Jaundice

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Mrs. J.S.

- Your patient in the ER is a 55 year-old female with a short history of upper abdominal discomfort and chills. Her family noticed she was jaundiced.
What other points of the history do you want to know?
History

- Focused HPI and relevant symptoms
- Medications particularly those associated with liver damage e.g. fluconazole, acetaminophen
- Alcohol use
- I.V. drug use
- History of biliary surgery and/or malignancy
- Previous transfusions / pregnancies
- Occupational exposure e.g. to solvents
History, Patient J.S.

Consider the following:

- Characterization of symptoms
- Temporal sequence
- Alleviating / Exacerbating factors:
- Associated signs/symptoms
- Pertinent PMH
- ROS
- MEDS
- Relevant Family Hx.
History

Characterization of Symptoms

Abdominal Discomfort
- Epigastric and right upper quadrant
- Radiating to back / shoulder
- Dull ache and increasing in severity
- Quantified as a 5/10

Chills
- Shivering and unable to get warm

Jaundice
- Associated with pruritus, dark urine and pale stools
History
Temporal sequence

- Pain
  - Started 3-4 days prior to ER presentation
  - Came on gradually and increased in severity
  - Previous episodes but of lesser severity
  - Some fatty food intolerance

- Chills
  - Noticed 24 hours after onset of pain

- Jaundice
  - Noticed by family on day of visit
History

- **Alleviating / Exacerbating factors:**
  - None noted

- **PMH**
  - MVA in 1985 received a blood transfusion
  - Two children uneventful pregnancies
  - Appendectomy 1970

- **ROS**
  - Non contributory

- **MEDS**
  - Antacids (OTC) for “indigestion” which has been increasing in frequency
History

- **Relevant Family Hx.**
  - Non relevant
  - Specifically no other family members have been jaundiced or ill

- **Social History**
  - Alcohol 6-8 beers per weekend
  - Smokes 1 pk/day for 25 years
  - Home maker
  - No recent shellfish ingestion
History

- **Associated signs/symptoms:**
  - Pale stools
  - Pruritus
  - Nausea
  - Anorexia
  - Weight loss nil
  - Chills
What is your Differential Diagnosis?
Differential Diagnosis
Based on History and Presentation

- **Cholestatic (obstructive) Jaundice**
  - Cholangitis
  - Cholecystitis
  - Cholelithiasis / choledocholithiasis
  - Benign or malignant biliary stricture
  - Pancreatic or biliary tumor

- **Cholestatic liver disease**
  - Primary Biliary Cirrhosis
  - Primary Sclerosing Cholangitis

- **Hepatocellular jaundice**
  - Hepatitis B / C
  - Alcoholic cirrhosis
  - Metastatic liver disease
Physical Examination

What would you look for?
Physical Examination
What would you look for?

- Vital signs
- General examination should take note of the presence or absence of jaundice, excoriation, palmar erythema, spider nevæae, or tremor
- Focused physical examination should include examination of the abdomen for tenderness, masses, hepatosplenomegaly or ascites.
Physical Examination, Patient J.S.

<table>
<thead>
<tr>
<th>Category</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEENT</td>
<td>NC</td>
</tr>
<tr>
<td>Chest</td>
<td>NC</td>
</tr>
<tr>
<td>CV</td>
<td>NC</td>
</tr>
<tr>
<td>Genital-rectal</td>
<td>NC</td>
</tr>
<tr>
<td>Neuromuscular</td>
<td>NC</td>
</tr>
<tr>
<td>Breast</td>
<td>NC</td>
</tr>
</tbody>
</table>

Remaining Examination findings non-contributory (NC)
Physical Examination. J.S.

- **Vital Signs:**
  - Temp 38.9
  - HR 100/min
  - BP 110/80

- **Appearance:**
  - In mild distress
  - Overweight
  - Jaundiced
  - Excoriation of skin
Relevant exam findings for a problem focused assessment

- **Abdomen**
  - Epigastric tenderness
  - Mild distension
  - Decreased bowel sounds
  - No ascites or rebound
  - No masses
- **Rectal exam**
  - shows gray stool (Guaiac negative)
Would you like to revise your Differential Diagnosis?
Would you like to revise your Differential Diagnosis?

- Primary liver disease is unlikely to cause jaundice in the absence of any stigmata of chronic liver disease.
  - Cholangitis
  - Cholecystitis
  - Cholelithiasis / choledocholithiasis
  - Benign or malignant biliary stricture
  - Pancreatic or biliary tumor
Laboratory

What studies would you obtain?
Laboratory

- CBC
- Comprehensive metabolic panel (includes electrolytes and LFTs)
- INR
- Blood cultures
## Lab Results, Patient J.S.

