Inpatient GI Consults

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Acute Care of the Complex Hospitalized Patient for NPs and PAs
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Disclosures

No off-label use of medications.

No conflicts of interest.
Learning Objectives

1. Distinguish between types of acute pancreatitis and discuss management of acute pancreatitis.

2. Define acute cholangitis and develop management algorithm.

3. Interpret elevated liver biochemistries and discuss differential diagnosis.

4. Recognize alcoholic hepatitis and summarize management plan.
Case History

- 60 year-old woman presents to ED with 6-hour history of epigastric pain, nausea and vomiting.
- History of hypertension and hyperlipidemia.
- Medications: aspirin 81mg daily, lisinopril 10mg daily, simvastatin 20mg daily.
- Vital signs: Heart rate 105, BP 100/60, Temperature 97.5F.
- Physical: Moderate epigastric tenderness, reduced bowel sounds.
- Laboratory studies: Hgb 13 g/dL, WBC $18 \times 10^9$ L, lipase 5637 U/L, AST 350 U/L, ALT 250 U/L, total bilirubin 1.1 mg/dL.
What would the best next step be?

A. CT scan of abdomen with IV contrast
B. Urgent ERCP
C. Plain abdominal x-ray
D. IV fluid, bowel rest and observation
Diagnosing acute pancreatitis

Clinical Presentation
- Abdominal pain (epigastric), radiation to back
- Nausea, vomiting

Diagnosis (2 out of 3 criteria)
1. Consistent clinical presentation
2. Lipase $\geq 3x$ upper limit normal
3. Radiologic evidence

- Incidence: 4.9-35 per 100,000
- Leading GI cause of hospitalization in US
Types of Pancreatitis

Interstitial edematous
- Acute inflammation of pancreas & peripancreatic tissues
- Enhances with IV contrast

Necrotizing
- Inflammation associated with necrosis of pancreas & peripancreatic tissue
- Doesn’t enhance with IV contrast & necrosis present

Radiology 2012;262:751-764
What is the most common cause of acute pancreatitis in the United States?

A. Hypercalcemia
B. Smoking
C. Pregnancy
D. Gallstones
## Etiologies

<table>
<thead>
<tr>
<th>Category</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td><strong>Gallstones</strong>, ampullary stenosis, pancreatic cancer</td>
</tr>
<tr>
<td>Toxic</td>
<td>Ethanol</td>
</tr>
<tr>
<td>Metabolic</td>
<td>Hyperlipidemia, hypercalcemia</td>
</tr>
<tr>
<td>Infection</td>
<td>HIV, HSV, CMV, cryptosporidium, salmonella</td>
</tr>
<tr>
<td>Trauma</td>
<td>ERCP</td>
</tr>
<tr>
<td>Vascular</td>
<td>Ischemia, vasculitis</td>
</tr>
<tr>
<td>Genetic</td>
<td>CFTR mutation, PRSS1 mutation</td>
</tr>
<tr>
<td>Drugs</td>
<td>Furosemide, mesalamine, cannabis, simvastatin</td>
</tr>
</tbody>
</table>
Most common etiologies

- Alcohol 30%
- Gallstones 35-40%
  - 3-7% of patients with gallstones develop pancreatitis
  - AST/ALT > 3x normal, likelihood of biliary pancreatitis 95%
Management

• Abdominal ultrasound
  • Evaluate for gallstones, sludge
  • CBD diameter normally 4-6 mm

• CT or MRI
  • Not necessary if clinical presentation and lipase make diagnosis
  • May be necessary if atypical presentation
Management

- Aggressive hydration (250-350 cc/hour)
  - Prefer Lactated Ringer’s over saline
  - Reassess fluid requirement within 6 hours of admission and for first 24-48 hours
- Analgesia (fentanyl, morphine)
- Oxygen to keep $O_2$ saturations $>95\%$
- Bowel rest (feed when pain free and appetite)
- Enteral feeding (if lengthy course likely)
- Antibiotics not usually needed initially

Gallstone Pancreatitis: Management

- Cholecystectomy prior to discharge

- Is an ERCP needed prior to cholecystectomy?
  1. Pain resolving & liver biochemistries improving → cholecystectomy + intraoperative cholangiogram.
  2. Pain persists & rising (bilirubin > 4) or stone in bile duct on imaging → pre-operative ERCP.
  3. Clinical features not clear → pre-operative MRCP or EUS.

Classify Severity of Acute Pancreatitis

- Classify severity with SIRS score
- **Mild** = absence of organ failure & complications
- **Moderately severe** = transient organ failure
  - Resolves within 48 hours
- **Severe** = organ failure persisting >48 hours
  - SBP <90 mm Hg
  - Pulmonary insufficiency (PaO₂ <60 mm Hg)
  - Renal failure (creatinine >2mg/dL after hydration)

Complications of Interstitial Pancreatitis

• Acute peripancreatic fluid collection
  • Within first 4 weeks

• Pancreatic pseudocyst
  • Encapsulated fluid collection
  • No necrosis; well defined
  • Matures > 4 weeks after pancreatitis

Indications for drainage

• Symptomatic (N/V; early satiety)
• Infected
• Enlarging
Complications of Necrotizing Pancreatitis

**Acute necrotic collection**
- Only with necrotizing pancreatitis
- No wall around collection

**Walled-off necrosis**
- Occurs > 4 weeks after necrotizing pancreatitis

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3. Interpret elevated liver biochemistries and discuss differential diagnosis.

