MINISTRY OF HIGHER AND SECONDARY SPECIAL EDUCATION OF THE REPUBLIC OF UZBEKISTAN

MINISTRY OF HEALTH OF THE REPUBLIC OF UZBEKISTAN

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Oncology Science

MASS LESIONS OF THE LIVER

Study guide

General Oncology -5A510110

For their specialization

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Annotation

In the textbook, the material is presented briefly, contains illustrations presented on the mass lesions of the liver. Information on morphology, anatomy, physiology, pathophysiological syndromes, benign and malignant neoplasms of the liver, criteria for their differential diagnosis, treatment, and prevention are presented. In conclusion, to consolidate the material, test tasks, tasks, and standards of answers to them are given. This manual is intended for masters, clinical residents, and young oncologists. The study guide greatly facilitates training in the specialty of oncology.

Аннотация

В учебном пособии материал изложен кратко, содержит иллюстрации представлены по объемным образованиям печени. Приведены сведения о морфологии, анатомии, физиологии, патофизиологических синдромах, добро- и злокачественных новообразованиях печени, критериям их дифференциальной диагностики, лечению и профилактике. В заключение, для закрепления материала, даны тестовые задания, задачи и эталоны ответов к ним. Данное пособие предназначено для магистров, клинических ординаторов и для молодых врачей онкологов. Учебное пособие значительно облегчает подготовку по специальности онкология.

Annotatsiya

Darslikda material qisqacha taqdim etilgan, jigarning hajmli shakllanishiga oid rasmlar mavjud. Jigarning morfologiyasi, anatomiyasi, fiziologiyasi, patofiziologik sindromlari, yaxshi va xavfli o'smalari, ularni differentsial diagnostika qilish, davolash va oldini olish mezonlari haqida ma'lumotlar keltirilgan. Xulosa qilib, materialni umumlashtirish uchun test topshiriqlari, topshiriqlari va ularga javob standartlari keltirilgan. Ushbu qo'llanma magistrlar,

klinik ordinatorlar va yosh onkologlar uchun mo'ljallangan. O'quv qo'llanma onkologiya mutaxassisligi bo'yicha o'qitishni sezilarli darajada osonlashtiradi.

CONTENT

INTRODUCTION

"Non progredi est regredi"

Latin proverb

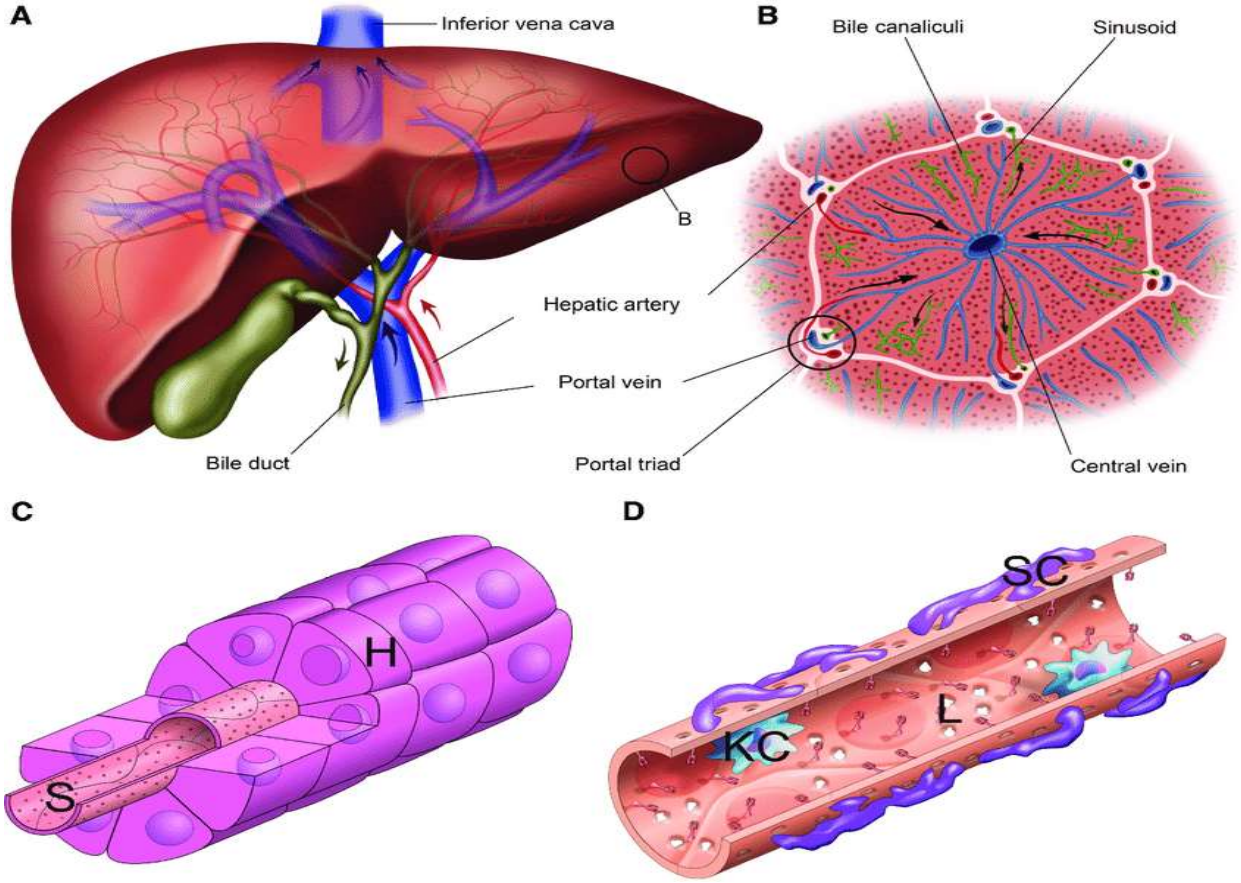
Mass lesions of the liver are a large group of diseases of various etiology and course, the common feature of which is the replacement of the functioning liver tissue with single or multiple pathological formations. The study, diagnosis, and treatment of mass lesions of the liver are among the tasks of studying oncology by masters, clinical residents, and general practitioners.

In this manual, the material is presented briefly, contains illustrations presented on volumetric formations of the liver. Information about morphology, anatomy, physiology, pathophysiological syndromes, benign and malignant neoplasms of the liver, criteria for their differential diagnosis, treatment, and prevention are given. In conclusion, to consolidate the material, test tasks, tasks, and sample answers to them are given. This manual is intended for masters, clinical residents, and young oncologists. The textbook greatly facilitates training in the specialty of oncology.

ANATOMY AND FUNCTIONS OF THE LIVER

MORPHOLOGICAL ANATOMY

The morpho-functional unit of the liver is the hepatic lobule. In the liver, the portal vein, hepatic artery, bile duct (the so-called portal triad) pass side by side, divide many times, forming lobar, sectoral, segmental branches. Interlobular portal triads run along with the lateral faces of the hepatic lobules. Venules and arterioles depart from the interlobular veins and arteries, branching into intralobular hemocapillaries, through which mixed venous and arterial blood flows from the periphery of the hepatic lobule to the center, where they flow into the central vein.

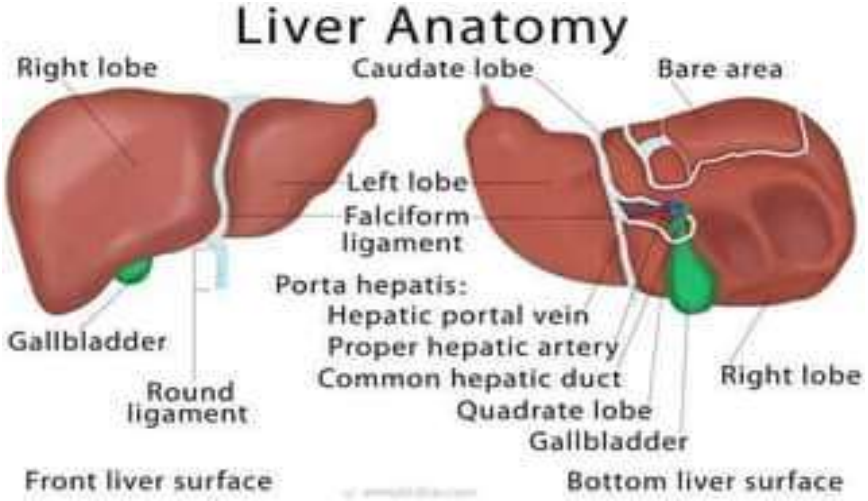


Hemocapillaries belong to the sinusoidal type of capillaries. Sinusoids pass between the hepatic beams, converging radially to the central veins. The sinusoids are lined with endotheliocytes. Numerous stellate Kupffer cells, which are phagocytes, are scattered between endotheliocytes. The total area of

hemocapillaries is about 400 m2. The space between the hemocapillaries and the hepatic trabeculae is called the space of Disse. In the hepatic beams, hepatocytes are located in 2 rows, between which bile capillaries lie, passing into the terminal bile ductules (Hering's tubules), and they, in turn, into the interlobular bile ducts. The central veins drain into the collecting veins, which form branches of the hepatic veins. In a large area of hemocapillaries, the presence of muscle sphincters in the wall of the interlobular veins and branches of the hepatic veins determine a slow and regulated blood flow inside the hepatic lobules.

ANATOMY

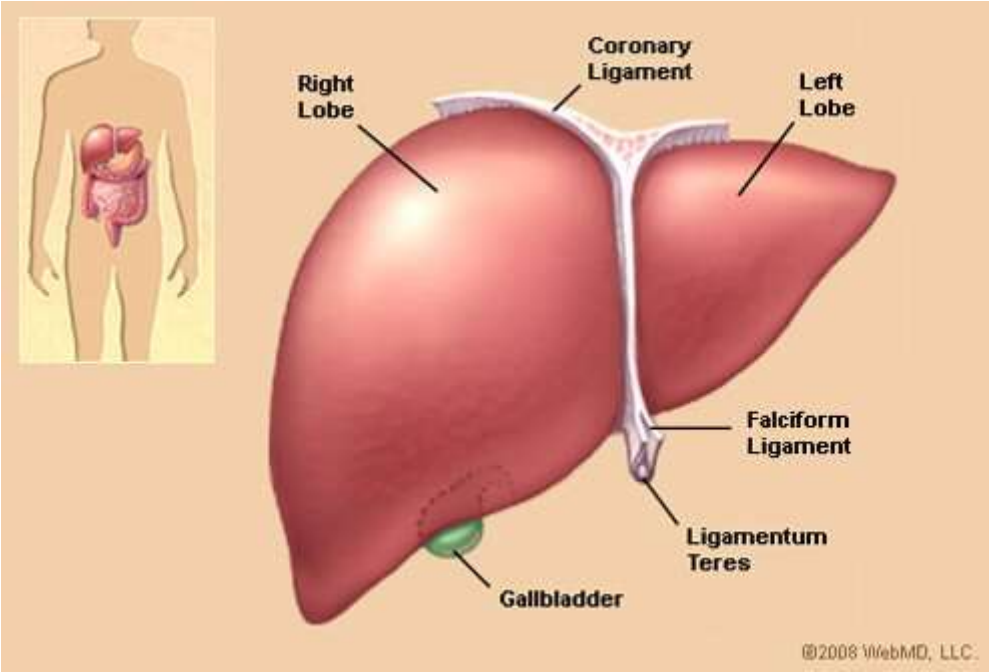
The liver (hepar) - the largest "gland" of the digestive system - is located under the right dome of the diaphragm. The mass of the liver in an adult healthy person is approximately 3% of body weight, which can reach up to 1.5 kg. The liver is located in the upper part of the abdominal cavity under the right dome of the diaphragm, and only a small part of the organ comes in an adult to the left of the midline. The lower edge of the liver normally does not protrude from under the edge of the costal arch. The high position of the liver is supported by the ligaments of the peritoneum, intra-abdominal pressure, internal organs, and the suction action of the diaphragm. The liver has two surfaces: diaphragmatic (facies diaphragmatic), adjacent to the lower surface of the diaphragm; and visceral (facies visceral), facing down and back.