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Normal Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>HCT</td>
<td>37%</td>
<td>(35 – 47)</td>
</tr>
<tr>
<td>WBC</td>
<td>16,000 K/µl</td>
<td>(4-11)</td>
</tr>
<tr>
<td>Sodium</td>
<td>142 MMol/L</td>
<td>(135-145)</td>
</tr>
<tr>
<td>Potassium</td>
<td>3.7 MMol/L</td>
<td>(3.5-5.0)</td>
</tr>
<tr>
<td>Chloride</td>
<td>101 MMol/L</td>
<td>(98-107)</td>
</tr>
<tr>
<td>CO2</td>
<td>28 MMol/L</td>
<td>(19-27)</td>
</tr>
<tr>
<td>INR</td>
<td>1.6</td>
<td>(0.0-1.2)</td>
</tr>
<tr>
<td>Test</td>
<td>Value</td>
<td>Reference Range</td>
</tr>
<tr>
<td>-----------------</td>
<td>---------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>T.Bilirubin</td>
<td>14 mg/dl</td>
<td>(0.02-1.2 mg/dl)</td>
</tr>
<tr>
<td>Conjugated bili</td>
<td>10.5 mg/dl</td>
<td></td>
</tr>
<tr>
<td>Alk phos</td>
<td>800 U/L</td>
<td>(34 – 104 U/L)</td>
</tr>
<tr>
<td>AST</td>
<td>177 U/L</td>
<td>(13 – 39 U/L)</td>
</tr>
<tr>
<td>ALT</td>
<td>195 U/L</td>
<td>(9 – 52 U/L)</td>
</tr>
<tr>
<td>Amylase</td>
<td>208 IU/L</td>
<td>(50 – 200 IU/L)</td>
</tr>
<tr>
<td>Lipase</td>
<td>1.5 IU/L</td>
<td>(0 – 1.5 IU/L)</td>
</tr>
<tr>
<td>BUN</td>
<td>18 mg/dl</td>
<td>(7 – 25 mg/dl)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>1.1 mg/dl</td>
<td>(.7 – 1.3 mg/dl)</td>
</tr>
</tbody>
</table>
Explain the significance of abnormalities in:

- LFT’s
- WBC
- Amylase
- INR
Lab Results Discussion

- **LFTS**

  The elevation in conjugated bilirubin / total bilirubin / alkaline phosphatase is greater than the relative increase in ALT / AST in conditions that cause cholestasis / extra hepatic biliary obstruction. The converse is true in hepatocellular injury.
Lab Results

- **WBC**
  An elevated WBC with left shift is consistent with infection or inflammation

- **Amylase / Lipase**
  Many acute abdominal conditions produce a chemical hyperamylasemia. Elevated amylase in setting of normal lipase is unlikely to be acute pancreatitis

- **INR**
  The PT (INR) may be prolonged in patients with obstructive jaundice due to malabsorbtion of Vitamin K
Interventions at this point?
Interventions at this point?

- NPO
- I.V. fluids
- I.V. broad spectrum antibiotics
- Nasogastric tube if vomiting or distended
- Analgesia
What further studies would you want at this time?
# Studies, Patient J.S.

<table>
<thead>
<tr>
<th>Obstruction Series/Acute Abdominal Series etc.</th>
<th>CT Scan: Abd/Pelvis CT Scan: Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flat/Upright Abdomen</td>
<td>MRI</td>
</tr>
<tr>
<td>PA/Lat Chest</td>
<td>PET SCAN</td>
</tr>
<tr>
<td>Mammogram/US</td>
<td>Extremity Film</td>
</tr>
<tr>
<td><strong>RUQ US</strong></td>
<td>Bone Scan</td>
</tr>
<tr>
<td>Angiogram</td>
<td>US Pelvis</td>
</tr>
<tr>
<td>HIDA Scan</td>
<td>MRCP</td>
</tr>
<tr>
<td>OTHER:</td>
<td></td>
</tr>
</tbody>
</table>
Studies – Results

- Discussion of imaging study

Ultrasound is the initial study of choice in most patients with suspected biliary disease. For gallstones the sensitivity and specificity are 95%. U/S can detect stones as small as 3mm in diameter and is highly sensitive for detecting intra and extra hepatic biliary dilatation but not CBD stones.
Would a flat / upright abdominal film be of any assistance at this point?
A plain abdominal x-ray may be a useful screening tool to exclude other acute abdominal conditions.

However it will not be helpful in diagnosing gallstones since 80% of gallstones are not radiopaque.
Ultrasound of Gallbladder

Gallbladder with stones
Radiology

The ultrasound demonstrates:

- Multiple stones in gallbladder
- Gallbladder is thickened but not distended
- Intra hepatic and extra hepatic biliary dilatation
- The pancreas is not visualized

Would you like to revise your Differential Diagnosis?
Revised Differential Diagnosis

- Cholangitis
- Cholelithiasis / Choledocholithiasis
- Benign or malignant biliary stricture (distal CBD)
- Pancreatic tumor
Blood Culture Findings

- Preliminary gram stain shows gram positive cocci later demonstrated to be enterococcus sensitive to cefazolin and piperacillin / tazobactam (Zosyn).
What next?

