

**MECHANISMS OF HUMAN DISEASE: LABORATORY SESSION
LIVER (HEPATOBIILIARY) PATHOLOGY LAB**

January 26, 2011
8:30 am – 10:00 pm

Faculty Copy

GOAL:

1. Describe the basic morphologic and pathophysiologic changes which occur in various conditions of the liver, gallbladder and biliary tree.
2. Define (Describe) and correlate symptoms and signs of a disease with the structural changes in diseased organs alcoholic liver disease.

OBJECTIVE:

1. Describe the morphologic changes which characterize alcoholic liver disease.
2. Describe the morphologic changes which characterize cholecystitis.
3. Describe the morphologic changes which characterize malignancies metastatic to the liver.

CASE 1

CHIEF CONCERN:

Routine Physical.

HISTORY:

A 24 year-old medical student with a history of “binge” drinking presents after a three-day history of excessive alcohol intake.

PHYSICAL EXAMINATION: The abdomen is soft and with no palpable masses or organomegaly. Mild right upper quadrant tenderness is noted.

LAB TESTS:

AST 39 (ref range 8-20 U/L)
ALT 18 (ref range 8-20 U/L)
Alk Phos 30 (ref range 20-70U/L)
Bilirubin, Total 0.4 (ref range 0.1-1 mg/dL)

AST minimally elevated; remaining hepatic enzymes within normal limits

1. Identify the organ/describe the pathologic changes in the virtual microscopy slide.

- **Liver**
- **Mild steatosis**

2. What is your diagnosis?

Hepatic steatosis/fatty liver (acute reversible manifestation of ethanol ingestion).

3. Describe biochemical mechanisms responsible for this condition.

Biochemical mechanisms responsible for fat accumulation in hepatocytes include: catabolism of fat by peripheral tissues increased and there is increased delivery of free fatty acids to the liver; metabolism of ethanol converts NAD to NADH which stimulates lipid biosynthesis; oxidation of fatty acids by mitochondria increased; acetaldehyde forms adducts with tubulin and impairs microtubule function, resulting in decreased transport of lipoproteins from the liver (Robbins page 412-414)

CASE 2

CHIEF COMPLAINT:

“My eyes are yellow.”

HISTORY:

53 year-old with chronic alcohol and drug abuse who has been in numerous rehabilitation facilities in the past now presents with abdominal pain after a 3-week alcoholic “binge.”

VITAL SIGNS:

BP 130/70 HR 80 RR 18 T 100

PHYSICAL EXAMINATION:

Patient has icteric sclerae and cutaneous “spider” angiomas. Abdominal exam significant for hepatomegaly, splenomegaly and RUQ tenderness to palpation.

LAB TESTS:

AST 169 (ref range 8-20 U/L)

ALT 70 (ref range 8-20 U/L)

Alk Phos 36 (ref range 20-70U/L)

Bilirubin, Total 4.6 (ref range 0.1-1 mg/dL)

Bilirubin, Direct 3.3 (ref range 0.0-0.3mg.dL)

AST/ALT ratio > 2; total bilirubin elevated with increased conjugated bilirubin.

1. What is the clinical problem?

Abdominal pain, jaundice

2. What is your clinical differential diagnosis?

Alcoholic or viral hepatitis, pancreatitis, cholecystitis, peritonitis

3. Identify the organ/describe characteristic pathologic changes in the virtual microscopy slide.

Liver; sections show focal hepatocellular necrosis with scattered inflammatory cells (including neutrophils), steatosis, and mallory bodies. Bands of fibrosis produce pseudolobules.

4. What is your diagnosis?

Acute alcoholic hepatitis superimposed on alcoholic cirrhosis.

5. What are the potential complications of this disorder?

Cirrhosis:

- Ascites
- Esophageal varices
- Coagulopathy
- Encephalopathy

-Hepatocellular carcinoma

Alcoholic Hepatitis:

-In severe cases liver failure or even death

CASE 3

CHIEF COMPLAINT:

“My stomach hurts after I eat.”

HISTORY:

An obese 40 year-old diabetic female presents with RUQ abdominal pain 30-45 minutes after eating fatty meals.

PHYSICAL EXAMINATION:

Alert and oriented female with round, protuberant abdomen who has RUQ tenderness to palpation. No masses or organomegaly are identified.

1. What is the clinical problem?

Abdominal pain after meals

2. What is the clinical differential diagnosis?

Cholecystitis, cholelithiasis, gallstone pancreatitis

3. Identify the organ/describe the characteristic pathologic changes in the virtual microscopy slide

Gallbladder; sections show a thickened gall bladder wall with scattered chronic inflammatory cells. In some sections, Rokitansky-Aschoff (outpouching of the mucosal epithelium through the wall) sinuses are identified. Superimposition of acute inflammation on chronic inflammation would suggest an acute exacerbation in a patient with previously chronically injured gallbladder.

4. What is your diagnosis?

Chronic cholecystitis - most cases related to gallstones.

Cholesterol stones arise exclusively in gallbladder and may be pure cholesterol stones or associated with calcium carbonate; pigment stones are black or brown. Black stones found in sterile bile, brown in infected bile

5. What are potential complications of this clinical problem?

Bacterial superinfection with cholangitis or sepsis, gallbladder perforation and local abscess formation, rupture with peritonitis, biliary enteric fistula; empyema/gangrenous cholecystitis after acute cholecystitis

CASE 4

CHIEF COMPLAINT:

None

HISTORY:

72-year-old male with a past medical history significant for colon cancer presents with an enlarged liver.

PHYSICAL EXAMINATION:

Abdomen is soft and non-tender with a well-healed scar. The liver is enlarged. No masses are palpated and no lymphadenopathy is noted.

LAB TESTS:

CEA 1250 ng/ml (<5ng/ml)

AST 47 (ref range 8-20 U/L)

ALT 52 (ref range 8-20 U/L)

Alk Phos 125 (ref range 20-70U/L)

Bilirubin, Total 1.1 (ref range 0.1-1 mg/dL)

Elevated serum CEA, mildly elevated transaminases and alkaline phosphatase

1. Identify the organ/describe the characteristic pathologic changes in the virtual microscopy slide.

Liver; sections show islands of well differentiated adenocarcinoma surrounded by unremarkable liver.

2. What is your diagnosis?

Metastatic adenocarcinoma

3. Review Case 4 slide for comparison with case 2 slide.

4. What is "CEA"?

Carcinoembryonic antigen is a glycoprotein normally found in fetal gut tissue. It is increased in a variety of adenocarcinomas, particularly colorectal cancer.

Because it lacks both sensitivity and specificity, serum CEA is NOT a useful screening tool for colorectal cancer. However, in patients with established disease, the absolute level of the serum CEA correlates with disease burden.