Board Simulation in Hepatology

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Outline

Viral hepatitis
Fatty liver
Portal hypertension
Evaluation of abnormal liver function tests
Acute liver failure
Liver disease in pregnancy
Miscellaneous – Primary biliary cirrhosis, primary sclerosing cholangitis, autoimmune hepatitis, Budd-chiari, hemochromatosis, Wilson disease
36 year-old health care worker is diagnosed with chronic hepatitis C.

Physical examination normal

INR, serum albumin, platelet count normal. Transaminases mildly elevated.

Liver biopsy shows chronic hepatitis.
Question 1

What treatment would you recommend?

A. Lamivudine
B. No therapy- close follow-up
C. Peginterferon and ribavirin
D. Peginterferon monotherapy
E. Telbivudine
C. Peginterferon and ribavirin

- Combination of peginterferon and ribavirin superior to interferon alone
  - higher initial response
  - fewer relapses
  - More convenient dosing

- FDA approved first protease inhibitor 5/11

- Oral nucleos(t)ide analogues (i.e. Lamivudine and Telbivudine) are indicated for hepatitis B and have no role in HCV infection
A 42-year-old woman presents for management of chronic hepatitis C virus (HCV) after being refused as a blood donor.

Her risk factor for HCV is a brief period of IVDU while in her teens.

She has no symptoms; the results of her physical examination are unremarkable.
Question 2

Serum ALT level was normal on two occasions.

HCV genotype 1a.

HCV RNA level of 430,000 IU/ml.
Question 2

Which of the following is most helpful in estimating her prognosis?

A. ALT level
B. Duration of HCV infection
C. HCV genotype
D. HCV viral load
E. Results of a liver biopsy
Answer 2

E. Liver biopsy

- ALT, HCV genotype and HCV RNA viral load are not associated with liver disease progression and therefore are not useful prognostic markers (although are important markers in estimating treatment outcome). Estimation of duration of infection is often inaccurate.
Question 3

A 31-year old pregnant woman with chronic HCV asks about the risk of transmitting HCV to her newborn. The most accurate estimate is:

A. 5%
B. 20%
C. 50%
D. 80%
E. 95%
While perinatal transmission of HBV is very efficient, transmission of HCV from an infected mother to her newborn is rare (except in HIV/HCV coinfected mothers).

- No advantage of C-section over vaginal delivery
- Breast feeding is safe
A 23-year-old man presents with jaundice, fatigue and pruritus.

Labs: TB 6.2, DB 4.5, Alb 3.4, AST 300, ALT 450, AP 200, INR 1.2
HBsag-, HBcIgM+, HCV Ab+, HCV RNA+
Question 4

The most appropriate therapy is:

A. Hepatitis B immunoglobulin (H BIG)
B. Hepatitis B immunoglobulin + Hepatitis B vaccination at separate anatomic locations
C. Oral nucleos(t)ide analogue
D. Pegylated interferon and ribavirin
E. Referral for liver transplant
F. Supportive care
Answer 4

F. Supportive care

- This patient has hepatitis C (acute or chronic) and acute hepatitis B in the window period of seroconversion.

- Therapy of acute hepatitis B is supportive care, as most patients (90-95%) clear the infection.

- Therapy of chronic hepatitis C is pegylated interferon and ribavirin, but should be deferred until acute symptoms have resolved.

- He is not in liver failure.
Acute hepatitis B with resolution

- HBeag
- HBV-DNA
- HBsag

Graph showing the progression of ALT, HBc-IgM, HBeAb, and HBsAb over 6 months.
Question 5

Which of the following people should *not* routinely be offered hepatitis B vaccination?

A. Persons with chronic liver disease
B. Persons treated for sexually transmitted diseases
C. Men who have sex with men
D. Persons with history of Guillain-Barre
E. All may be offered vaccine
Answer 5
E. All may be offered vaccine

- **Indications**
  - Persons at risk by sexual exposure
  - Persons at risk by percutaneous or mucosal exposure
  - Chronic liver disease
  - HIV
  - International travelers (some)

- **Contraindications**
  - Hypersensitivity to yeast or vaccine
  - Serious adverse reaction to hepatitis B vaccine
  - NOT: autoimmune disease, pregnancy
Question 6

Each of the following statements about Gilbert’s syndrome is true EXCEPT:

A. It is present in 5%-7% of white adults in the US
B. Characterized by increased serum conjugated bilirubin
C. Bilirubin concentration may rise 2-3 fold following fasting
D. It is a benign syndrome that requires no further workup
B. Characterized by increased serum conjugated bilirubin

- Gilbert’s is a hereditary unconjugated hyperbilirubinemia (< 5 mg/dL)
- Diagnosis established by exclusion of other underlying pathology and repeated demonstration of normal liver enzymes
A 68-year-old man was brought to the ER. He was found unconscious and had suffered a non-hemorrhagic stroke.