1. Additional Imaging?
2. Endoscopy?
3. OR?
4. Other?
What next?

ERCP vs. PTC
ERCP Dilated CBD
Advantages of ERCP vs. PTC

- The ultrasound has shown dilatation of both intra and extra hepatic bile ducts suggesting a lesion in the distal CBD. Therefore an ERCP would be the procedure of choice.

- If the biliary dilatation was predominantly intra hepatic a PTC would be the procedure of choice as it will better define proximal biliary anatomy.
ERCP Patient J.S
ERCP Findings

- **ERCP** (Endoscopic Retrograde Cholangiopancreatography) demonstrates a stone in the common bile at the ampulla. A sphincterotomy is performed and the stone is extracted.

- **What potential complications may occur after ERCP?**
ERCP

- Complication rate is 10%
  - Bleeding
  - Duodenal perforation
  - Pancreatitis

- Success rate is 90%
Final Diagnosis

- 1. Cholangitis secondary to
- 2. Choledocholithiasis
What are?

- Charcot’s triad
- Reynalds’s pentad
- Triangle of Calot
ANSWERS

- Charcot’s triad
  - Right upper quadrant pain
  - Jaundice
  - Fever / chills

- Reynolds’s pentad
  In addition to the above triad the patient may have pus in the biliary tree “acute suppurative cholangitis” with
  - Hypotension
  - Mental confusion
**Answers**

- **Triangle of Calot**
- This is the three sided area bordered by the inferior margin of the liver, cystic duct and common hepatic duct. The cystic artery and right hepatic artery traverse this triangle.
Further Management

24 hours after the ERCP the patient has improved LFTs and is now afebrile with a WBC of 12,000.

What next?
Further Management

- Continue IV fluids
- Continue IV antibiotics
- Correct INR

What surgical procedure is indicated at this point?
Laparoscopic Cholecystectomy (vs. open cholecystectomy) is now the procedure of choice.
Why is rehydration with intravenous fluid of particular importance in the jaundiced patient?
Answer

- To minimize the possibility of developing hepato-renal failure
Consent for Cholecystectomy

- What are the critical elements of informed consent?
The following criteria are essential for consent to be considered informed:

- Capacity to make a decision
- Absence of Coercion
- Inform patient re potential Complications and alternatives
- Content of message (i.e. imparting knowledge or informing the patient)
When Discussing Potential Complications of Surgery Consider:

- **Anesthetic (medical) complications**
  - Drug related
  - Pneumonia
  - M.I.
  - D.V.T.

- **Complications of any operation**
  - General e.g. bleeding
  - Incision related e.g. dehiscence / infection

- **Complications of this specific operation**
Potential Complications Following Laparoscopic Cholecystectomy

- Conversion to an open operation (5%)
- Trocar injury to major vessels or to the intestine
- Biliary injury (3-10%)
Frequently asked questions by patients undergoing lap chole.

- **Will I have a tube in my nose when I wake up?**
  - Usually a nasogastric tube is not indicated post operatively

- **When can I drive?**
  - Generally two weeks after surgery if the patient no longer requires narcotics for pain.

- **When can I go back to work?**
  - One – two weeks for a sedentary job, two to four weeks for physical labor
QUESTIONS?

Should patients with asymptomatic gallstones have an elective cholecystectomy?

- Approximately two thirds of patients will remain symptom free after 20 years therefore the answer is “No” unless the patient has a calcified gallbladder (increased risk of malignancy) or is a diabetic (controversial), with an increased risk of infection.
In a jaundiced patient with an enlarged palpable gallbladder the most likely diagnosis is:

- Choledocholithiasis
- Carcinoma of the head of the pancreas

Explain your answer
Courvoisier’s Law

- “In the presence of jaundice a palpable gallbladder is unlikely to be due to stone”

If the obstruction was due to stone, the thick walled gallbladder would probably not distend.
Describe some common variations in biliary anatomy
Explain why patients with cholestatic jaundice have dark urine and pale stools
- **Cholestasis** predominantly increases direct (conjugated) bilirubin but also indirect (unconjugated) bilirubin

- **Dark urine**

- Since direct bilirubin is water soluble bilirubinuria develops

- **Pale stools**

  Biliary obstruction prevents passage of bile into the intestinal tract for deconjugation to urobilinogen, the compound responsible for the dark color of stool
QUESTIONS?
Acknowledgment

The preceding educational materials were made available through the ASSOCIATION FOR SURGICAL EDUCATION

In order to improve our educational materials we welcome your comments/suggestions at:
feedbackPPTM@surgicaleducation.com