4. Recognize alcoholic hepatitis and summarize management plan.
Case History

• 40 year-old woman presents to ED with nausea, vomiting, shaking chills, fever, and upper abdominal pain for 4-hours.

• Physical examination: Temperature 39.2°C, scleral icterus, epigastric tenderness.

• Laboratory Studies: Hgb 11.7 g/dL, WBC 18,300/µL (80% PMN), serum creatinine 1.7 mg/dL, ALT 250 U/L, alkaline phosphatase 375 U/L, total bilirubin 4.7 mg/dL, lipase 65 U/L.

• Abdominal ultrasound: gallstones, dilated common bile duct.
You immediately begin IV antibiotics for acute cholangitis. Which of the following is the most appropriate next step in management?

A. Emergent laparotomy with cholecystectomy and common duct exploration
B. Hepato-iminodiacetic acid (HIDA) scan
C. CT abdomen/pelvis with IV contrast
D. Emergent ERCP with sphincterotomy
Defining acute cholangitis

- Clinical syndrome:
  - Charcot triad: fever, jaundice, abdominal pain
  - Reynolds pentad: hypotension, mental status change

- Pathogenesis:
  - Bacterial infection in patient with biliary obstruction
    - *E. coli, Klebsiella, Enterobacter*
2013 Tokyo Guidelines for Diagnosis

- Suspect if 1 of following:
  - Fever and/or shaking chills
  - Inflammatory response based on laboratories
- AND 1 of the following:
  - Jaundice
  - Abnormal liver chemistries
- Definite if meets above PLUS:
  - Biliary dilation on imaging
  - Evidence of etiology on imaging (stone)

Management of Acute Cholangitis

• Monitor and treat for sepsis
• Obtain blood cultures
• Start empiric antibiotic coverage:
  • Piperacillin-tazobactam
  • Ceftriaxone plus metronidazole
  • Ciprofloxacin plus metronidazole
• Biliary drainage:
  • ERCP with sphincterotomy and stone extraction
  • Percutaneous transhepatic cholangiography
  • Open surgical decompression
Management of Acute Cholangitis

- ERCP should be performed within 24-48 hours
- Urgent biliary decompression if:
  - Persistent abdominal pain
  - Hypotension
  - Temperature >39°C
  - Mental confusion
- Pregnant patient: Same management

Hou LA et al. J Clin Gastroenterol 2016 Epub. DOI: 10.1097/MCG.0000000000000763
Learning Objectives

1. Distinguish between types of acute pancreatitis and discuss management of acute pancreatitis.

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3. Categorize elevated liver biochemistries and discuss differential diagnosis and further evaluation based on pattern.

4. Recognize alcoholic hepatitis and summarize management plan.
Liver Biochemistries

Hepatocellular
- Affects hepatocytes
- AST
- ALT (most specific)

Cholestatic
- Affects biliary system
- Alkaline phosphatase (AP)
- Bilirubin

Synthetic Function
- Prothrombin time
- Serum albumin
Initial Evaluation

1. Duration of abnormality?
   - < 3 months - acute
   - > 3 months - chronic

2. Severity of elevation?

3. Risk factors for alcohol or viral hepatitis?

4. Abnormal physical examination for chronic liver disease?
Hepatocellular: Severity and Differential Diagnosis

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>Magnitude of Elevation</th>
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<tbody>
<tr>
<td>Nonalcoholic fatty liver disease</td>
<td>AST &amp; ALT &lt;4x ULN</td>
</tr>
<tr>
<td>Alcoholic fatty liver disease</td>
<td>AST &lt;8x ULN</td>
</tr>
<tr>
<td></td>
<td>ALT &lt;5x ULN</td>
</tr>
<tr>
<td>Acute viral hepatitis</td>
<td>AST &amp; ALT &gt;25x ULN</td>
</tr>
<tr>
<td>Ischemic hepatopathy</td>
<td>AST &amp; ALT &gt; 50x ULN</td>
</tr>
</tbody>
</table>

**Key point:** ALT > 5000 U/L only occurs in acetaminophen toxicity, ischemia, & Herpes Simplex hepatitis.
Testing for Hepatocellular Elevation

- Liver ultrasound with Doppler
- Serology for viral hepatitis
- ANA and total IgG
- Fasting serum iron and TIBC
- Serum ceruloplasmin if age < 40
- Tissue transglutaminase
Cholestatic: Severity and Differential Diagnosis

< 4x ULN
- Any type of hepatitis
- Cirrhosis
- Infiltrative liver disease
- Heart failure
- 3rd trimester pregnancy
- High bone turnover
- Hodgkin lymphoma

> 4x ULN
- Choledocholithiasis
- Malignant obstruction
- Biliary strictures
- AIDS cholangiopathy
- Drugs/toxins
- TPN
- Metastatic disease
- Alcoholic hepatitis
Testing for Cholestatic Elevation

- AP isoenzymes or GGT
- Abdominal ultrasound to assess for dilated bile ducts, liver mass, or normal appearance
- Dilated bile ducts
  - MRCP, EUS, and/or ERCP
- Liver mass
  - CT or MRI imaging
- Normal
  - Anti-mitochondrial antibody (AMA)
Case History

• 80 year-old female presents to ED with painless jaundice and fatigue. Symptoms present for approximately 2 weeks. Admitted to you for expedited work-up.