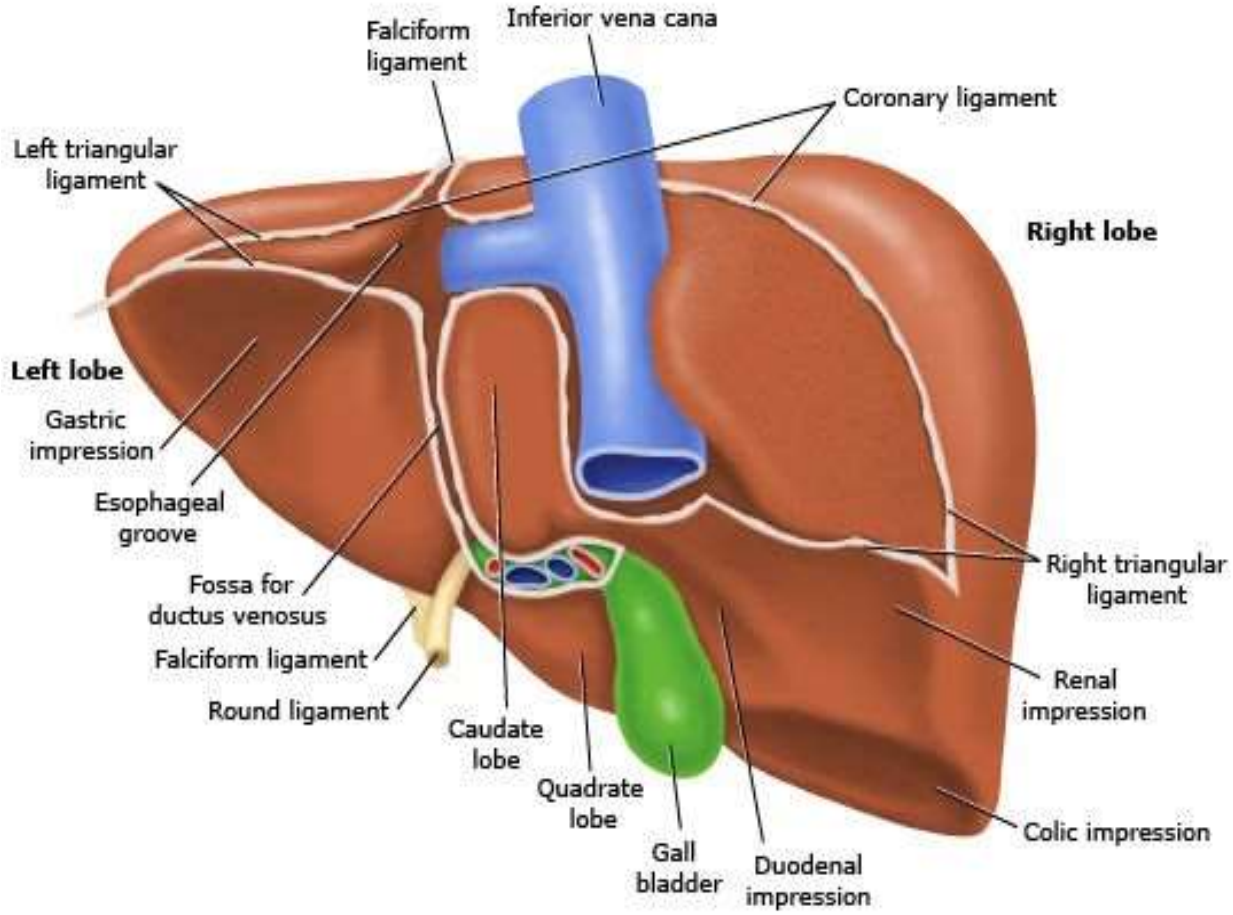


On the latter, impressions are formed from the internal organs of the abdominal cavity, to which it is adjacent. The diaphragmatic and visceral surfaces

are separated from each other by two edges: the lower (sharp) and the posterior (blunt). Sometimes the posterior edge is considered as the posterior surface of the liver.

On the diaphragmatic surface of the liver, the peritoneum forms two ligaments: in the sagittal plane, there is a crescent ligament (lig. falciform hepatitis), which divides the liver into right and left lobes (lobus hepatitis dexter et sinister). In the free edge of the crescent ligament is a round ligament (lig. teres hepatis), which is an overgrown umbilical vein; in the frontal plane, a coronary ligament (lig. coronarium hepatis) is formed, the edges of which have the form of triangular plates, referred to as triangular ligaments (right and left). Both ligaments fix the liver to the diaphragm. Ligaments depart from the visceral surface of the liver to the nearest organs: to the right kidney, to the lesser curvature of the stomach, and to the duodenum. On the visceral surface, the liver is divided into four lobes by two longitudinal and one transverse groove: right (lobus dexter), left (lobus sinister), square (lobus quadratus), and caudate (lobus caudatus). In the left longitudinal groove, the round ligament is located in the front, and the venous ligament is behind; in the right longitudinal groove, respectively, the gallbladder and the inferior vena cava. The transverse groove is called the gates of the liver (porta hepatis). Through the gate, the liver enters its own hepatic artery, nerves, and portal vein; out - the common hepatic duct (ductus hepaticus communis) and lymphatic vessels.





Features of the vessels of the liver are that, in addition to arterial blood, it also receives venous blood. Through the gate, the hepatic artery and the portal vein

enter the substance of the liver, carrying blood from the unpaired organs of the abdominal cavity, which, having entered the gate of the liver, branches into the thinnest branches located between the lobules - the interlobular veins. The latter are accompanied by arteries of the same name (branches of the proper hepatic artery) and interlobular ducts. In the substance of the liver lobules themselves, a single capillary network is formed from the arteries and veins, from which all the blood is collected into the central veins. They, leaving the lobules of the liver, flow into the collecting veins, which, gradually connecting with each other, form the hepatic veins. The hepatic veins have sphincters where they join the central veins. Hepatic veins in the amount of 3-4 large and several small exits from the liver on its posterior surface and flow into the inferior vena cava.

Thus, there are two systems of veins in the liver:

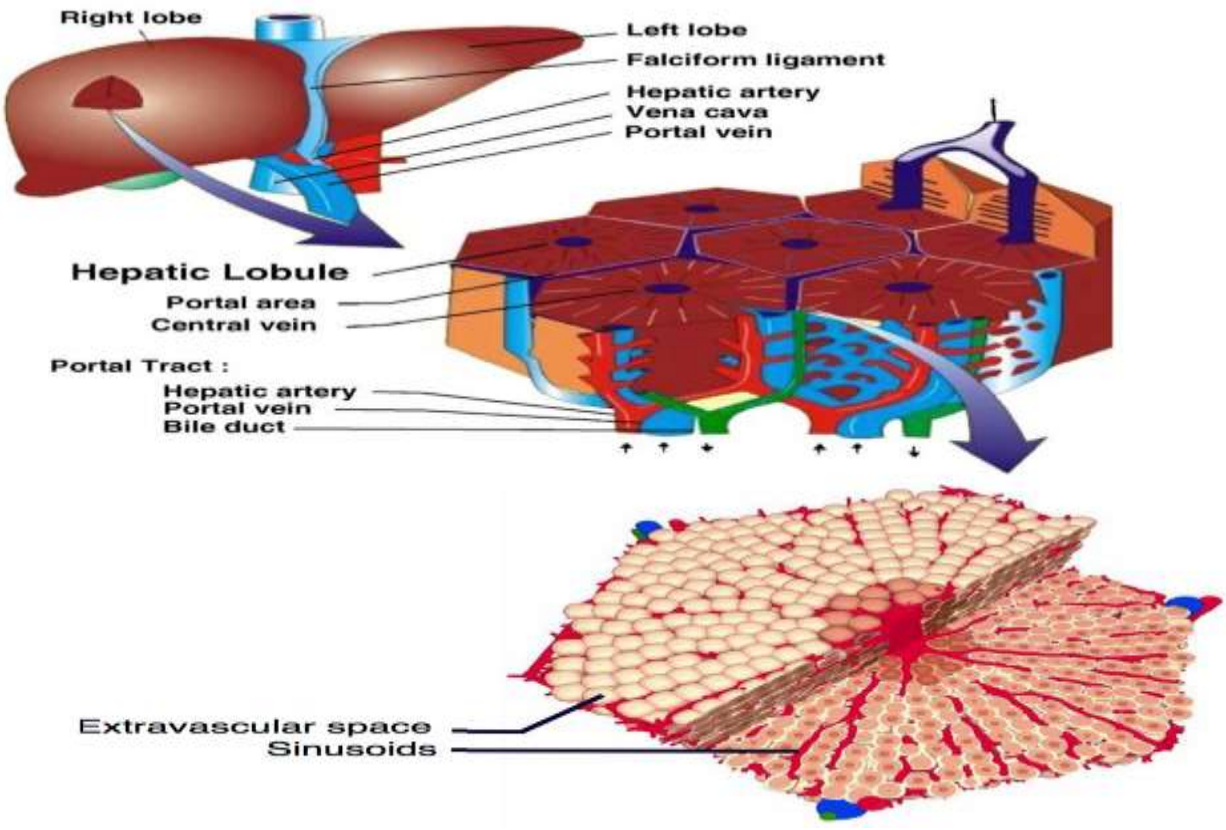
1) portal - formed by branches of the portal vein, which enters the gate of the liver. Through this system, blood flows from unpaired organs of the abdominal cavity, except for the liver itself;

2) caval - this system is formed by several hepatic veins that carry blood from the liver to the inferior vena cava.

