Gallbladder and Pancreas

Hope Leblanc, MD
Emergency Medicine, PGY 3
11/19/08
Objectives

- **Gallbladder**
  - Cholelithiasis/Biliary colic
  - Cholecystitis
  - Acalculous cholecystitis
  - Cholangitis
  - Complications of cholecystitis
  - Tumors

- **Pancreas**
  - Acute versus Chronic Pancreatitis
  - Tumors
Risk Factors for Gallstones

- “Forty”
- “Female”
- “Fertile”
- “Fat”
- Medications
- Pregnancy
- Ethnicity
- Profound weight loss
- Prolonged fasting
- TPN
- High spinal cord injury
- Chronic intravascular hemolysis
- Liver disease
- Cystic fibrosis
- Hypertriglyceridemia
- Chronic parasitic infections
Anatomy 101

The Liver

- Hepatic Ducts
- Normal Flow of Bile
- Cystic Duct
- Common Bile Duct
- Pancreatic Duct
- Bile Enters Small Intestine

Gallbladder

Small Intestine
Gallstone Composition
Gallbladder Disease

- Biliary Colic
- Cholecystitis
- Cholangitis
- Empyema or Gangrenous Gallbladder
### Signs and Symptoms*

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cholelithiasis</strong></td>
<td>• Right upper quadrant or epigastric pain, <em>may</em> be colicky and postprandial</td>
</tr>
<tr>
<td></td>
<td>• Pain <em>may</em> radiate to upper back, shoulder or around waist</td>
</tr>
<tr>
<td></td>
<td>• Nausea and vomiting <em>may</em> be present</td>
</tr>
<tr>
<td><strong>Cholecystitis</strong></td>
<td>• Same manifestations as cholelithiasis, plus Murphy sign present</td>
</tr>
<tr>
<td></td>
<td>• Lasts longer than 6 hours</td>
</tr>
<tr>
<td></td>
<td>• Fever and chills <em>may</em> be present</td>
</tr>
<tr>
<td><strong>Cholangitis</strong></td>
<td>• Same manifestations as cholecystitis, plus</td>
</tr>
<tr>
<td></td>
<td>• Jaundice</td>
</tr>
<tr>
<td></td>
<td>• Altered mental status</td>
</tr>
<tr>
<td></td>
<td>• Shock</td>
</tr>
</tbody>
</table>
Acalculous Cholecystitis

- 10% of patients with acute cholecystitis
- Indistinguishable with 2 exceptions:
  - patients frequently are gravely ill
  - Is a complication from another process

Risk factors:
- elderly
- DM
- multiple trauma
- extensive burn injury
- prolonged labor
- major surgery
- gallbladder torsion
- systemic vasculitic
- infections of biliary tract
Differential Diagnosis of Cholecystitis

- Gastritis
- GERD
- Pancreatitis
- Hepatitis
- PUD
- Acute MI
- Renal colic
- Pyelonephritis
- Appendicitis (in pregnancy or patients with a retrocecal appendix)
- PID
- Fitz Hugh-Curtis
- Ectopic pregnancy
- Pneumonia
- Pleural effusion
Diagnosis

- Poor predictive value
  - History
  - Physical
  - Labs

- Ultrasound
  - Sensitivity 94%
  - Specificity 78%

- HIDA scan
  - Sensitivity 97%
  - Specificity 90%
## Treatment

<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| Biliary Colic                                  | • Supportive care  
• Possible ED discharge  
• Elective surgery                                                                 |
| Cholecystitis                                  | • Surgery within 1-3 days  
• Supportive care  
• Single-coverage antibiotics                                                                 |
| Cholangitis and other complicated disease      | • Aggressive resuscitation  
• Broad-spectrum antibiotics  
• Immediate surgery                                                                 |
Antibiotics in Complicated Infection

- Ampicillin, gentamicin, and metronidazole
- Ciprofloxacin and metronidazole
- Zosyn
- Unasyn
- Ticarcillin-clavulanate
- Imipenem
- Third-generation cephalosporin and metronidazole or clindamycin
- Aztreonam and clindamycin
Complications

