreatitis, cholangitis, cholecystitis, choledocholithiasis needing endoscopic intervention, or gallstone colic) or mortality within 6 months
- Results: Lower rate of readmission for gallstone related complications in same admission CCY group (5%) vs. interval CCY group (17%, p=0.002)
Gallstone Pancreatitis

- Cholangitis/High Clinical Suspicion for persistent CBD stone
  - Proceed to ERCP

- Intermediate Clinical Suspicion for persistent CBD stone and/or High Risk ERCP patients
  - Offer MRCP and/or EUS
  - If positive for CBD stone → ERCP
  - If negative, labs improving, observe clinically → elective cholecystectomy
  - If negative, labs not improving → ERCP vs. IOC

- Low clinical suspicion for persistent CBD stone
  - Labs normalizing → Elective cholecystectomy +/- IOC
  - If labs normalizing slowly, persistent symptoms → Offer further imaging (MRCP, EUS), remainder as above
Case 4

- A 45 year old woman presents to the Emergency Room 1 day after laparoscopic cholecystectomy with diffuse abdominal pain and fever (T 102 degrees F). LFTs are normal and RUQ U/s shows a CBD measuring 5 mm and is otherwise normal. CXR/KUB show no free air.
Case 4: Questions

• What might be going on with this patient?
• What are your next steps in evaluation/management?
Bile Leaks post-cholecystectomy

• Significant leaks occur in 0.8-1.1 % of patients post-cholecystectomy

• Diagnosis
  – Can usually be confirmed on Ultrasound
  – CT Scan may demonstrate the presence of a biloma
  – HIDA Scan can be useful in identifying leaks when U/s is negative
  – ERCP allows delineation of leak site in 95% of cases and allows for therapeutic intervention (biliary sphincterotomy + stent placement)

Trondsen E et al; Eur J Surg 1994; 160: 145
Barkun A et al, GIE 1997; 45: 277
Bourke M et al, GIE 1995; 41: 390
Bile Leaks

• High-Grade Leaks
  – Leak identified with rapid extravasation of contrast with negligible filling of intrahepatic ducts

• Low-Grade Leaks
  – Leak identified with near complete filling of intrahepatic ducts
Bile Leaks Post-Cholecystectomy

• Sites of Injury
  – Cystic Duct (75%)
  – Gallbladder Bed/Ducts of Luschka (6-17%)
  – Hepatic ducts

Barkun A et al, GIE 1997; 45: 277
Bourke M et al, GIE 1995; 41: 390
Ligoury C et al; Surgery 1991; 110: 779
Davids P et al, Gut 1992; 33: 1118
Ryan M et al; GIE 1998; 47: 261
Hourigan L et al; J Gastroenterol Hepatol 1999; 14: A145
Cystic Duct Leak: High Grade Leak
Duct of Luschka Leak: Low Grade Leak
Endoscopic Therapy for Bile Leaks

• ERCP with biliary sphincterotomy and stent placement (typically 10 Fr stents)
• Goal is to decrease trans-papillary pressure gradient and allow leak to heal
• Typically do not need to traverse leak site with stent
•Leaks typically heal within 4-6 weeks
•Retained common bile duct stones seen in 20-25% of patients with bile leaks

Coelho-Prabhu N et al, Am J Gastro 2010; 105: 100
Bile Leaks

• Biloma
• Persistent fluid collection
• Usually cannot be treated by biliary stent alone and require percutaneous drainage
• ~25% of patients with bile leaks undergo percutaneous drainage
• 4-6% require open surgical drainage of loculated fluid collections
Bile Duct Injury

• Role of Endoscopic therapy depends on location of injury

• For Bile Duct Transection typically requires operative management (Proximal Hepatico-jejunostomy with Roux-en-Y proximal Jejunal Loop)

• For persistent bile leaks despite endoscopic therapy, think of injury to abberant right hepatic duct (may require operative intervention)