Cirrhosis and Liver Failure

NORMAL LIVER FUNCTION

- Production and excretion
- Formation of bile, cholesterol, hormones, and drugs
- Metabolism of fats, proteins, and carbohydrates
- Ammonia detoxification and blood purification
- Storage of glucose, vitamins, and minerals
- Synthesis of plasma proteins, such as albumin, and clotting factors

NORMAL LIVER ANATOMY

- Human Liver Anatomy
- Inferior vena cava
- Portal vein
- Hepatic artery
- Gallbladder
- Common bile duct

WHAT IS CIRRHOSIS?

Replacement of normal liver tissue with scar tissue

CAUSES OF CIRRHOSIS

- Alcohol
  - Risk of disease increases with quantity and duration of etoh use
  - Leading cause of liver disease in the USA (American Liver Foundation)
- Chronic Viral Hepatitis
  - Hep C - second leading cause of cirrhosis
  - 1 in 4 people with hepatitis C will develop cirrhosis
  - Incidence is decreasing with the development of antiviral medications
  - Chronic Hepatitis B and D can also cause cirrhosis
- Nonalcoholic steatohepatitis/Nonalcoholic fatty liver disease
  - Due to fat build up in liver, incidence on the rise
  - Pts often have several other comorbidities related to obesity - DM, high cholesterol, heart disease
- Bile Duct Disease - Primary sclerosing cholangitis & primary biliary cirrhosis
  - Prevents bile from flowing out of liver and into small intestine
  - Bile retained in liver causes edema and cirrhosis
- Genetic disease
  - Wilson’s disease, hemochromatosis, Alpha 1 antitrypsin deficiency, autoimmune hepatitis
**Epidemiology**

- Mortality for Chronic liver disease and cirrhosis
  - Number of deaths: 38,170 (CDC, 2013)
  - Deaths per 100,000 population: 12.0 (CDC, 2013)

**Signs and Symptoms**

- **Jaundice:** also known as icterus, is a yellowish or greenish pigmentation of the skin and whites of the eyes due to high bilirubin levels.
- **Pruritus:** Due to cholestasis and build-up of bile salts (uptodate, 2016)
- **Skin Telangiectasis** (spider angiomata) - etiology unknown, thought to be related to changes in sex hormones (Uptodate, 2016)
- **White Nails:** exact pathogenesis is unknown, but it is believed to be due to hypoalbuminemia
- **Petechiae:** small pin point bleeding. Due to platelet dysfunction

**Complications**

- **Anemia, thrombocytopenia, coagulopathy**
  - Anemia - multifactorial, related to acute or chronic GI blood loss, folate deficiency, bone marrow suppression, anemia of chronic disease
  - Thrombocytopenia - related to portal hypertension and resulting splenomegaly (UptoDate, 2016)
  - Coagulopathy - related to inability to synthesize clotting factors
  - Treatment: judicious blood product administration

**Complication: Portal Hypertension**

- Portal hypertension: increased pressure within portal venous system. Causes most of the complications seen in cirrhosis.
  - Gastric varices
  - Esophageal varices
  - Ascites
  - Splenomegaly
  - Hepatic encephalopathy

**Complications of Portal Hypertension**

- Ascites
- Splenomegaly
- Hepatic encephalopathy

**Complications: Anemia, thrombocytopenia, coagulopathy**

- Portal Hypertension
- Esophageal varices
- Ascites
- Splenomegaly
- Hepatic encephalopathy
- Hepatorenal syndrome
- Hepatocellular carcinoma

**TIPS**

- Transjugular intrahepatic portosystemic shunt: Creates new connections between two blood vessels in your liver. This procedure allows blood to flow better in your liver, stomach, esophagus, and intestines, and then back to your heart.
- TIPS is treatment for portal hypertension and can also help improve or prevent symptoms, such as ascites, splenomegaly.
### Complication: Esophageal Varices

- **Cause in half of all patients with cirrhosis**
  - Underlying liver disease (e.g., hepatitis, alcohol)
  - Portal hypertension

- **Prevention:**
  - Splenectomy
  - Balloon tamponade

- **Treatment:**
  - Endoscopic or surgical treatment

- **Complications:**
  - Bleeding
  - Congestive hepatopathy
  - Ascites

### Complication: Ascites

- **Ascites:**
  - Most common complication of cirrhosis

- **Treatment:**
  - Tips: Large Volume Paracentesis
  - Medical Management: diuretics (spironolactone)
  - Diet (low salt)
  - TIPS

- **SBP: Spontaneous Bacterial Peritonitis**
  - Infection of ascites fluid without evidence of another surgically treatable source.