- Ascending Cholangitis
- Gallstone Pancreatitis
- Gallstone Ileus
- Gallbladder Empyema
- Emphysematous (Gangrenous) Cholecystitis
- Porcelain Gallbladder
Gallstone Ileus

- Gallstone erodes into the bowel
- Fistula forms between biliary tract and intestine
- Elderly and females
- Intestinal obstruction if stone > 2 cm
- Mechanical obstruction not an ileus
- May be intermittent: “tumbling phenomenon”
Gallstone Ileus

- Nausea
- Vomiting
- Pain
- Constipation
- History of biliary disease
- Rarely have biliary symptoms directly before episode
Gallstone Ileus

- Rigler’s Triad
  - Partial or complete obstruction
  - Pneumobilia
  - Ectopic gallstone in intestine
- CT scan up to 93% sensitive in diagnosing gallstone ileus
- Urgent Laparotomy
Ascending Cholangitis

- Complete biliary obstruction + bacterial infection
- Charcot triad (25%)
- Reynold’s pentad
- Mortality approaches 100% if untreated
- Fluids, Vasopressors, IV antibiotics and Surgical decompression
Gallbladder Empyema

- Complete cystic duct obstruction + bacterial infection + abscess formation
- Reynold’s pentad
- Risk Factors: elderly, DM, trauma, burns, vasculitis
- Frequently develop gram-negative sepsis
- Fluids, Vasopressors, IV antibiotics and Surgical decompression
Gangrenous Cholecystitis

- Focal or diffuse gangrene
- Gallbladder wall becomes ischemic, then develop bacterial infection and gangrene
- 1% of cholecystitis pt’s, but 30% of these are acalculous
- Reynold’s pentad
- KUB may demonstrate pneumobilia
- Recommend CT scan
- Similar treatment
Porcelain Gallbladder

- Incidence 0.6-0.8%
- Pathological finding of a brittle gallbladder with bluish discoloration resulting from extensive calcification of the gallbladder wall
- Relevance is based on high association between gallbladder cancer and porcelain gallbladder
- Diagnosis:
  - hard mass in the RUQ
  - incidental findings on KUB, US, or CT
- Prophylactic cholecystectomy
Tumors

- Cholangiocarcinoma
- Primary Gallbladder Cancer
Cholangiocarcinoma

- Neoplasm from intra- or extrahepatic bile duct epithelium
- Second most common primary hepatic tumor
- Average age 50 yrs
- Increasing incidence in US
- 1 case per 100,000 per year
- Risk factor: primary sclerosing cholangitis
Cholangiocarcinoma

- Most cholangiocarcinomas remain clinically silent until advanced stages
  - Extrahepatic: biliary obstruction results in painless jaundice
  - Intrahepatic: RUQ pain and cachexia and malaise
- CT and MRI with MRCP help with diagnosis and staging
- Surgical resection or liver transplantation and chemotherapy
- Overall survival 6 months in 90% of pt’s
Primary Gallbladder Cancer

- Incidence 0.8% to 1.2%
- Female: Male, 3:1
- Aged 62-66yrs
- Highest in American Indians and Hispanic
- Most patients not diagnosed until advanced disease as no specific signs or symptoms
- Risk factor is chronic inflammation
  - >75% inflammation is cholesterol gallstones
Signs and Symptoms

- Similar symptoms of gallstones and biliary colic
- Abdominal pain may be of a more diffuse and persistent nature
- Courvoisier sign: Palpable mass in the RUQ
- Sister Mary Joseph nodes: Periumbilical LAD
- Virchow node: Left supraclavicular adenopathy
- Pelvic seeding: Mass is palpated on DRE
Diagnosis and Treatment

- May see elevated alkaline phosphatase and bilirubin levels
- US or CT scan completed due to RUQ pain
- 10-20% of patients present with tumor confined
- Complete surgical resection in early disease
- Gallbladder replaced by the cancer
- 50% of patients have lymph node mets
- Advanced disease, palliative treatment only
- 5-year survival rates of 15-20%
Pancreas