On exam, he is intubated, anicteric, has no stigmata of chronic liver disease, and no abnormalities on abdominal examination.

His laboratory results are as follows:
## Question 7

<table>
<thead>
<tr>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bilirubin:</strong></td>
<td></td>
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<tr>
<td>Total</td>
<td>1.4 mg/dL</td>
</tr>
<tr>
<td>Direct</td>
<td>0.3 mg/dL</td>
</tr>
<tr>
<td><strong>Alkaline phosphatase:</strong></td>
<td></td>
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<tr>
<td></td>
<td>84 U/L</td>
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<tr>
<td><strong>AST</strong></td>
<td>1570 U/L</td>
</tr>
<tr>
<td><strong>ALT</strong></td>
<td>128 U/L</td>
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</tbody>
</table>
Question 7

Which is the most likely diagnosis?

A. Acetaminophen overdose
B. Acute alcoholic hepatitis
C. Ischemic hepatitis
D. Mesenteric vasculitis
E. Rhabdomyolysis
Answer 7

E. Rhabdomyolysis

- While ALT is a relatively liver-specific, AST is in skeletal and cardiac muscles among other organs in addition to the liver.
- An isolated or disproportionate elevation of AST compared to ALT should prompt a search for an extrahepatic source.
43 year-old man has chronic compensated cirrhosis.
Undergoes screening endoscopy for sequelae of portal hypertension- has large esophageal varices.
Of the options listed, what would be the most appropriate intervention?

A. Surveillance endoscopy in one year
B. Octreotide 0.1 mg sq bid
C. Transjugular intrahepatic portosystemic shunt (TIPS)
D. Splenorenal shunt
E. Beta blocker therapy
E. Beta blocker therapy

- Patient exhibits risk factor for variceal hemorrhage (size)
- Mortality from first variceal bleed: 20% at 6 weeks
- Beta blockade prevents bleeding in more than half of patients with high risk esophageal varices
Question 9

Every condition listed below is associated with a low serum-ascites albumin gradient (SAAG) EXCEPT:

A. Peritoneal carcinomatosis
B. Tuberculous peritonitis
C. Nephrotic syndrome
D. Budd-Chiari syndrome
E. Pancreatic ascites
D. Budd Chiari syndrome

- Serum-ascites albumin gradient:
  - Serum albumin – Ascites albumin
- Distinguishes portal HTN (high gradient) from non-portal HTN (low gradient) causes of ascites- 97% accurate
- Replaces old transudate/exudate concept
### Answer 9

<table>
<thead>
<tr>
<th>High Gradient (≥1.1 g/dl)</th>
<th>Low Gradient (&lt; 1.1 g/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cirrhosis</strong></td>
<td><strong>Peritoneal carcinomatosis</strong></td>
</tr>
<tr>
<td><strong>Portal vein thrombosis</strong></td>
<td><strong>Tuberculous peritonitis</strong></td>
</tr>
<tr>
<td><strong>Cardiac ascites</strong></td>
<td><strong>Pancreatic ascites</strong></td>
</tr>
<tr>
<td><strong>Massive liver metastases</strong></td>
<td><strong>Nephrotic syndrome</strong></td>
</tr>
<tr>
<td><strong>Budd Chiari syndrome</strong></td>
<td><strong>Lupus associated ascites</strong></td>
</tr>
<tr>
<td><strong>Veno-occlusive disease</strong></td>
<td></td>
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</tbody>
</table>
A 57-year-old man with a long history of tobacco and IVDU is evaluated for new-onset ascites.

PE:
- temporal atrophy and muscle wasting.
- needle track marks on his arms
- moderate ascites and ankle edema
Question 10

Ascites fluid analysis shows a leukocyte count of 1000/mL (35% polymorphonuclear leukocytes, 65% lymphocytes).

Serum ascites albumin gradient (SAAG) of 1.2 g/dL.

Gram-stained slide shows no bacteria, and culture results are pending.
Question 10

What is the most likely diagnosis?

