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**Assignment**

* In the hepatic portal system, the liver receives a dual blood supply from the hepatic portal vein and hepatic arteries. The hepatic portal vein carries venous blood drained from the spleen, gastrointestinal tract and its associated organs; it supplies approximately 75% of the liver’s blood. The hepatic arteries supply arterial blood to the liver and account for the remainder of its blood flow. Oxygen is provided from both sources; approximately half of the liver’s oxygen demand is met by the hepatic portal vein, and half is met by the hepatic arteries.
* **Diseases of the Liver**

1. Alagille Syndrome: Alagille Syndrome is an inherited disorder that closely resembles other forms of liver disease seen in infants and young children. However, a group of unusual features affecting other organs distinguishes Alagille syndrome from the other liver and biliary diseases of infants. Symptoms of Alagille Syndrome are jaundice; pale, loose stools; and poor growth within the first three months of life. Later, there is persistent jaundice, itching, fatty deposits in the skin, and stunted growth and development during early childhood. The disease often stabilizes between ages four and ten with an improvement in symptoms. Other features, which help establish the diagnosis, include abnormalities in the kidneys, cardiovascular system, eyes, and spine. Narrowing of the blood vessel connecting the heart to the lungs leads to heart murmurs but rarely causes problems in heart function. The shape of the bones of the spinal column may look like the wings of a butterfly on x-ray, but this shape almost never causes any problems with function of the nerves in the spinal cord. More than 90% of children with Alagille syndrome have an unusual abnormality of the eyes. An extra, circular line on the surface of the eye can be detected during a specialized eye examination. In addition, some children may have some changes in kidney function. Many physicians believe that there is a specific facial appearance shared by most of the children with Alagille syndrome that makes them easily recognizable. The features include a prominent, broad forehead; deep-set eyes; a straight nose; and a small pointed chin. Alagille Syndrome is a genetic condition (associated with the Notch signaling pathway and Jagged1 gene) that causes narrowed and malformed bile ducts in the liver. Bile that cannot flow through the deformed ducts builds up in the liver and causes scarring. The scar tissue prevents the liver from working properly to eliminate wastes from the bloodstream. Treatment of Alagille Syndrome focuses on trying to increase the flow of bile from the liver, maintaining the child’s normal growth and development pattern, and correcting any of the nutritional deficiencies that often develop. Because bile flow from the liver to the intestine is slowed in Alagille syndrome patients, medications designed to increase the flow of bile are frequently prescribed. While reduced bile flow into the intestine leads to poor digestion of dietary fat, a specific type of fat can still be well digested, and therefore infant formulas containing high levels of medium-chain triglycerides (MCT) are usually substituted for conventional formulas. Some infants can grow adequately on breast milk if additional MCT oil is given. There are no other dietary restrictions. Problems with fat digestion and absorption may lead to deficiency of fat-soluble vitamins (A, D, E, and K). Deficiencies of these vitamins can be diagnosed by blood tests and can usually be corrected by large oral doses. If the child’s system cannot absorb vitamins given by mouth, vitamin injections into the muscle may be necessary. Sometimes surgery is necessary during infancy to help establish the diagnosis of Alagille syndrome by direct examination of the bile duct system and through liver biopsy. However, surgical reconstruction of the bile duct system is not recommended because bile can still flow from the liver, and there is presently no procedure that can correct for the loss of the bile ducts within the liver. Occasionally, liver cirrhosis advances to a stage where the liver fails to perform its functions. Liver transplantation is then considered.
2. Cirrhosis: Cirrhosis is the scarring of the liver – hard scar tissue replaces soft healthy tissue. It is caused by swelling and inflammation. As cirrhosis becomes worse, the liver will have less healthy tissue. If cirrhosis is not treated, the liver will fail and will not be able to work well or at all. There are usually no symptoms of cirrhosis in its early stage. Over time, cirrhosis may cause symptoms and complications:

**Symptoms**

* Loss of appetite
* Tiredness
* Nausea
* Weight loss
* Abdominal pain
* Spider-like blood vessels
* Severe itching

