Surgical Treatment of Hepatobiliary and Splenic Disorders
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OBJECTIVES
• Anatomical considerations
• Indications
• Contraindications
• Operative treatment options
• Imaging studies
• Advanced techniques
• Survival, Recurrence, Surveillance

Question 1 ~ Anatomy
Which of the following are not ligaments of the liver?
A) Arantius’ Ligament
B) Ligamentum Venosum
C) Hepatogastric
D) Coronary
E) LienoRenal

Answer 1 ~ Anatomy
• Which of the following are not ligaments of the liver?
  A) Arantius’ Ligament
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  D) Coronary
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Question 2
A 40-year old female presents with dull left upper quadrant pain and presents with the following imaging after attempted aspiration. Which of the following is the best treatment?

A) Reaspiration and catheter drainage  
B) Observation  
C) Enucleation/excision  
D) Left trisectionectomy  
E) Marsupialization

Post-resection Imaging

BENIGN LESIONS
- CYSTIC LESIONS
  - SIMPLE CYSTS
  - POLYCYSTIC LIVER
  - BILIARY CYSTADENOMA

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Question 3
A 32-year old female complains of progressive left upper abdominal pain and early satiety with solid meals. She presents with the following imaging. Which of the following is the best treatment?

A) Cessation of birth control pills  
B) Radiofrequency ablation  
C) Left partial liver resection  
D) Observation  
E) Referral for liver transplantation evaluation
BENIGN LESIONS

- SOLID LESIONS
  - HEMANGIOMA
  - HEPATIC ADENOMA
  - FOCAL NODULAR HYPERPLASIA
  - BILIARY HAMARTOMA
  - Von Meyenberg complex

Focal Nodular Hyperplasia

HEPATIC ADENOMA

Giant Hemangioma
Question 3~ Answer
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Question 4
Which of the following are indications for resection?
A) 3-cm asymptomatic hemangioma left liver
B) 10-cm simple symptomatic cyst- left liver
C) Bilobar metachronous breast cancer mets
D) 5-cm left liver colorectal met into antrum
E) Left CholangioCa with right PV thrombus

MALIGNANT LESIONS
• METASTATIC LESIONS
  – COLORECTAL CANCER
  – NEUROENDOCRINE
  – GIST
  – BREAST / OVARIAN
• PRIMARY LIVER CANCERS
  – HEPATOCELLULAR CANCER
  – CHOLANGIOCELLULAR
  – CYSTADENOCARCINOMA

COLORECTAL METASTASES
METASTASECTOMY

Hepatocellular Carcinoma
• Milan Criteria
  – <5-cm, 3<3-cm
• MELD Score
• Child Pugh
MELD Score

- The Model for End-Stage Liver Disease
  - Scoring system for assessing the severity of chronic liver disease.
  - MELD was developed to predict death within three months of surgery in patients who had undergone a transjugular intrahepatic portosystemic shunt (TIPS) procedure.
- Predict:
  - Short-term survival in patients on wait list for liver transplantation
  - Risk of postoperative mortality

MELD

- United Network for Organ Sharing (UNOS) use MELD score to prioritize organ allocation.
- MELD = 3.78[Ln serum bilirubin (mg/dL)] + 11.2[Ln INR] + 9.57[Ln serum creatinine (mg/dL)] + 6.43
  - If the patient has been dialyzed twice within the last 7 days, then serum creatinine should be assigned a value of 4.0.
  - Any value less than one should be converted to 1.0.
- Patients with MELD scores 17 or greater are considered candidates for liver transplantation.

<table>
<thead>
<tr>
<th>MELD Score</th>
<th>3 Month Mortality</th>
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<tbody>
<tr>
<td>40 or more</td>
<td>71.3% mortality</td>
</tr>
<tr>
<td>30–39</td>
<td>52.6% mortality</td>
</tr>
<tr>
<td>20–29</td>
<td>19.6% mortality</td>
</tr>
<tr>
<td>10–19</td>
<td>6.0% mortality</td>
</tr>
<tr>
<td>&lt;9</td>
<td>1.9% mortality</td>
</tr>
</tbody>
</table>

Child-Pugh-Turcotte Score

<table>
<thead>
<tr>
<th>Measure</th>
<th>1 point</th>
<th>2 points</th>
<th>3 points</th>
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</thead>
<tbody>
<tr>
<td>Total bilirubin, μmol/L (mg/dL)</td>
<td>&lt;34 (&lt;2)</td>
<td>34–50 (2–3)</td>
<td>&gt;50 (&gt;3)</td>
</tr>
<tr>
<td>Serum albumin, g/dL</td>
<td>&gt;3.5</td>
<td>2.8–3.5</td>
<td>&lt;2.8</td>
</tr>
<tr>
<td>Prothrombin time, prolongation (s) OR INR</td>
<td>&lt;4.0 &lt;1.7</td>
<td>4.0–6.0 1.7–2.3</td>
<td>&gt; 6.0 &gt;2.3</td>
</tr>
<tr>
<td>Ascites</td>
<td>None</td>
<td>Mild (or suppressed with medication)</td>
<td>Moderate to severe (or refractory)</td>
</tr>
<tr>
<td>Hepatic encephalopathy</td>
<td>None</td>
<td>Grade I–II</td>
<td>Grade: III–IV</td>
</tr>
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</table>