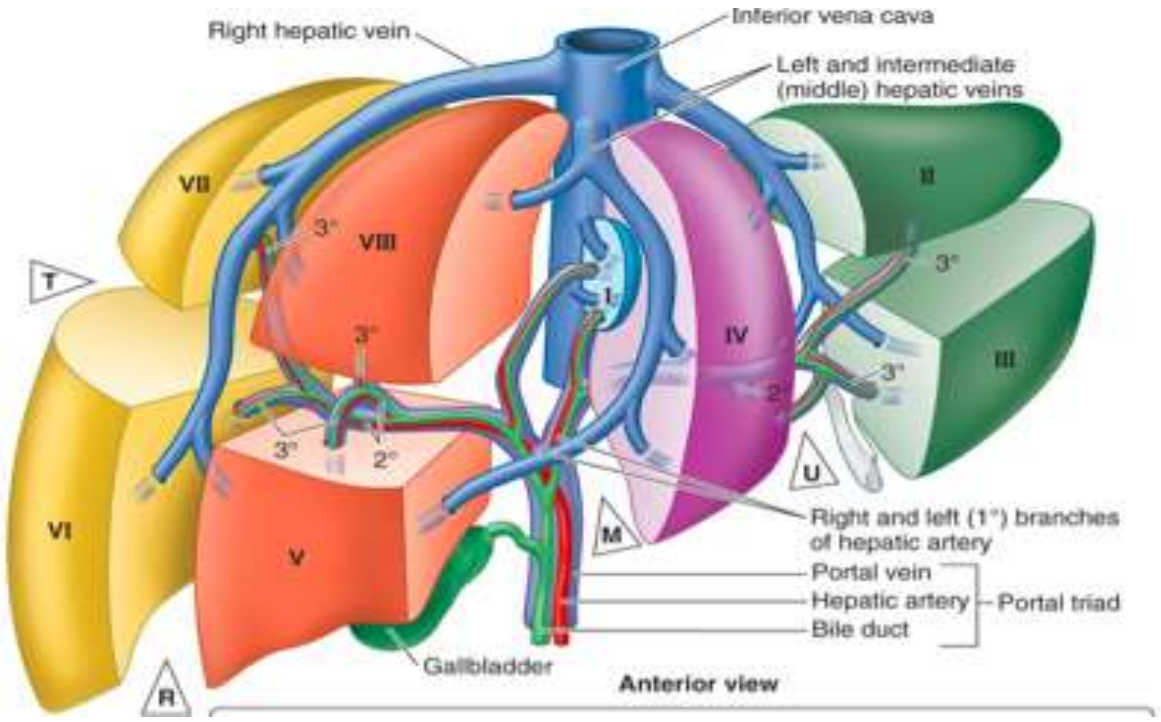
In the liver itself, the branches of these two systems run parallel to each other. In total, there are 5 tubular systems in the liver: biliary tract; arteries; branches of the portal vein (portal system); hepatic veins (caval system); lymphatic vessels. Arteries, bile ducts, and lymphatic vessels accompany the portal vein branching, forming vascular-secretory bundles. In the course of the latter are nerve fibers.

The serous membrane (peritoneum) covers the liver from 3 sides (mesoperitoneally). The liver has its own fibrous membrane located under the peritoneum. At the gates of the liver, it penetrates inward along the vessels, forming connective tissue septa surrounding the liver lobules. A lobule is a structural unit of the liver - a prismatic formation with a diameter of about 1-2 mm. Segments are formed from the lobules and from them the lobes of the liver: right, left, square and caudate. The segment of the liver is a pyramidal section of its

parenchyma adjacent to the hepatic triad - branches of the portal vein of the 2nd order, the proper hepatic artery, and the hepatic duct. In the center of each lobule is a central vein, from which hepatic cells diverge radially to the periphery, forming beams or trabeculae. Hepatic beams are built from two rows of epithelial cells (hepatocytes), between which are blood capillaries and bile ducts. Between the lobules of the liver are interlobular veins, arteries, and bile ducts. Of the latter, segmental, lobar bile ducts are formed. More often from two excretory ducts - the right and left, a common hepatic duct is formed, which is located at the gates of the liver.



In order to unify surgical anatomy, hepatologist surgeons use the Couinaud anatomical classification, according to which the liver is divided into sectors and segments, and 8 segments are distinguished (I–VIII). In this case, the IV segment is divided into sub-segments IVa and IVb.



Couinaud classifications.

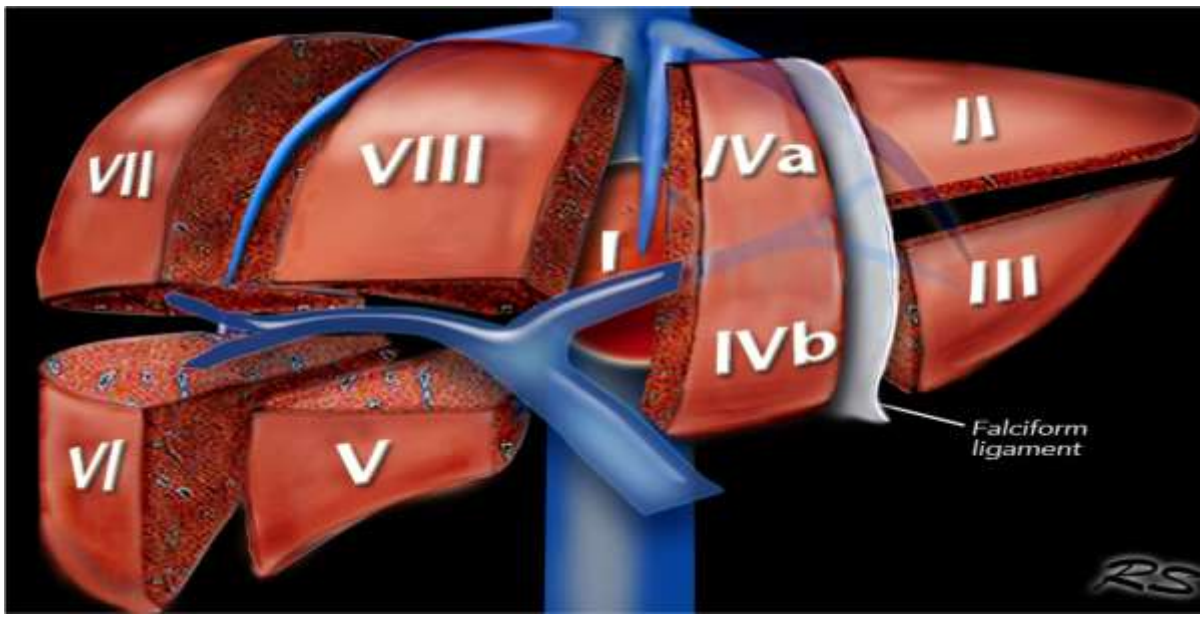
According to the Couinaud classification, the liver is divided into eight independent segments. Each segment has its own vascular inflow, outflow, and bile duct. In the center of each segment, there are branches of the portal vein, hepatic artery, and bile duct. On the periphery of each segment of the vein, going to the hepatic vein.

• The right hepatic vein divides the right lobe of the liver into anterior and posterior segments.

• The middle hepatic vein divides the liver into the right and left lobes. This plane runs from the inferior vena cava to the fossa of the gallbladder.

• The falciform ligament separates the left lobe from the medial side - segment IV and from the lateral sides - segment II and III.

• The portal vein divides the liver into upper and lower segments. The left and right portal vein divides into superior and inferior branches, rushing to the center of each segment. The image is shown below.

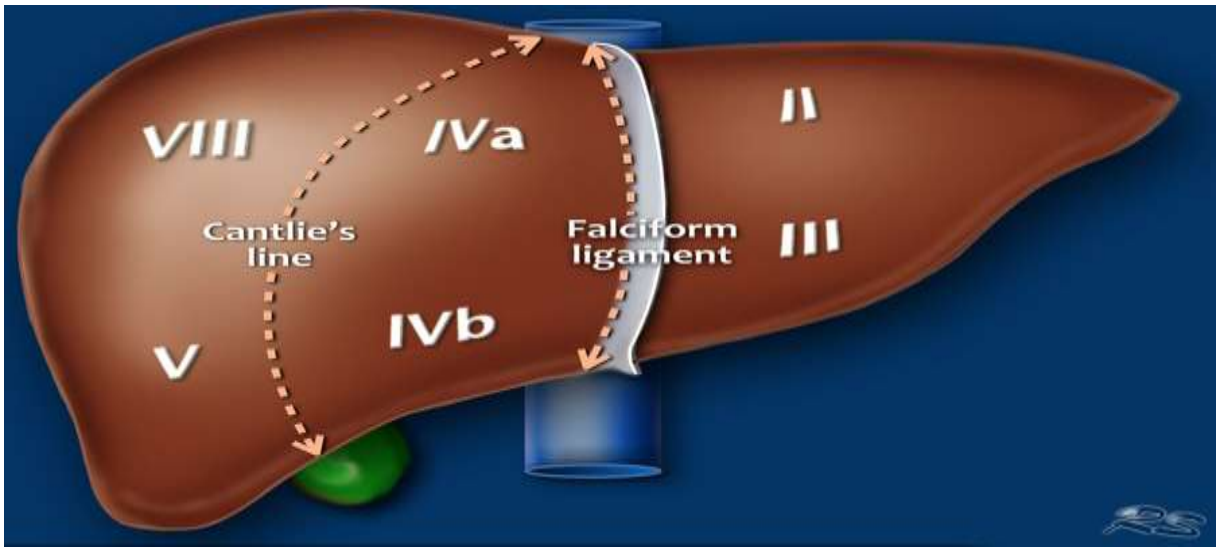


• On a normal frontal view, segments VI and VII are not visible because they are located more posteriorly.

• The right border of the liver is formed from segments V and VIII.

• Although segment IV is part of the left lobe, it is located to the right.

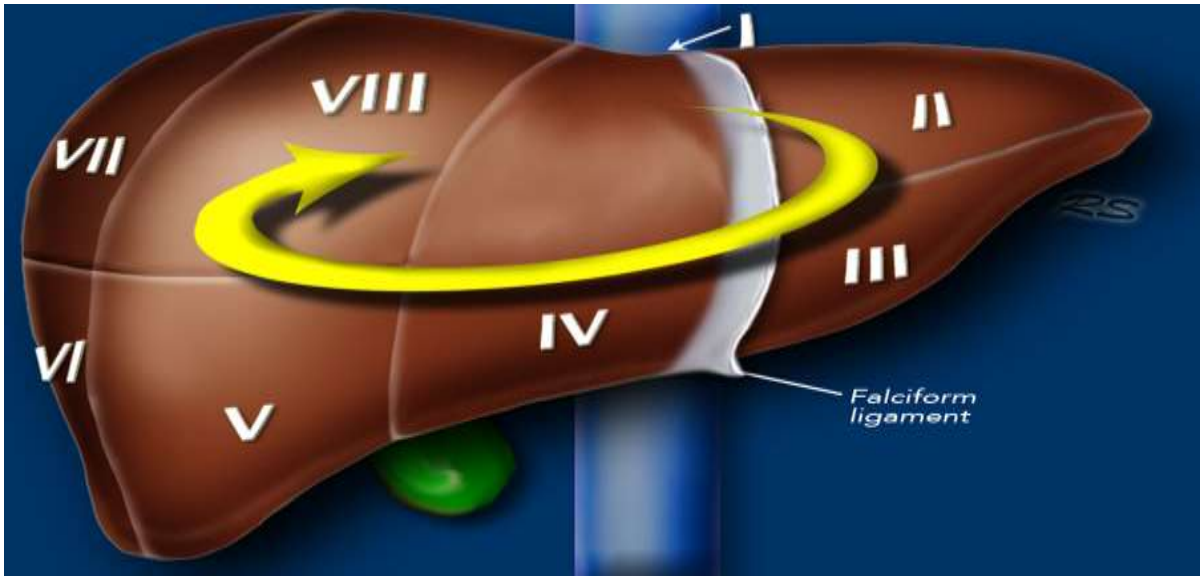
Couinaud decided to functionally divide the liver into left and right livers along with the projection of the middle hepatic vein (Cantley's line).



Segment numbering.