**Complications**

* Jaundice, a yellow discoloration of the skin and whites of the eyes
* Bruising and bleeding easily
* Fluid build up and painful swelling of the legs (edema) and abdomen (ascites)
* Hepatic Encephalopathy (HE), a buildup of toxins in the brain that causes confusion, as well as both mental and physical complications
* Liver Cancer

Treatment options for cirrhosis depend on the cause and the level of liver damage. Depending on the disease causing cirrhosis, medications or lifestyle changes may be used for treatment. The goals of treatment are to prevent further liver damage and reduce complications. When cirrhosis cannot be treated, the condition is known as End-Stage Liver Disease, or ESLD. ESLD includes a subgroup of patients with cirrhosis who have signs of decompensation that is generally irreversible with medical management other than transplant. Decompensation includes hepatic encephalopathy, variceal bleed, kidney impairment, ascites, lung issues. The decompensated liver disease allows these ESLD patients to be prioritized on the transplant list.

1. Hepatitis A: Hepatitis A is a liver disease caused by the hepatitis A virus (HAV). HAV causes the liver to swell and prevents it from working well. HAV usually goes away on its own in almost all cases with no serious complications. However, HAV may cause some patients to suffer liver failure. In the United States, there are about 100 deaths a year due to HAV. Those at risk of serious long term effects from HAV include people with other liver diseases and people over 60. Low energy is the most common symptom of HAV. Other symptoms include fever, tiredness, loss of appetite, nausea, headache, itchy skin, muscle soreness, pain near the liver, and jaundice (a yellowing of the skin and whites of the eyes). Symptoms of HAV can occur two to seven weeks after infection and are often mild. Children may not have any symptoms. Symptoms usually go away within two months. If you think you have HAV, it is important to see a doctor — symptoms of HAV are similar to other more serious liver diseases. HAV usually goes away on its own within six months. Doctors often recommend bed rest, drinking lots of fluids, eating a healthy diet and avoiding alcohol. Medicines are not used to treat HAV. Talk to your doctor before taking prescription or over-the-counter drugs, vitamins or herbal supplements. Itchy skin caused by HAV can be treated with non-prescription anti-itch medicine. It is important to see your doctor regularly to make sure your body has fully recovered from the virus. Also, talk to your doctor about getting vaccinated for hepatitis B.
2. Hepatitis B is a high preventable liver disease caused by the hepatitis B virus (HBV). HBV causes the liver to swell and prevents it from working well. About 95% of adults who are exposed to HBV fully recover within 6 months (acute HBV) without medication. About 5% have HBV all their lives (chronic HBV) unless they are successfully treated with medications. Infants born to mothers infected with HBV are at high risk of developing chronic HBV. Chronic HBV can lead to cirrhosis (scarring) of the liver, liver cancer, and liver failure. A majority of adults develop symptoms from acute HBV infection; however, young children often do not. Symptoms, when they occur, may include:

* Fever
* Dark Urine
* Joint Pain
* Weakness and Fatigue
* Loss of Appetite
* Nausea and Vomiting
* Abdominal pain near the liver

Doctors often recommend bed rest, drinking lots of fluids, eating a healthy diet and avoiding alcohol. Medicines are not used to treat acute HBV. It is important to see your doctor regularly to make sure your body has fully recovered from the virus.

1. Liver Cyst: Liver cysts are abnormal sacs filled with fluid in the liver. The cause of most liver cysts is unknown. Liver cysts can be present at birth or can develop at a later time. They usually grow slowly and are not detected until adulthood. Some cysts are caused by a parasite, echinococcus that is found in sheep in different parts of the world. Most liver cysts do not cause any symptoms. However, if cysts become large, they can cause bloating and pain in the upper right part of your abdomen. Sometimes, liver cysts become large enough that you can feel them through your abdomen. Liver cysts can have rare complications of liver failure and liver cancer. Most liver cysts do not need to be treated. However, if cysts get large and painful, they may need to be drained or surgically removed. Cysts also may be surgically removed if they are stopping bile from reaching your intestine. If a parasite is found, antibiotics are used for treatment.