CPT Score

<table>
<thead>
<tr>
<th>Points</th>
<th>Class</th>
<th>One year survival</th>
<th>Two year survival</th>
</tr>
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<tbody>
<tr>
<td>5–6</td>
<td>A</td>
<td>100%</td>
<td>85%</td>
</tr>
<tr>
<td>7–9</td>
<td>B</td>
<td>81%</td>
<td>57%</td>
</tr>
<tr>
<td>10–15</td>
<td>C</td>
<td>45%</td>
<td>35%</td>
</tr>
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SEGMENTAL RESECTION
**COLORECTAL METASTASES**

**ACTUARIAL SURVIVAL**

n=161 survival 48% at 7 years (Lodge-Leeds)

**CYSTIC MALIGNANT NEOPLASMS**

**CYSTADENOCARCINOMA**

**HEPATIC RESECTION**

**IMPROVING RESULTS**

- Adjuvant therapies
- Careful follow up
  - Tumor markers
  - Complex radiology
- Further surgery
  - Redo hepatic surgery
  - Recurrent colorectal cancer excision
  - Lung surgery
- Further chemotherapy / radiotherapy
Question 4 ~ Answer

Which of the following are indications for resection?

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Bile Duct Exploration-Steps

• Cholangiogram via cystic duct (repeated)
• Kocher maneuver and palpation
• Flush with Saline
• Open Duct longitudinally just above duodenum
• Flush again, cholangiogram +/- endoscopy
• T tube to dependent drainage
• May need bypass- Avoid side to side
• Duodenotomy, sphincterotomy
• Cholangiogram timing post op and management

Question 5

An otherwise healthy 65-year old man presents with progressive jaundice and itching. The Total Bili is 30 and Ultrasound of the liver shows intrahepatic biliary ductal dilation and cholelithiasis. Which of the following is the next step?

A) Stop lipitor and rescan in 1 month
B) Laparoscopic cholecystectomy
C) Staging CT imaging
D) Laparotomy and cholecystectomy/cholangiogram
E) ERCP
CHOLANGIOCARCINOMA

Evaluation and Management

- Diagnostic Studies
  - Imaging
    - Spiral CT +/- Angiography
    - MRI/MRCP
    - Eovist
    - ERCP/PTC
      - Stent
      - Brushings
    - Laparoscopy
    - PET

STRICTURE

- Benign or Malignant
  - Ask IBD/UC
  - PSC
  - Cholangiocarcinoma
- CT scan
  - MRI/MRCP
- ERCP/PTC/Brushings
  - Grade
  - Level
- CA 19-9
- Stent

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Question 6
A 50-year old female is found to have an asymptomatic 2-cm hypoechoic polypoid mass in the gallbladder on an ultrasound. She has normal liver function tests. What is the best treatment?
A) Observation
B) Surgery
C) Percutaneous biopsy
D) Ursodeoxycholic Acid (URSO)
E) ERCP and biopsy

GALLBLADDER CANCER

RISK FACTORS
- Gallstones
- Porcelain gallbladder
- Female gender
- Obesity
- Older age
- Ethnicity
- Choledochal cysts
- Abnormalities of the bile ducts
- Gallbladder polyps
- Industrial and environmental chemicals
- Typhoid

DIAGNOSIS-TREATMENT
- Timing
  - Preoperative
  - Intraoperative
  - Postoperative
- Extent of Resection
  - T1a- Cholecystectomy
  - Radical Cholecystectomy +/- CBD resection

Survival Statistics by Stage

<table>
<thead>
<tr>
<th>Stage</th>
<th>5-Year Survival Rate</th>
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<tbody>
<tr>
<td>0</td>
<td>81%</td>
</tr>
<tr>
<td>IA</td>
<td>50%</td>
</tr>
<tr>
<td>IB</td>
<td>29%</td>
</tr>
<tr>
<td>IIA</td>
<td>7%</td>
</tr>
<tr>
<td>IIB</td>
<td>9%</td>
</tr>
<tr>
<td>III</td>
<td>3%</td>
</tr>
<tr>
<td>IV</td>
<td>2%</td>
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D) Ursodeoxycholic Acid (URSO)
E) ERCP and biopsy
Spleen-Resection

- Failure to respond to conservative Tx
  - Advanced splenic trauma
  - En bloc for Cancers of stomach, pancreas, and colon
  - Blood dyscrasias
    - ITP, Thal Major, HS, Primary lymphoma
    - Beware of the patient sent for low platelets sent for splenectomy who has liver disease

- Vaccinate-Pneumovax
- Expect transient leukocytosis/thrombocytosis