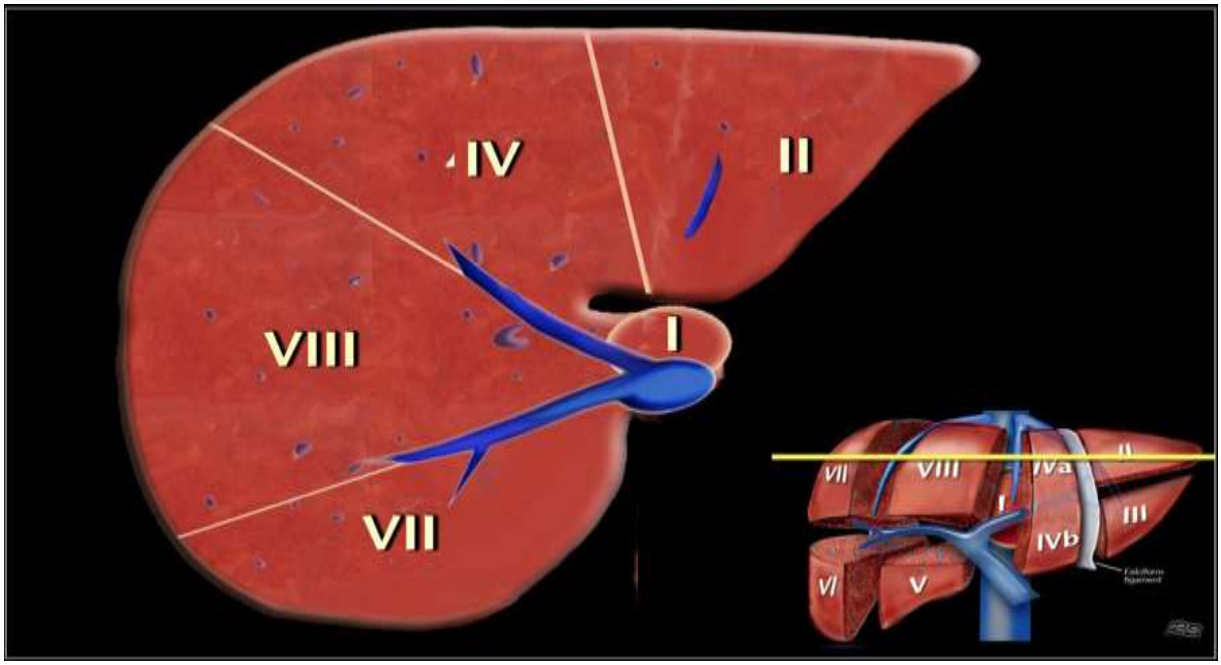
There are eight segments of the liver. Segment IV - sometimes divided into segment iva and ivb according to Bismuth. Segment numbering clockwise.

Segment I (caudate lobe) is located posteriorly. It is not visible in frontal projection.



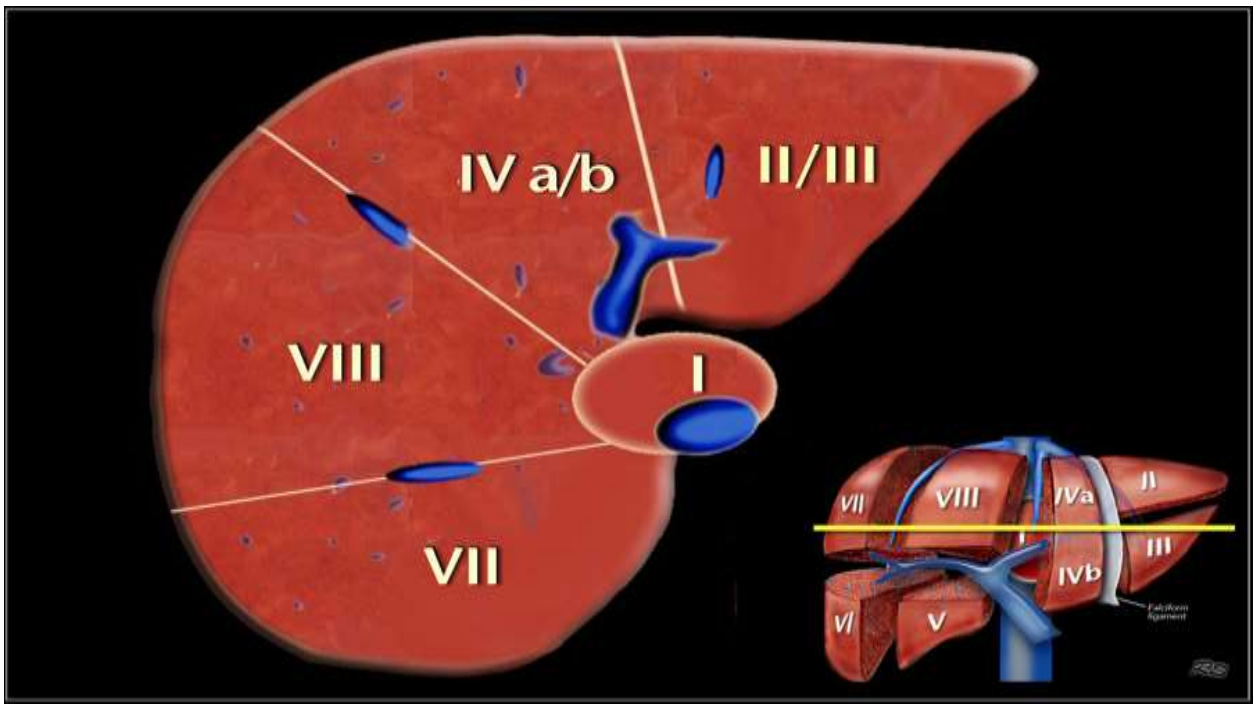
Axial anatomy.

Axial view of the upper segments of the liver, which are separated by the right and middle hepatic veins and the falciform ligament.

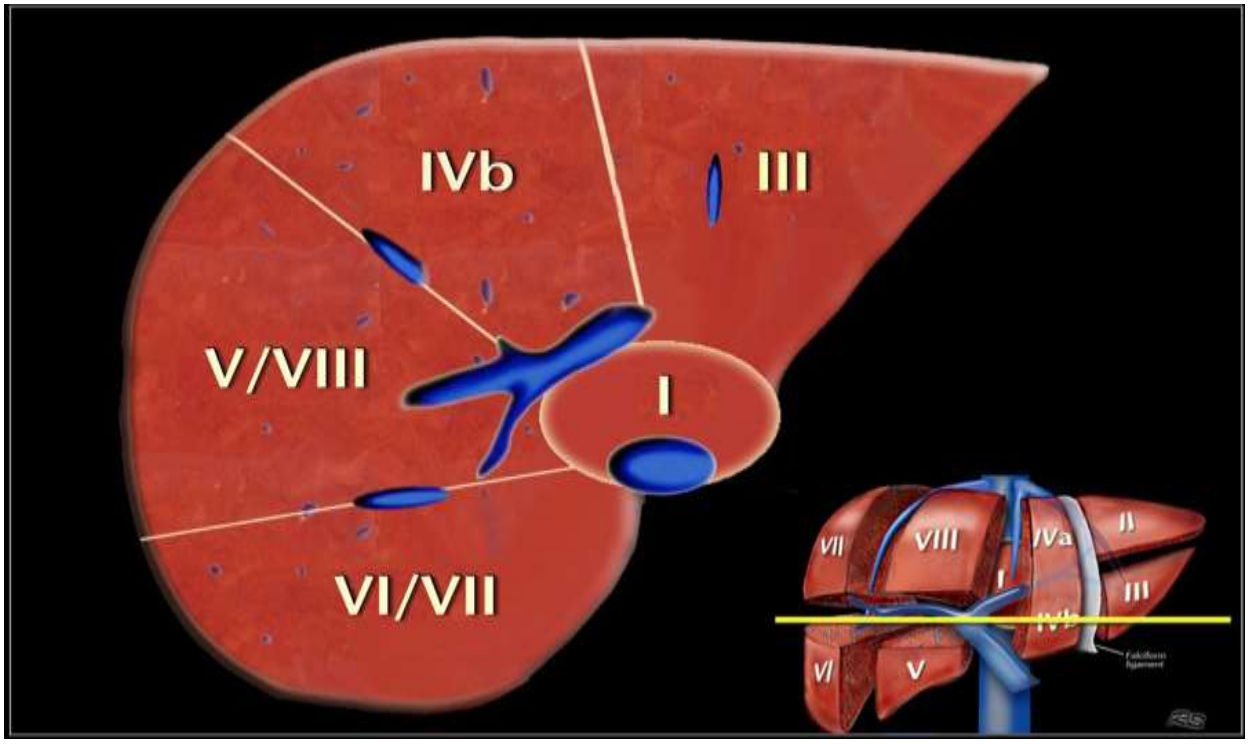


These are transverse images at the level of the left portal vein.

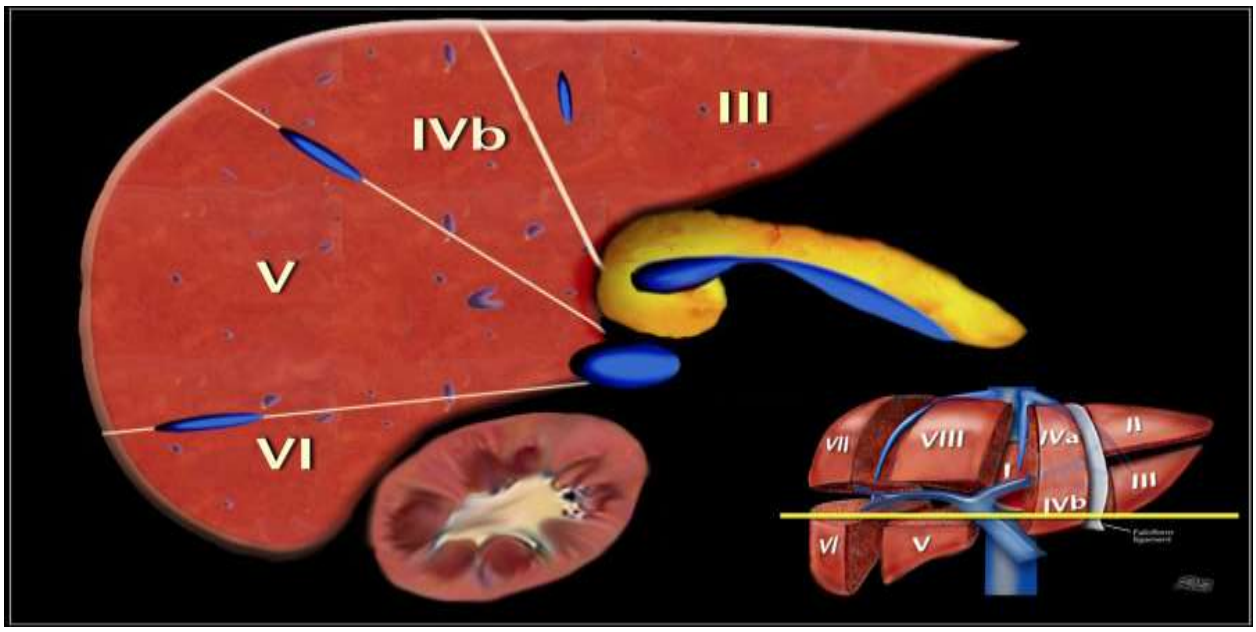
At this level, the left portal vein divides the left lobe into the upper segments (II and IVa) and lower segments (III and IVc). The left portal vein is at a higher level than the right portal vein.