A. Cardiac ascites
B. Nephrotic syndrome
C. Peritoneal carcinomatosis
D. Spontaneous bacterial peritonitis
E. Tuberculous peritonitis
Answer 10

D. Spontaneous Bacterial Peritonitis

- PMNs $\geq 250$
- Occurs only in the setting of severe liver disease
- Most patients have symptoms, but they may be subtle
Question 11

Which of the following patients is an appropriate candidate for referral for liver transplantation?
Question 11

A. 53 man, NASH cirrhosis, stage 3 colon cancer 7 months ago, new 4 cm solitary liver mass, AFP 150
B. 63 man, HBV cirrhosis, ascites, encephalopathy, HBV DNA 4.5 million IU/mL
C. 24 woman, fulminant liver failure after intentional acetaminophen overdose, polysubstance abuse. Toxicology: +EtOH, THC, cocaine metabolites
D. 35 woman, HCV cirrhosis, HIV, CD4 65, 2 HCC (2.9 cm and 1.8 cm)
B. Decompensated HBV cirrhosis with positive HBV DNA

- HBV should be treated with antiviral agent to render HBV DNA undetectable prior to transplant to decrease risk of recurrent disease

- Contraindications to transplant: recent malignancy with possible metastasis, substance abuse, AIDS (CD4 <100 because of portal hypertension)
The most common cause of acute liver failure worldwide is:

A. Acetaminophen
B. Autoimmune hepatitis
C. Budd-Chiari syndrome
D. Hepatitis A virus infection
E. Hepatitis B virus infection
Answer 12

A. Acetaminophen

- In the order of their frequency:
  - Acetaminophen (39%)
  - Indeterminate (18%)
  - Idiosyncratic drug reaction (13%)
  - HBV (9%)
  - Shock (7%)
  - HAV (5%)
Question 13

A 25-year-old intravenous drug user presents to the emergency department with jaundice, fever, hypotension, elevated transaminase levels, and an elevated international normalization ratio (INR).

Determining the level of which of the following factors may help to distinguish sepsis from acute liver failure?
Question 13

A. Factor II
B. Factor V
C. Factor VII
D. Factor VIII
E. Factor IX
D. Factor VIII

- Both sepsis and acute liver failure may be associated with mental status changes, elevated bilirubin and coagulopathy.
- Liver synthesizes factors II, V, VII, IX, X
- In sepsis, factor VIII is typically diminished while it is normal in acute liver failure.
26 woman G1P0 presents at 29 weeks gestation with pruritus

Total Bilirubin 1.5 mg/dL
AST 330 U/L
ALT 450 U/L
INR 1.1
Bile salts 12 mcg/dL (<10)
Question 14

Which of the following is true?

A. Treatment of choice is prompt delivery
B. This condition is the most common cause of jaundice in pregnancy
C. Maternal morbidity and mortality are high
D. This condition may recur in subsequent pregnancies
Answer 14

D. This condition may recur in subsequent pregnancies

- Intrahepatic cholestasis of pregnancy
- Cholestasis-induced pruritus, elevation in bile acids and transaminases which resolve after delivery
- 3rd trimester, genetic predisposition with recurrence in subsequent pregnancies (50%), low maternal morbidity, fetal risk increases with level of bile acids
- Viral hepatitis is the most common cause of jaundice in pregnant women
## Liver disease in pregnancy

<table>
<thead>
<tr>
<th></th>
<th>ICP</th>
<th>HELLP</th>
<th>AFLP</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Onset</strong></td>
<td>Late 2\textsuperscript{nd}-Early 3\textsuperscript{rd}</td>
<td>3\textsuperscript{rd} or post</td>
<td>3\textsuperscript{rd} or post</td>
</tr>
<tr>
<td><strong>Preeclampsia</strong></td>
<td>No</td>
<td>Yes</td>
<td>50%</td>
</tr>
<tr>
<td><strong>Clinical</strong></td>
<td>Itch, high bile acids, low vit K</td>
<td>Hemolysis, low platelet</td>
<td>Liver failure</td>
</tr>
<tr>
<td><strong>AST/ALT</strong></td>
<td>Up to 20-fold</td>
<td>Up to 20-fold</td>
<td>300-500</td>
</tr>
<tr>
<td><strong>Liver image</strong></td>
<td>Normal</td>
<td>Infarct, hematoma, rupture</td>
<td>Fatty</td>
</tr>
<tr>
<td><strong>Mat mortality</strong></td>
<td>0</td>
<td>1-25%</td>
<td>7-18%</td>
</tr>
<tr>
<td><strong>Fetal mortality</strong></td>
<td>1.5%</td>
<td>11%</td>
<td>9-23%</td>
</tr>
<tr>
<td><strong>Recurrence</strong></td>
<td>45-70%</td>
<td>4-19%</td>
<td>Yes-if LCHAD</td>
</tr>
</tbody>
</table>
A 25-year-old woman presented to the ER with a 1-month history of abdominal pain and distention.

On physical exam she is found to have tender hepatomegaly and ascites.