- Acute Pancreatitis
- Chronic Pancreatitis
- Pancreatic Cancer
Pathophysiology of Acute Pancreatitis

- A stress/trigger starts the activation of proenzymes and digestive zymogens
- Results in autodigestion of the pancreas
- Causes edema, interstitial hemorrhage, vascular damage, coagulation, and cellular necrosis
- May get extension of the localized process into a generalized systemic inflammatory response
Acute Pancreatitis

- United States
  - 90% due to alcohol abuse or cholelithiasis
  - 5% due to medications
  - Remaining due to infection, inflammation, trauma, and metabolic disturbances

- Etiology different in other countries

- Prevalence is 0.5%
Medications Associated with Pancreatitis

- **Antiarrhythmics:** Amiodarone, amlodipine
- **Antiasthmatic:** Montelukast
- **Antibiotics:** Erythromycin, azithromycin, clarithromycin, sulfamethoxazole, quinolones, pentamidine, paromomycin, rifampin, dalfopristin-quinupristin
- **Antiepileptics:** Carbamazepine, valproic acid, topiramate
- **Antifungals:** Metronidazole
- **Antihypertensives:** Diazoxide, indapamide, methyldopa
- **Antilipemic agents:** All types
- **Antineoplastic agents:** Asparaginase, pegaspargase, cytarabine, tamoxifen, mycophenolate, vinorelbine, anagrelide, interleukin2 (IL-2) analogues, interferons
- **Antipsychotics:**
  - Risperidone
- **Antiretrovirals:** All types
- **Diuretics:** Thiazides, furosemide, ethacrynic acid, metolazone
- **Ergotamines**
- **Estrogens:** All types
- **Etanercept** (anti-TNF)
- **Ethanol**
- **Gastrointestinal agents:** Cholestyramine, cimetidine, octreotide, ranitidine, proton pump inhibitors
- **Glucocorticoids:** All types
- **Hydroxyurea**
- **Nonsteroidal anti-inflammatory agents:** All types
  - Retinoic acid derivatives
- **Salicylates**
  - Somatropin (growth hormone)
Signs and Symptoms

- Midepigastric or LUQ pain
- Constant, boring pain
- Radiates to back, flanks, chest, or lower abdomen
- Worse in supine position
- Relieved by sitting, knees flexed
- Nausea and vomiting
- Abdominal bloating

- Low-grade fevers
- Tachycardia
- Hypotension
- Cullen sign
- Grey Turner sign
- Hypovolemic shock
- Multisystem organ failure
Complications of Acute Pancreatitis

- **Pulmonary**
  - L Pleural effusions
  - Atelectasis
  - Hypoxemia
  - ARDS (>50% mortality)

- **Metabolic**
  - Hypocalcemia
  - Hyperglycemia
  - Hyperlipidemia
  - Coagulopathy
  - DIC

- **Cardiovascular**
  - Myocardial depression
  - Hemorrhage
  - Hypovolemia

- **Other**
  - Hemorrhage
  - Colonic perforation
  - Renal failure
  - Erythema-nodosum
  - Arthritis
  - Pseudocyst
  - Abscess
## Laboratory tests and diagnostic value

<table>
<thead>
<tr>
<th>Test Characteristic</th>
<th>Amylase</th>
<th>Lipase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity</td>
<td>80–90%</td>
<td>90%</td>
</tr>
<tr>
<td>Specificity</td>
<td>75%</td>
<td>90%</td>
</tr>
<tr>
<td>Suggested best cutoff</td>
<td>3x upper limit of normal</td>
<td>2x upper limit of normal</td>
</tr>
<tr>
<td>Prognostic value</td>
<td>Poor</td>
<td>Poor</td>
</tr>
<tr>
<td>Rate of rise</td>
<td>Rapid</td>
<td>Rapid</td>
</tr>
<tr>
<td>Return to baseline</td>
<td>3–4 days</td>
<td>7–14 days</td>
</tr>
</tbody>
</table>
Diagnosis

- ALT: 3 X upper limit of normal
  - Positive predictive value 95% for gallstone etiology

- Film
  - Rules out other disease

- Ultrasound
  - Important in ruling out gallstones as etiology
  - May visualize pancreatic edema or pseudocysts

- CT scan
  - Insensitive in early or mild disease
  - Phlegmons, abscesses, or pseudocysts
Prognostic Markers?