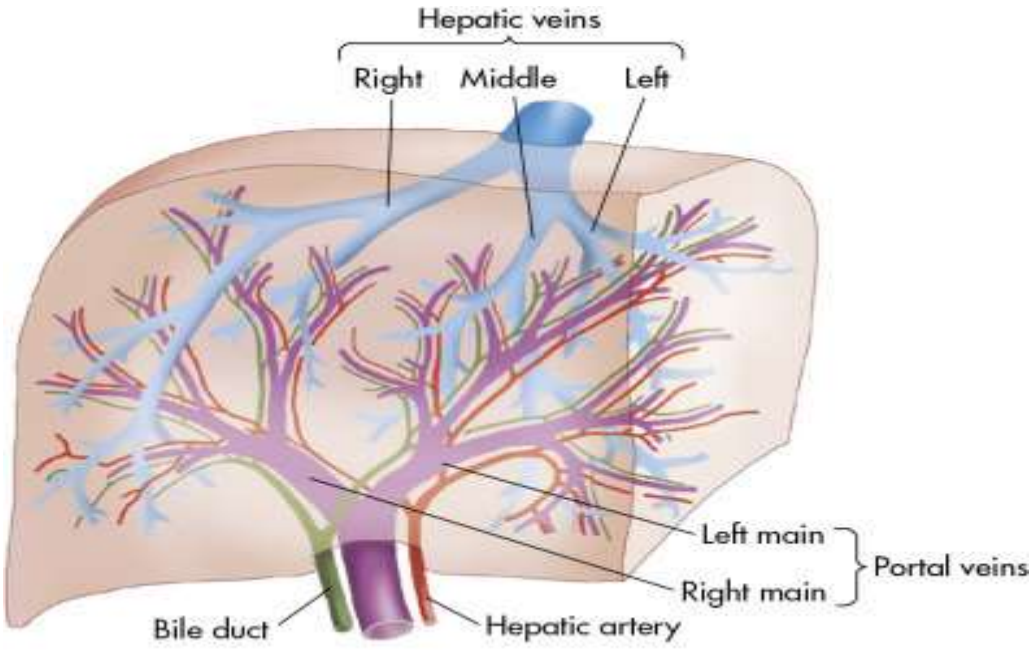
Axial image at the level of the right portal vein. In this section, the portal vein divides the right lobe into upper segments ((VII and VIII) and lower segments (V and VI). The level of the right portal vein is below the level of the left portal vein.



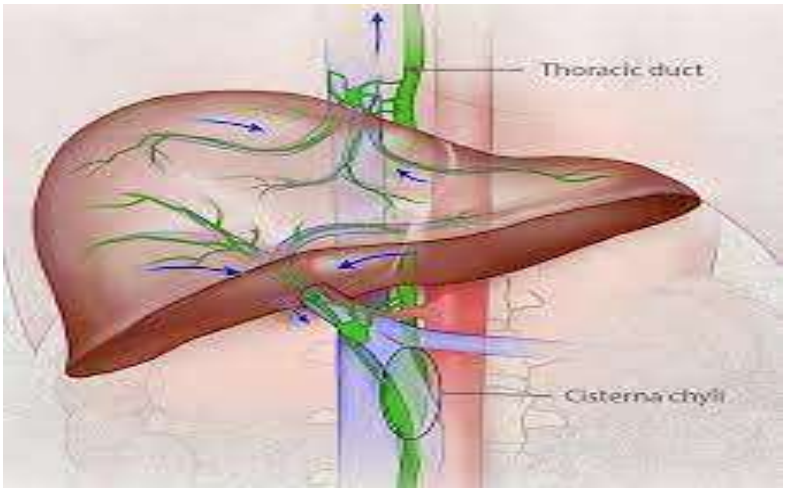
The axial image at the level of the splenic vein, which is below the level of the right portal vein, is visible only in low-lying segments.



The blood supply to the liver is carried out by the hepatic artery (~20%) and the portal vein (~80%), which collects blood from the abdominal organs. Venous outflow from the liver is carried out into the inferior pudendal vein through three hepatic veins - right, middle, and left. The outflow of bile is carried out through the right and left hepatic ducts, which merge to form the common hepatic duct, and after the cystic duct flows into it, the common bile duct. All of these tubular structures are located in the hilum of the liver and the hepatoduodenal ligament. The system of lymphatic vessels does not correspond to the portal segments of the liver. Lymphatic vessels have numerous intra- and extra-organ anastomoses, both superficial and deep, which determines the possibility of extensive metastasis. On the back wall of the gallbladder, the lymphatic vessels of the right and left halves of the liver are interconnected, which predetermines the lymphomatous metastasis of tumors from one half of the liver to the other.



Lymph outflow from the liver is carried out both in the direction of the lymph nodes of the abdominal cavity and in the direction of the chest.



Regional lymph nodes are the nodes of the gate of the liver, hepatoduodenal ligament, posterior pancreatoduodenal region. In addition, lymphatic vessels may drain into the lumbar, prepericardial, diaphragmatic, retropericardial, cardiac, left gastric, paraesophageal, celiac, and right gastric nodes.

The innervation of the liver is carried out by sympathetic, parasympathetic, and sensitive nerve fibers. Blood enters the liver from two vascular systems: arterial - from its own hepatic artery, venous - from the portal vein, through which 70-80% of all blood entering the liver passes. Between the branches of the portal vein and the proper hepatic artery, there is a wide anastomosing network with the formation of sinusoids in the liver lobules. Hepatic lobules are formed from

hepatocytes, which form beams to the periphery from the central vein, between which sinusoids are located. Thus, both arterial and venous blood enters the sinusoids. From the sinusoids, blood enters the central veins of the hepatic lobules. The walls of the sinusoids do not have a basement membrane and are built from a single row of endothelial cells. Between the endothelial cells of the sinusoids and the sinusoidal pole of the hepatocyte, there is a free perisinusoidal space - the space of Disse.

The functionally active surface of hepatocytes is significantly increased due to numerous microvilli. A large surface of contact between blood and hepatocytes and slow blood flow in the sinusoids provide optimal conditions for metabolic processes in the liver. In the hepatocyte, along with the sinusoidal pole, there is a biliary pole facing the bile duct. The microvilli of the sinusoidal pole of hepatocytes capture metabolites from the blood, and the secretion is produced by the biliary pole. These processes are regulated by enzyme systems.

PHYSIOLOGY OF THE LIVER

The liver performs a variety of functions, of which the most important are: metabolic (participation in metabolism), excretory, and barrier.

Metabolic function. In the liver, amino acids and the most important proteins are synthesized: all albumins and some blood globulins, almost all blood coagulation factors, transport proteins - transferrin, transcortin, etc., as well as tyrosine, cholinesterase, and others. Acute-phase proteins (APP) are synthesized in it: C-reactive protein, ceruloplasmin, haptoglobin, antiproteases alpha-1-

antitrypsin, and antichemotrypsin. No less intense is the breakdown of proteins in the liver, as well as the neutralization of the end product of protein metabolism - ammonia.

The liver plays a significant role in lipid metabolism, which is closely related to the secretion of bile, which is necessary for the breakdown and absorption of fats in the intestine. In the liver, there is a synthesis of triglycerides, phospholipids, cholesterol, bile acids, ketone bodies.

The liver is actively involved in carbohydrate metabolism. Galactose and fructose are converted into glucose in the liver, glycogen is synthesized and decomposed, glucose is oxidized, glucose is formed from certain amino acids, and lactic, pyruvic, and glucuronic acids are synthesized. Hepatocytes are one of the most important depots of glycogen in the body.

The liver is an important depot of vitamins: A, D, K, PP; B12, folic acid, and others. Bile acids synthesized by hepatocytes are necessary for the absorption of fat-soluble vitamins (A, D, E, K) in the intestine. The liver plays the role of a depot for iron, copper, zinc, manganese, molybdenum. A very important type of metabolism, which is directly related to the diagnosis of liver diseases, is the exchange of enzymes. In the liver, not only the vast majority of them are synthesized, but also their dynamic constancy is ensured, and their decay is also regulated. Liver enzymes are divided into three groups: 1) secretory; 2) indicator (markers of hepatocyte cytolysis); 3) excretory (markers of cholestasis). Secretory enzymes are synthesized in the liver, then released into the blood plasma and there they carry out their activities. This group includes blood coagulation factors, cholinesterases, ceruloplasmin. Indicator (cytolytic) enzymes make it possible to assess the degree of destruction of hepatocytes. These include aspartate and alanine aminotransferases (ASAT, AlAT), lactate dehydrogenase (LDH), etc., located in the cytoplasm. Glutamate dehydrogenase (GlDH), malate dehydrogenase (MDH) are located in the mitochondria. Membrane-bound excretory enzymes, the amount of which increases in the blood during cholestasis, include gamma-glutamate dehydrogenase (GGTP), alkaline phosphatase (AP), leucine aminopeptidase -LAP,

and 5-nucleotidase.

The liver is involved in maintaining and correcting the acid-base balance. It serves as a supplier of blood protein buffer, maintains a normal level of ammonia in the blood. Hepatocytes use lactate, pyruvate, and amino acids in gluconeogenesis. Ketone bodies and bicarbonate are synthesized in the liver.

The excretory function of the liver is the formation and secretion of bile into the intestines. Bile is a complex aqueous solution of organic and inorganic substances with osmotic properties similar to those of plasma. The main organic components of hepatic bile are bile acids (FA), phospholipids (lecithin), cholesterol, and bile pigments (bilirubin).

Bile acids are synthesized from cholesterol, which consumes about 40% of its content in the body. Cholic and chenodeoxycholic fatty acids are formed in the liver. LC synthesis is regulated by the negative feedback mechanism. Under various conditions leading to a decrease in the FA pool (loss of bile through the fistula, cholestyramine intake, resection of the small intestine), FA synthesis increases by 5-10 times. The bile acid CoAesterases formed at the final stage of synthesis are conjugated with taurine and glycine and enter the small intestine to carry out the micellar phase of digestion and absorption of fats. The bulk of fatty acids (more than 90%) is absorbed in the small intestine and returned to the liver through the portal vein system (hepato-intestinal cycle), so their content in the blood is negligible. FAs are the most important stabilizer of the colloidal state of bile. Violation of the composition of bile can contribute to the formation of stones in the biliary tract.

The participation of the liver in pigment metabolism consists in the capture from the blood of unconjugated (unbound, indirect) bilirubin, formed in the reticuloendothelial system from hemoglobin during the destruction of erythrocytes, its conjugation with glucuronic acid, and excretion into the bile in the form of conjugated (connected to glucuronic acid, direct) bilirubin. The name direct bilirubin reflects its ability to give a positive direct reaction with Ehrlich's reagent without the addition of alcohol, and indirect bilirubin is detected only after the

precipitation of proteins associated with it with alcohol. The name is considered obsolete.

The detoxifying function of the liver is to neutralize several toxic products of both endogenous and exogenous origin, for example, such as phenol, skatole, indole, putrescine, cadaverine, etc., formed under the action of microbial flora in the intestine and entering the liver through the portal system. veins. Under the action of alcohol dehydrogenase of hepatocyte mitochondria, ethyl alcohol is converted into aldehyde, followed by its oxidation. In the course of reduction reactions, nitro compounds are rendered harmless. By hydrolysis, several medicinal substances are detoxified, for example, cardiac glycosides. Some toxic substances are neutralized by including in the synthesis of substances that are harmless to the body, for example, a very toxic end product of protein metabolism - ammonia in the liver turns into non-toxic (up to certain limits) urea, which is excreted from the body with urine. One of the methods of detoxification is the formation of paired compounds with glucuronic or sulfuric acid (conjugation), leading to inactivation or increased solubility and accelerated excretion of the resulting products. This inactivates steroid hormones, unbound bilirubin, bile acids, aromatic hydrocarbons, and their derivatives. 5 Many hormones are metabolized in the liver: glucocorticoids, aldosterone, ADH, estrogens, insulin, thyroxine, serotonin, and histamine are inactivated.