• Physical examination: Only notable for jaundice.

• Laboratory studies: AST 46 U/L, ALT42 U/L, AP 373 U/L, total bili 11.3 mg/dL, direct bili 8.8 mg/dL.

• CT A/P: motion artifact; dilated intra- & extra-hepatic ducts no obvious mass.
Dilated bile ducts on imaging

Duct measures 1.1 cm
Is an inpatient work-up required?
A. Yes  
B. No

What is the best next step?
A. Anti-mitochondrial antibody  
B. EUS/ERCP  
C. MRCP  
D. CT A/P
Results

- EUS/ERCP
  - Dilated bile duct w/o obstructing mass or stone
  - Duodenal diverticulum
- Liver biopsy at EUS
  - Mild to moderate hepatocanalicular cholestasis
- Differential diagnosis
  - Bile outflow impairment due to a stone or stricture
  - AMA-negative primary biliary cirrhosis
  - Drug reaction
What did we miss?

• Medication history!!
  • Amoxicillin/clavulanate 3 weeks prior to presentation for upper respiratory infection

• Final diagnosis
  • Drug induced liver injury
  • Dilated bile duct from periampullary diverticulum
Drug Induced Liver Injury (DILI)

• Incidence 19.1 cases per 100,000 persons
• Most common predictable drug: acetaminophen
• Most common unpredictable drug: amoxicillin/clavulanate
• Most common drug class: antibiotics
  • Isoniazid
  • Trimethoprim-sulfamethoxazole
  • Nitrofurantoin
• Unpredictable DILI has longer and variable latency in comparison to predictable DILI

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Case History

- 33 year-old male presents to ED with fatigue, jaundice and abdominal swelling for 2 weeks. He admits to drinking 6 beers daily for years.

- Physical examination: Afebrile, HR 101 bpm, icteric sclera, jaundice, tender hepatomegaly.

- Laboratory studies: Hgb 12.5 g/dL, MCV 108 fL, platelets 120x10^9/L, WBC 14.9x10^9/L, AST 125 U/L, ALT 59, AP 290 U/L, albumin 3.3 g/dL, total bilirubin 22.8 mg/dL.

- Ultrasound: gallbladder sludge, coarse liver echotexture, no ascites, no bile duct dilation.
He clinically appears to have alcoholic hepatitis. If he drinks 6-12 oz beers daily, how many grams of alcohol is he consuming?

A. 28 grams
B. 42 grams
C. 84 grams
D. 126 grams
E. I have no idea how to calculate grams of alcohol per day, I just know he drinks too much.
Alcohol Equivalents of 14 grams

- Wine 5 oz (12% alcohol)
- Beer 12 oz (5% alcohol)
- Liquor 1.5 oz (80 proof)

- Definition of heavy consumption > 50 g/day
Medical Management of Alcoholic Hepatitis (AH)

1. Abstinence from alcohol
2. If jaundice & suspected AH
   • Admit to hospital
   • Culture blood, urine, ascites if present
   • Restore nutrition
3. Image liver (contrast increased risk of AKI)
4. Nutritional needs
   • 1-1.5 g protein
   • 30-40 kcal/kg body weight
   • Consider enteral feeding if necessary

Medical Management of AH

5. Evaluate severity & prognosis
   - Maddrey Discriminant Function (MDF)
   - Model for End-Stage Liver Disease (MELD)

6. Increased risk of multi-organ failure (MOF) if SIRS present on admission. Very high mortality rate!

7. Avoid nephrotoxic drugs. AKI is early sign of MOF.

8. MDF > 32 or MELD > 20 without contraindication may be treated with methylprednisolone 32 mg daily. Does not improve survival beyond 28 days!
   - Alternative: pentoxifylline 400 mg TID with meals

Medical Management of AH

9. Severe AH (MELD > 26) with good insight into alcohol use disorder & social support, consider Hepatology consult for evaluation for liver transplantation.

10. Mild to moderate AH (MELD < 20, MDF < 32) need abstinence counseling, high protein diet, B vitamins and folic acid.

Summary

• Acute pancreatitis
  • Interstitial or necrotizing type
  • Gallstones & alcohol
  • IVF hydration key in first 24-48 hours

• Acute cholangitis
  • Clinical syndrome
  • IV antibiotics and biliary drainage
Summary

- Elevated liver biochemistries
  - Determine pattern
  - Evaluation varies by pattern
  - Only 3 causes of ALT > 5000 U/L
  - DILI – make sure to ask about medications!

- Alcoholic hepatitis
  - Abstinence
  - Adequate nutrition
  - Assess for infection if jaundice
Questions & Discussion