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FEATURES OF LIVER ANATOMY ITSELF

Anatomically, the liver has 4 lobes: right, left, caudate, and quadrate**.** The quadrate lobe is located on the inferior surface of the right lobe. The caudate lobe is located between the left and right lobes in an anterior and superior location.

The liver is the largest gland in the body and is ideally located to receive absorbed nutrients and detoxify absorbed drugs and other noxious substances. It serves as both an exocrine organ and an endocrine organ. The exocrine functionality of the liver is mainly in the synthesis and excretion of bile salts into the common hepatic duct, as well as the conjugation of bilirubin and excretion into the gut. The endocrine functions of the liver include involvement in glycemic control via insulin and glucagon. The liver synthesizes important proteins such as fibrinogen, albumin, prothrombin, and other amino acids and modifies proteins into enzymes and peptide hormones. The liver participates in fatty acid metabolism and synthesizes lipoproteins, cholesterol, and phospholipids. Additionally, it is involved in the metabolism of carbohydrates, which includes storing glycogen and gluconeogenesis. It also is involved in the metabolism of lactic acid and converts ammonia to urea. The liver stores vitamins and minerals such as iron. In summary, the liver is an important mediator from the gut to the blood and plays a vital role in the metabolism of macronutrients, hormones, components of blood plasma, and exocrine and endocrine substances.

The liver, gallbladder, and biliary system arise from a ventral proliferation of endoderm that grows into mesoderm from the caudal part of the foregut. This outgrowth happens in the fourth week of embryonic growth and is called the hepatic diverticulum or liver bud. The endoderm of the liver bud differentiates into hepatocytes, while the mesoderm becomes connective tissue and blood vessels. It is important to remember that the liver has a hematopoietic role throughout the fetal period.

The liver receives a dual blood supply, with 75% to 80% of the blood volume coming from the portal vein and 20% to 25% from the hepatic artery. The portal vein is formed from the superior mesenteric and splenic veins posterior to the neck of the pancreas. It is joined by the proper hepatic artery, a branch of the celiac trunk, and the common bile duct to form the portal triad, enclosed in the hepatoduodenal ligament. Within the portal triad and associated branches, the bile leaves the liver in the bile ducts while the portal vein and hepatic artery are delivering blood to the liver; this creates countercurrent flow, which allows for the optimized exchange of electrolytes, bile acids, and other compounds.

Venous drainage of the liver occurs primarily via the left, right, and middle hepatic veins. The left hepatic vein accounts for 20.7% of the venous drainage and primarily drains the left lobe of the liver. The middle hepatic vein accounts for 32.7% of hepatic drainage and drains the middle portions of the left and right lobes of the liver. The right hepatic vein accounts for 39.6% of drainage and drains the lateral portion of the right lobe of the liver. The caudate lobe of the liver drains into the middle hepatic vein in most cases. In some cases, it drains directly into the retrohepatic portion of the inferior vena cava

The hepatic plexus innervates the liver. This plexus consists of sympathetic fibers from the celiac plexus and parasympathetic fibers from the anterior and posterior vagal trunks. The hepatic plexus accompanies the vessels and biliary ducts within the portal triad.

The liver can be involved in many pathologies, so only a few of the most common conditions are mentioned. When the liver's exocrine function is impaired, either by physical blockage of the bile ducts, hepatocyte damage, or dysfunction of conjugation, bilirubin concentration rises in the blood. This manifests as a yellowing of the skin and sclera, called jaundice, and can be associated with itching, mental status changes, edema, and spider vessels.

The liver is highly vascular and is the main site for portocaval anastomosis. Patients with portal hypertension often exhibit signs of venous congestion at points of portocaval anastomoses. This can lead to esophageal varices, rectal hemorrhoids, and caput medusae.

Budd-Chiari syndrome is the blockage of hepatic venous drainage caused by thrombosis of 1 or more major hepatic veins. This condition should be considered in patients with hypercoagulable states that present with signs of portal hypertension, such as ascites, jaundice, or varices. Patients with right heart failure may also present with these signs due to back-up of blood through the inferior vena cava, but these patients are not considered to have Budd-Chiari syndrome. The diagnosis of Budd-Chiari syndrome is made with ultrasound or MRI.

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