The barrier function of the liver is carried out due to the protective action of Kupffer cells, which remove microorganisms, their toxins, antigens, immune complexes, fat droplets, obsolete blood cells, etc. from the blood by phagocytosis. 95% of substances with antigenic properties are neutralized by Kupffer cells of the liver. Specific (immune) protective reactions are carried out by lymphocytes of the hepatic lymph nodes.

The liver is also credited with hormonal functions. In the embryonic period, it is characterized by the function of hematopoiesis, since erythrocytes are formed in it, and after birth, it is a "depot" of blood.

The liver is a multifunctional organ. It performs the following functions.

1. Participates in protein metabolism. This function is expressed in the breakdown and rearrangement of amino acids. In the liver, deamination of amino acids occurs with the help of enzymes. The liver plays a decisive role in the synthesis of plasma proteins (albumins, globulins, fibrinogen). The liver contains a reserve protein, which is used when there is a limited intake of protein from food.

2. The liver is involved in carbohydrate metabolism. Glucose and other monosaccharides entering the liver are converted into glycogen, which is stored as a reserve of sugar. Lactic acid and the breakdown products of proteins and fats are converted into glycogen. When glucose is consumed, glycogen in the liver is converted into glucose, which enters the bloodstream.

3. The liver is involved in fat metabolism through the action of bile on fats in the intestine, as well as directly through the synthesis of lipids (cholesterol) and the breakdown of fats with the formation of ketone bodies. Fatty acids are oxidized in the liver. One of the most important functions of the liver is the formation of fat from sugar. With an excess of carbohydrates and proteins, lipogenesis predominates, and with a lack of carbohydrates, gluconeogenesis from protein predominates. The liver is a depot of fat.

4. The liver is involved in the metabolism of vitamins. All fat-soluble vitamins are absorbed in the intestinal wall only in the presence of bile acids secreted by the liver. Some vitamins are stored in the liver. Many of them are involved in chemical reactions occurring in the liver. Part of the vitamins is activated in the liver, undergoing phosphorylation.

5. The liver is involved in the metabolism of steroid hormones and other biologically active substances. Cholesterol is formed in the liver, which is a precursor of steroid hormones. In the liver, there is splitting and inactivation of many hormones: thyroxine, aldosterone, blood pressure, insulin, etc.

6. The liver plays an important role in maintaining homeostasis due to its participation in hormone metabolism.

7. The liver is involved in the exchange of trace elements. It affects the absorption of iron in the intestine and deposits it. The liver is a depot of copper and

zinc. It takes part in the exchange of manganese, cobalt, etc.

8. The protective (barrier) function of the liver is manifested in the following. First, microbes in the liver undergo phagocytosis. Secondly, liver cells neutralize endogenous and exogenous toxic substances. All blood from the gastrointestinal tract through the portal vein system enters the liver, where substances such as ammonia are neutralized (turned into urea). In the liver, toxic substances are converted into harmless paired compounds (indole, skatole, phenol).

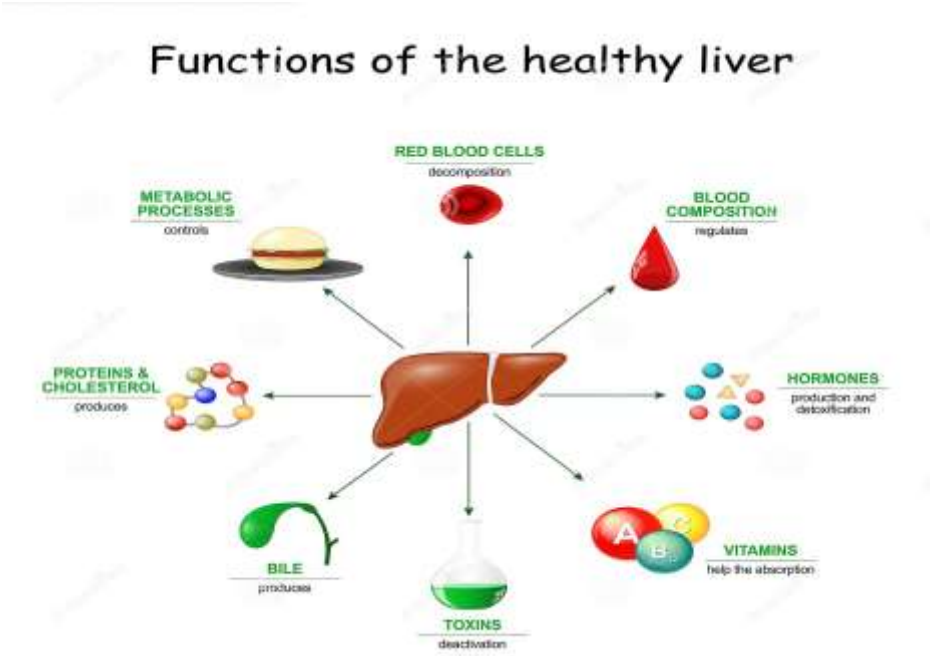
9. Substances are synthesized in the liver, and components of the anticoagulant system are involved in blood coagulation.

10. The excretory function of the liver is associated with bile formation since the substances excreted by the liver are part of the bile. These substances include bilirubin, thyroxine, cholesterol, etc.

11. The liver is a blood depot.

12. The liver is one of the most important organs of heat production.

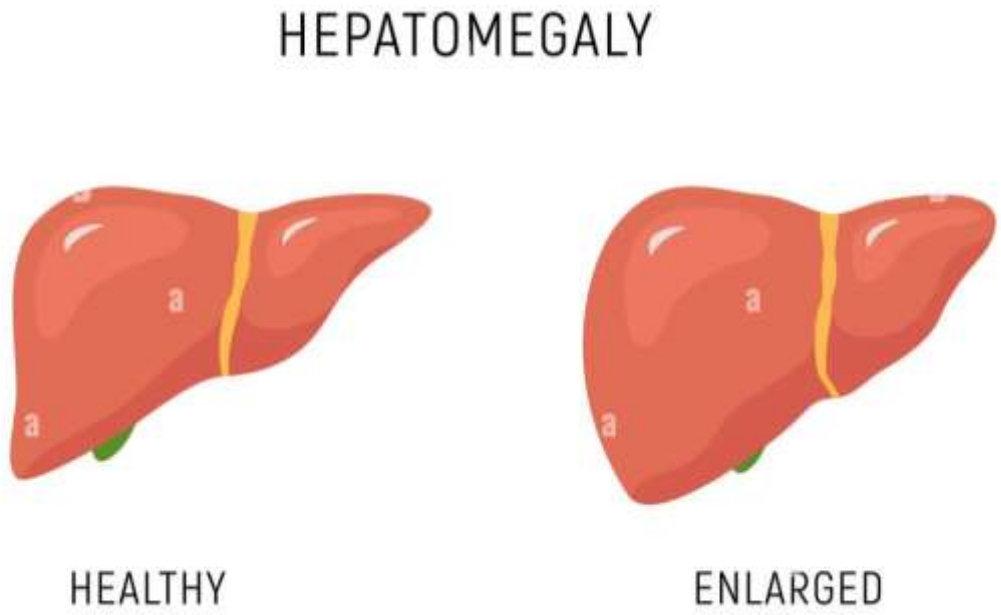
13. The participation of the liver in the processes of digestion is provided mainly by bile, which is synthesized by liver cells.



PATHOPHYSIOLOGICAL SYNDROMES

I. Hepatomegaly (enlargement of the liver) is the most common symptom of liver disease. It can be caused by: dystrophy of hepatocytes, lymphomacrophage infiltration in acute and chronic hepatitis, development of regenerative nodes and fibrosis in cirrhosis; stagnation of blood in heart failure, endophlebitis of the hepatic veins, constrictive pericarditis; intrahepatic cholestasis in primary biliary cirrhosis and extrahepatic - in violation of the outflow of bile (with the formation of secondary biliary cirrhosis); focal lesions in tumors, abscesses, cysts.

In 88% of healthy people, the lower edge of the liver is palpable, it is soft, painless, even. With liver diseases, it can be dense, sharp; in patients with cardiac stagnation - rounded, with tumors and parasitic diseases - tuberous. A rapid increase in the liver is characteristic of acute viral hepatitis, malignant tumors. A rapid decrease in the organ indicates the development of massive necrosis and is a poor prognostic sign. With cirrhosis, the liver initially increases, and at the end of the disease, it decreases.



II. Hepatolienal syndrome is a combined enlargement of the liver and spleen, due to a common connection with the portal vein, common lymphatic drainage, common innervation, and also belonging to a single system of mononuclear phagocytes. The development of this syndrome is observed in acute

and chronic diffuse lesions of the liver; congenital and acquired defects of the vessels of the portal system, systemic blood diseases, chronic infections.At the same time, hyperplasia of the reticulohistiocytic tissue, infiltrative-proliferative and dystrophic changes are noted in both organs.

III. Hypersplenism is a syndrome that is expressed by an increase and perversion of the function of the spleen to remove destroyed platelets, granulocytes and erythrocytes. Increased destruction of full-fledged blood cells is manifested by leukopenia, thrombocytopenia, and anemia. An important role can be played by immune mechanisms induced by the hepatitis B virus and alcoholic hyaline, which lead to splenogenic inhibition of bone marrow hematopoiesis and immune cytopenia.

IV. Asthenovegetative syndrome accompanies most liver diseases. This syndrome is manifested by weakness, depressed mood, irritability, insomnia, decreased performance and may indicate hepatocellular insufficiency.

V. Dyspeptic syndrome is observed in many liver diseases. Poor appetite, nausea, heaviness in the epigastrium, belching, bloating, constipation may be due to hepatocellular insufficiency, intra- and extrahepatic cholestasis, and portal hypertension. Perhaps weight loss (poor nutrition syndrome), sometimes reaching cachexia.

VI. Hemorrhagic syndrome, which is manifested by the appearance of a petechial rash and hemorrhages in the skin. The development of the syndrome is due to: a decrease in the synthesis of blood coagulation factors (I, II, V, VII, IX, X, XIII) in hepatocytes; a decrease in the number of platelets due to hypersplenism; increased consumption of both platelets and blood coagulation factors, activation of the fibrinolytic system.

VII.Portal hypertension is an increase in pressure in the portal vein basin due to impaired blood flow either in the portal, or in the hepatic, or in the inferior vena cava.