- **Treatment:**
  - Antibiotic therapy (Cipro/flagyl) after collection of ascites fluid for culture

### Complication: Splenomegaly

- **Enlargement of the spleen caused by increased splenic vein pressure**
- May result in thrombocytopenia and leukopenia

### Complication: Hepatic Encephalopathy

- **Hepatic encephalopathy:**
  - Decline in brain function that occurs as a result of severe liver disease.
  - The liver cannot adequately remove toxins (e.g., ammonia) from the blood.
  - This causes a buildup of toxins in the bloodstream, which can lead to brain damage.

- **Multifactorial causes:**
  - Metabolic, brain atrophy, brain edema, or any combination of these conditions

- **Treatment:**
  - Correct any metabolic abnormalities
  - Medications: Lactulose, Rifaximin

### Complication: Hepatorenal Syndrome

- **Treatment:**
  - Improvement in liver function
  - Medical management
  - TIPS
  - HD

### Complication: Hepatocellular Carcinoma

- **Primary tumor of the liver that develops in the setting of chronic liver disease**

- **Treatment:**
  - TACE: Transarterial chemoembolization
  - Other treatments may be necessary depending on the stage and extent of the tumor.
**Classification: Child Pugh Score**

- Child’s Pugh Score:
  - Classification of the severity of liver disease according to the degree of ascites, the serum concentrations of bilirubin and albumin, the prothrombin time, and the degree of encephalopathy.
  - The class correlates with survival rates.

**Classification: MELD**

- MELD (model for end stage liver disease) Score:
  - Predicts prognosis, based upon bilirubin levels, creatinine, INR, and the etiology of cirrhosis.
  - Score 6-40
    - The individual score determines how urgently a patient needs a liver transplant within the next three months.
    - The higher the number the sicker the patient.

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**Liver Failure**

- Liver failure: the inability of the liver to perform its normal synthetic and metabolic function as part of normal physiology. Two forms are recognized, acute and chronic.
  - Acute liver failure: loss of liver function that occurs rapidly (in days or weeks). Usually in a person who has no pre-existing liver disease.
  - Chronic liver failure: disease process of the liver that involves a process of progressive destruction and regeneration of the liver parenchyma leading to fibrosis and cirrhosis. Chronic liver disease refers to disease of the liver which had lasted over a period of 6 months.

**End Stage Liver Disease**

- End stage liver failure: Late stage of liver failure characterized by the onset of mental and neurological symptoms, due to build up of toxic metabolites.
  - End stage liver disease is treated with liver transplant.

**Liver Transplant: Primary diagnosis**

Figure 3: Liver transplant in 81 to primary diagnosis, 2001-2011.

**Liver Transplant: Evaluation**

- Evaluation: should be considered once a patient with cirrhosis has a complication such as ascites, hepatic encephalopathy, or variceal hemorrhage or hepatocellular and a MELD score ≥15 (1-A).
- Multidisciplinary evaluation consisting of:
  - Financial, social support, psychiatric history
  - Full cardiac evaluation
  - Surgical evaluation to assess for any technical challenges to operation
  - Lab testing: viral serologies, tumor markers, ABORH
  - General health assessment: chest xray, pap smear, mammogram, colonoscopy
  - Dental assessment
  - Nutrition Evaluation
Liver Transplant: Wait time

- Based on: blood type, body size, stage of liver disease, overall health, and the availability of a matching liver
- On average, 22 people die a day while waiting

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Current wait list in Illinois

Liver Transplant: Outcomes

Questions??