Medications include acetaminophen (occasional), albuterol inhalers, and oral contraceptives.
Question 15

Which is the most likely diagnosis?

A. Acetaminophen-induced liver failure
B. Acute hepatitis B virus infection
C. Alpha-1 antitrypsin deficiency
D. Budd-Chiari syndrome
E. Hemochromatosis
D. Budd-Chiari Syndrome (hepatic venous outflow obstruction)

- Classic triad include:
  - Abdominal pain
  - Hepatomegaly
  - Ascites

- Possible relation to the use of oral contraceptives

- Acute viral hepatitis presents with malaise, RUQ pain, jaundice, nausea

- She is young to have portal hypertension from A1AT or hemochromatosis
Question 16

A patient has a new diagnosis of autoimmune hepatitis confirmed by liver biopsy. The first choice for single-drug therapy for this patient would be:

A. Cyclosporine
B. Mesalamine
C. Prednisone
D. Tacrolimus
E. Ursodiol
Answer 16

C. Prednisone

- Oral prednisone is the treatment-of-choice for patients with new onset AIH
- Imuran is the preferred agent for maintenance therapy (steroid-sparing).
Question 17

A 40-year old man presents to his physician with complaints of polydipsia, polyuria, arthralgias, abdominal pain, and impotence.

His brother, who had diabetes mellitus, died recently of heart failure.

On exam, he has tan-appearing skin with spider angiomas on his chest and abdominal ascites.
Question 17

The most likely cause of this man’s cirrhosis is:

A. Alcohol
B. Autoimmune hepatitis
C. Hemochromatosis
D. Hepatitis C virus infection
E. Nonalcoholic fatty liver disease
Answer 17

C. Hemochromatosis

- Typical age of presentation for men with hemochromatosis is 40-50 years.
- Non-hepatic clinical manifestations may include arthralgias, diabetes, heart failure and loss of libido.
- Phlebotomy is the treatment of choice and may be beneficial in management of diabetes.
A 43-year-old woman known to have advanced primary biliary cirrhosis presents with new onset of weight loss, greasy stools, and easy bruising.

Stool studies show the presence of fecal fat.

The best course of management for this patient would be:
Question 18

A. Colonoscopy with random biopsies
B. Esophagogastroduodenoscopy (EGD) with duodenal biopsy
C. Fat-soluble vitamin replacement
D. Lactase replacement
E. Pancreatic enzyme replacement
C. Fat-soluble vitamin replacement

- Deficiency of fat-soluble vitamins (A, K, D, E) is one of the common clinical features of PBC and should be monitored and replaced.
- It is due to bile salt deficiency
- Bone disease is another major clinical issue associated with PBC
Question 19

The currently recommended medical therapy for primary biliary cirrhosis is:

A. Chlorambucil
B. Cyclosporin
C. Glucocorticoids
D. Ursodeoxycholic acid
D. UDCA

- UDCA is currently the only FDA approved medication for PBC in the US.
- It decreases the rate of progression to cirrhosis and decreases the need for liver transplantation.
A 17-year-old woman presents with fatigue and jaundice after a trip to Mexico.

Jaundice, spider angioma, spleen tip; no lymph nodes, no Kayser-Fleischer rings.

Bilirubin: Total 6.2 mg/dL, Direct 1.8 mg/dL
AST 120 U/L, ALT 110 U/L
Alkaline phosphatase 39 U/L
INR 1.4
Hemoglobin 7.8 mg/dL, Platelet 130K/mL
Coomb’s negative
Question 20

The most likely diagnosis is:

A. Wilson’s disease
B. Acute hepatitis A
C. Alcoholic hepatitis with Zieve syndrome
D. Acute mononucleosis
Answer 20

A. Wilson’s disease

- Hepatic presentation of Wilson’s disease usually between ages 5 and 40
- Coomb’s negative hemolytic anemia
- Disproportionately low alkaline phosphatase
- Kayser-Fleischer rings present in ~50%; may not be visible without slit lamp exam
- Spider angiomas suggest portal hypertension and chronicity
- Zieve is a nonimmune hemolytic anemia associated with fatty liver and alcohol use
Question 21

A 65-year-old man presents with increasing abdominal girth.

He is found to have a 6-cm enhancing mass in the left hepatic lobe with associated portal vein thrombosis.

All of the following are risk factors for liver cancer except?
Question 21

A. Aflatoxin
B. Copper
C. HBV infection
D. Excessive iron deposition
E. *Amanita Phylloides*
E. Amanita phylloides

- Amanita phylloides is associated with acute liver failure.
- HBV infection is by far the most common factor associated with HCC worldwide although HCV-associated HCC is more common in the US.