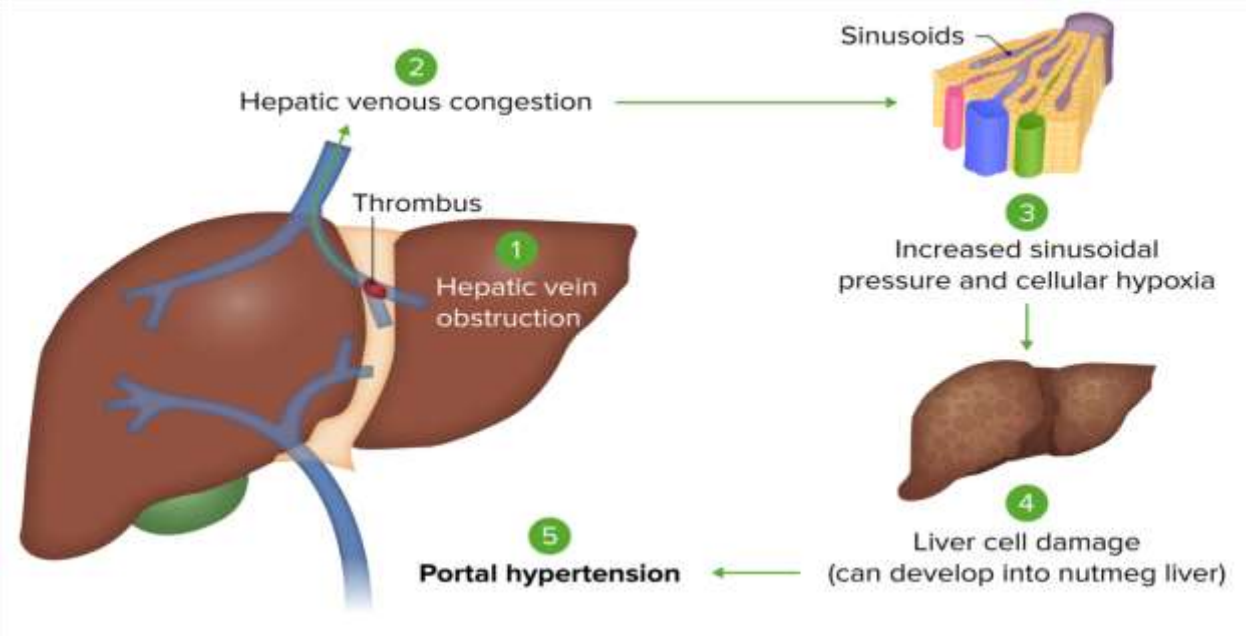
Hepatic blood flow is characterized by the connection of arterial and venous flows in the central vein of the hepatic lobules. If in the precapillary part of the

arterial system the pressure is 110-120 mm Hg. Art., then in venules - only 5-10 mm Hg. Art. This huge difference would have to lead to an exclusively arterial blood flow, which is prevented by a system of special sphincters that equalize this pressure difference. As a result, 75% of the total blood flow goes through the portal vein, and only 25% goes through the artery. Thus, it is not only about equalizing the pressure, but also about creating an advantage for the venous flow, which comes at very low pressure. Every minute, 1500 ml of blood flow through the vessels of the liver.

There are **three forms of portal hypertension:**

1**) subhepatic block** caused by a congenital anomaly of the portal vein or compression of the portal collector, resulting in increased pressure in the portal vein;

2) **suprahepatic block**, which develops as a result of thrombosis of the hepatic veins; compression of the hepatic veins (Budd-Chiari syndrome), right ventricular heart failure;



3) **intrahepatic block,** which is associated with diffuse liver diseases. In 70% of cases, the cause of this block is cirrhosis of the liver. This form is based on the disorganization of the liver structure due to regeneration and the formation of false lobules. The vascular architectonics is disturbed, the sphincters die and the obstacle in the way of the arterial flow is removed. Inflammatory processes in the

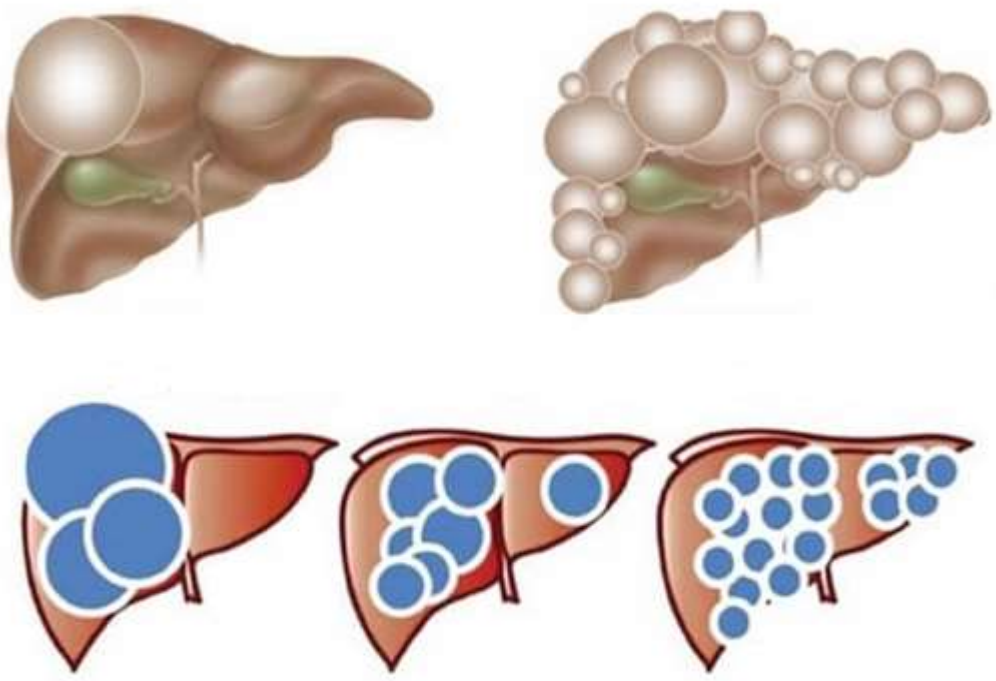
liver parenchyma, accompanied by swelling and increased pressure inside the hepatic lobule itself, lead to compression of the venous vessels.

A typical consequence of portal hypertension is the formation of a bypass phenomenon, in particular, between the portal vein and the inferior vena cava system outside the liver (portocaval shunts). Three main localizations of such shunts are known: cutaneous anastomoses in the navel, anastomoses in the lower third of the esophagus, and hemorrhoidal veins. Blood shunting partially or completely turns off the antitoxic function of the liver, since blood with a large number of toxic substances coming from the intestine through the portal vein bypasses the liver parenchyma and enters the general circulation. The result of this is severe intoxication of the body. Portal hypertension is accompanied by the following symptoms and syndromes: hepatomegaly, splenomegaly or hypersplenism, malnutrition (a person with thin, thin limbs and a large belly due to ascites 10 has a "spider" figure); varicose veins of the lower third of the esophagus, stomach, hemorrhoidal veins, veins of the anterior abdominal wall (“jellyfish head” symptom); hemorrhagic syndrome (bleeding from varicose veins is one of the most common causes of death in patients), ascites, intoxication.

VIII. Ascites is the accumulation of fluid in the abdominal cavity. Most common in cirrhosis of the liver. Ascitic fluid is like a plasma ultrafiltrate, its components are in dynamic equilibrium with the plasma components.

NONPARASITIC LIVER CYSTS

Non-parasitic cysts of the liver are a variety of nosological forms that are combined according to one feature: the formation of a cavity or cavities filled with liquid in the liver. Cysts can be single or multiple. Polycystic disease refers to the defeat of more than 60% of the liver tissue in both lobes.



Classification:

True cysts (congenital) arise from aberrant bile ducts, i.e. during embryonic development, there is no connection to the biliary tract system of individual intralobular and interlobular bile ducts; the absence of involution and dilation of these passages leads to the development of cysts. They are lined from the inside with the epithelium of the bile ducts. False cysts:

Post-traumatic - the outcome of resorption of a traumatic central or subcapsular rupture of the liver (hematoma). Their wall consists of fibrous-modified liver tissue.

Inflammatory - after conservative and puncture treatment of liver abscess, after echinococcectomy.

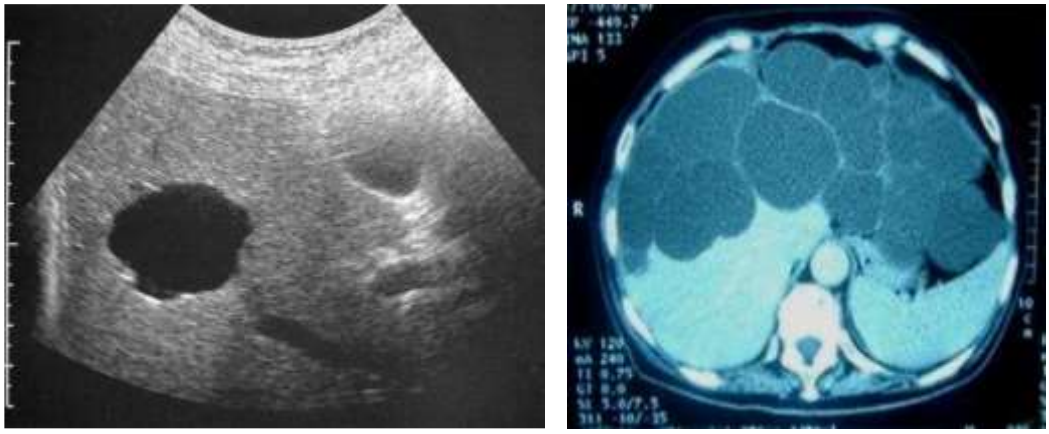
Clinical symptoms

The main feature of non-parasitic liver cysts is their predominantly asymptomatic course. Vague pains in the right hypochondrium and epigastric region are associated with compression of the liver parenchyma and stretching of the Glisson capsule. Asymmetry of the abdomen can be observed, a tumor-like formation in the right hypochondrium can be determined.

With compression of the portal vein, signs of portal hypertension develop (ascites, varicose veins in the esophagus, etc.); with compression of the bile ducts - obstructive jaundice; with compression of the duodenum - duodenostasis.

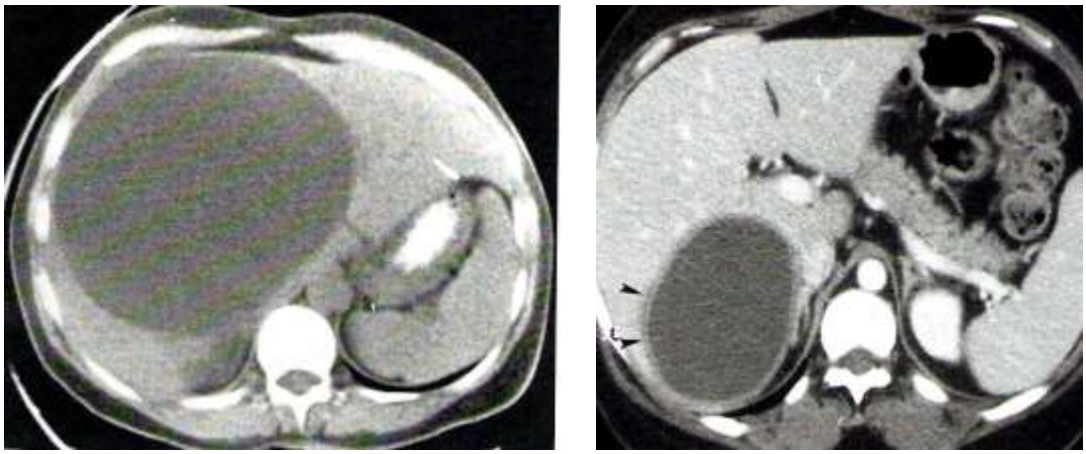
The decisive factor in the diagnosis belongs to ultrasound and CT (MRI).

Characteristic features of ultrasound of non-parasitic cysts are echo-negative liquid formations of a round or oval shape with clear, even contours and a thin capsule. There is an increased reflection of the echo signal from the posterior wall of the cyst and an amplification effect behind it, often with lateral attenuation of the echo signal.