- Ranson’s Criteria
- APACHE II
- Level of amylase or lipase
Ranson’s Criteria

**At admission:**
- Age > 55 years
- WBC > 16000
- Glucose > 200
- serum AST > 250
- serum LDH > 350

**After 48 hours:**
- Calcium < 8.0
- HCT drop > 10%
- Oxygen PO2 < 60
- BUN increased by 5
- Base deficit > 4
- Fluid Sequestration > 6 L
Treatment Mild to Moderate Pancreatitis

- 90%
- "rest the pancreas"
- IV fluid resuscitation
- Clear liquids
- UOP = 100 ml/hr
- IV narcotics and antiemetics
- Biliary etiology: elective vs urgent surgery
WANNA PAY EXTRA FOR THE PAINKILLER OR GET THE FREE ONE?
Treatment of Severe Pancreatitis

- 10-20% develop necrosis or systemic complications
- Supportive care
- NPO
- IV antibiotics
  - Polymicrobial
  - Imipenem (or FQ) + metronidazole
- Vasopressors
- Consider surgical intervention
Disposition

- Level of disease, PO tolerance, follow up
- Home
- Medical floor
- ICU
- Consider Surgical consult
Chronic Pancreatitis

- Prevalence from 0.04 to 5 %
- Irreversible damage to pancreatic structure and function
  - Interstitial inflammation with duct obstruction and dilatation leads to parenchymal loss and fibrosis
  - Results in impairment of both exocrine and endocrine pancreatic functions
  - Endocrine impairment occurs much later
Etiology of Chronic Pancreatitis

- Alcohol abuse
- Idiopathic
- Malnutrition
- Hyperparathyroidism
- Pancreas divisum
- Ampullary stenosis
- Cystic fibrosis
- Hereditary
- Trauma
Signs and Symptoms

- Similar to acute pancreatitis
- Progresses from discrete attacks to no pain free periods
- Appear chronically ill
  - Weight loss
  - Steatorrhea
  - Clubbing
  - Polyuria
  - May have stigmata of liver disease
Diagnosis

- Amylase and Lipase may be elevated or normal
- US or CT
  - Consider when pain increasing and intractable
  - Check for complications (abscess, pseudocyst)
  - Rule out pancreatic cancer
Short and Long Term Treatment

- Supportive care
- Treat complications
  - Relieve mechanical obstruction
  - Correct malabsorption
  - Alteration of the disease course
- Pancreatic extracts
- Alcohol abstinence
- Celiac plexus nerve block
Disposition

- Home
  - Ruled out complications
  - Close follow-up
  - Pain under control

- Admission
  - Complications
  - Pain relief
Pancreatic Cancer

- Incidence has increased over the last decades
- 10\textsuperscript{th} most common cancer in the US
- Poor overall 5-year survival rate of 5%
- Why prognosis so poor
  - lack of early symptoms
  - early and frequent vessel wall involvement
  - high incidence of liver metastases
  - only 7\% are localized to the organ without spreading or distant mets
  - pain, jaundice, weight loss, and obstruction are late symptoms
Pancreatic Cancer

- Cancer screening in general population:
  - Low incidence
  - Lack of accurate, inexpensive, and noninvasive diagnostic tests for early disease

- Screening in high-risk populations:
  - Strong family history pancreatic cancer
  - Pancreatitis
  - Hereditary cancer syndromes
Summary

1. Stop Drinking
2. Learn how to do gallbladder ultrasounds.
3. If you’re feeling fine, you may have cancer!
References