Instrumental diagnosis of liver cysts: on the left - ultrasound (simple solitary liver cysts, the effect of acoustic amplification from the posterior wall on the right); right — CT scan for polycystic liver disease

Liver cyst must be differentiated from the abscess



Differential diagnosis between a cyst and a liver abscess: on the left - a liver cyst; on the right - an abscess; thicker abscess wall indicated by arrows

Complications of cysts are hemorrhage into the lumen of the cyst, suppuration of cysts, perforation of the cyst, torsion of the cyst on the leg,

malignant degeneration.

Treatment

The tactics of treatment are differentiated and depend on the size of the cysts, localization, the presence of complications, and concomitant diseases.

Patients with cysts up to 3–5 cm in diameter are subject to dispensary observation with ultrasound control every 3–6 months. As the cyst grows, the risk of complications (hemorrhage, cyst rupture) increases. This determines the need to start treatment of patients with non-parasitic liver cysts immediately after their detection, even if they are small.

Indications for surgical treatment:

• **absolute**: suppuration, rupture, bleeding;

• **conditional-absolute**: a giant cyst of any localization more than 10 cm in diameter, a cyst with a central location in the hilum of the liver, a cyst with a pronounced clinical picture;

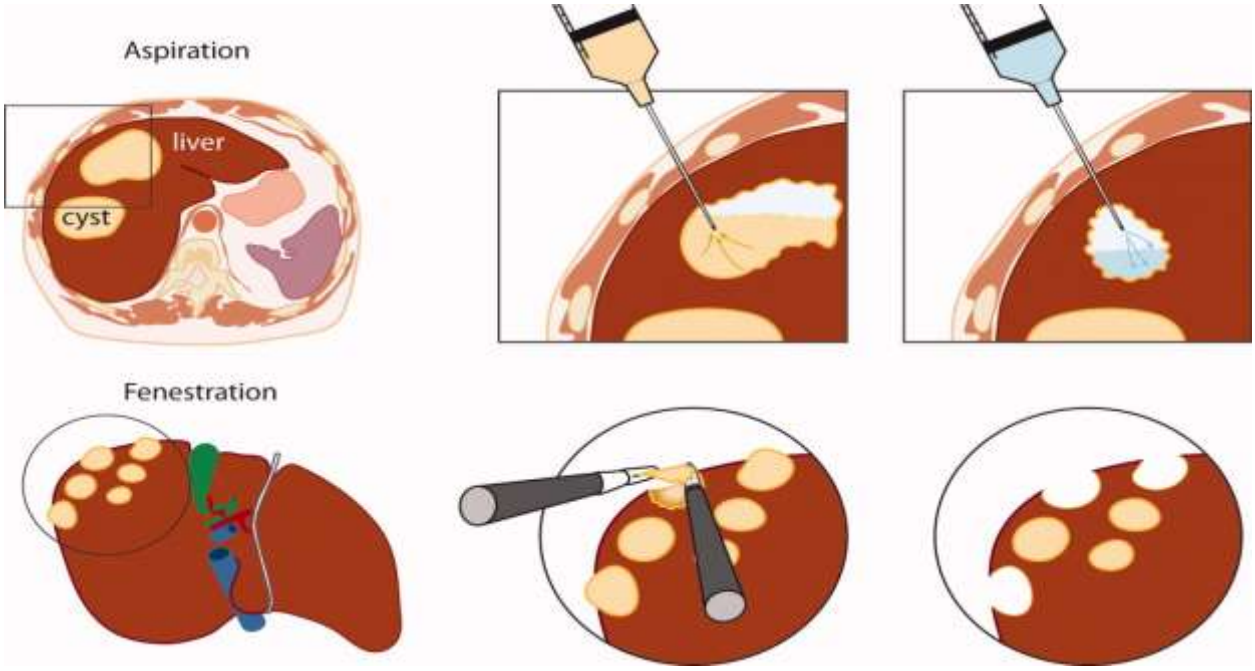
• **relative:** large cysts from 3 to 10 cm in diameter, isolated cyst III-IV segments, recurrent liver cysts in case of failure of puncture methods of treatment.

Surgical interventions for liver cysts are divided into:

• **radical:** liver transplantation for polycystic;

• **conditionally radical**: husking of the cyst with its membranes; resection of the affected part of the liver; laparoscopic excision of the cyst wall (domectomy);

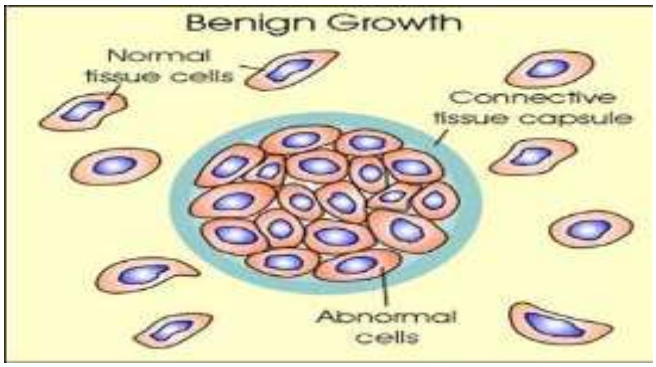
• **palliative:** partial excision of the cyst, opening, and emptying of the cyst; Marsupialization of the cyst during suppuration.



Particular attention is paid to minimally invasive surgery: percutaneous transhepatic cyst puncture under ultrasound or CT control, contrast enhancement, aspiration, external drainage, sclerotherapy. These methods are contraindicated in case of cyst connection with bile ducts, cyst rupture, massive hemorrhage into the cyst cavity.

BENIGN LIVER TUMORS

The frequency of benign liver tumors in recent years tends to increase due to the widespread use of hormonal contraceptives, in addition, the detection of lesions in the liver has increased significantly as a result of the widespread use of ultrasound.



Classification of benign neoplasms of the liver (according to Hamilton, 2000).

Epithelial tumors:

• hepatocellular adenoma;

• focal nodular hyperplasia;

• adenoma of intrahepatic bile ducts;

• cystadenoma of intrahepatic bile ducts;

• papillomatosis of intrahepatic bile ducts.

Non-epithelial tumors:

• hemangioma;

• infantile hemangioendotheleoma;

• angiomyolipomas;

• lymphangioma and lymphangiomatosis.

Tumors of mixed structure:

• solitary fibrous tumor;

• benign teratoma.

Mixed changes:

• mesenchymal hamartoma;

• nodal transformation;

• inflammatory pseudotumor.

As a rule, benign liver tumors with small sizes do not have clinical manifestations and are detected by chance during the ultrasound, and complaints appear with large neoplasms.

Differentiation of benign tumors should be from primary liver cancer, as well as from metastatic lesions. The diagnostic algorithm, in this case, includes the performance of ultrasound, CT, MRI, blood tests for tumor markers (AFP, CEA, CA19-9). In difficult differential diagnostic situations, video laparoscopy and fine-needle puncture biopsy are performed.

The most common benign liver tumors are hemangioma, hepatocellular adenoma, and focal nodular hyperplasia. Other forms of tumors are extremely rare.

HEMANGIOMA OF THE LIVER

Hemangiomas of the liver were first described by Dupuytren and

Gruveilhier in 1816, they are the most common liver tumors, are detected in 0.4–7.3% of autopsies, and account for up to 80% of all benign liver tumors. It is 4 times more common in women than in men. They are asymptomatic and are often found on ultrasound. For a long time, they may not change their size.

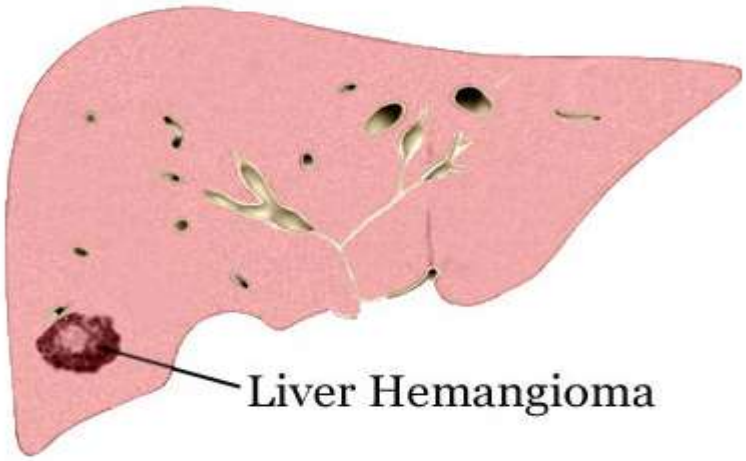
Hemangiomas consist of many vessels filled with blood and blood clots, separated by fibrous septa. There are the following types of hemangiomas: cavernous (most common), capillary, mixed. Histological types of hemangiomas have the following characteristics: capillary (narrow vascular gaps, highly developed stroma), scirrhous (dilated blocked vessels, pronounced fibrous stroma), cavernous (large vascular lacunae separated by narrow fibrous layers). Although the venous vessels of the liver are the anatomical substrate for the development of hemangiomas, the hepatic artery, and its branches are recognized as their main sources of nutrition.

Hemangiomas are never malignant, however, in childhood, they must be differentiated from hemangioendotheliomas, which often undergo malignant transformation.

The clinical picture of hemangiomas is varied and depends on the size and location of the tumor. Complaints appear when the tumor reaches a size of more than 5 cm. The severity of the pain syndrome, which occurs in 50–75% of patients, depends on the degree of stretching of the Glisson capsule, on the state of hemodynamics in the portal vein (the presence of portal hypertension syndrome), on the compression of the bile ducts by the tumor in the gates of the liver (the presence of obstructive jaundice) and impaired venous outflow from the liver.

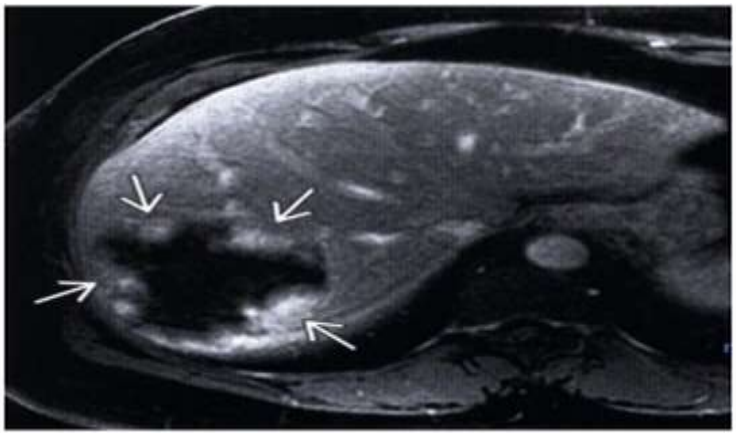
The most formidable complication, occurring in 10% of cases with large hemangiomas, is its spontaneous or traumatic rupture, accompanied by massive bleeding into the abdominal cavity and leading to death in 63–80% of cases. Other complications are also likely: tumor thrombosis with possible infection of a thrombus and subsequent abscess formation, torsion of the tumor stem with the appearance of symptoms of an "acute abdomen", fusion with the omentum or intestinal loops with the development of intestinal obstruction, hemangiomatous

degeneration of the liver with the development of hepatocellular insufficiency, hemobilia, impaired blood clotting (Kazabakh-Merritt syndrome is a disease of unknown etiology, characterized by a combination of large hemangiomas with thrombocytopenia and anemia).



Diagnostics

A comprehensive examination of patients with hepatic hemangiomas makes it possible to establish an accurate diagnosis in 82.5–100% of cases. In the diagnosis of liver hemangiomas, ultrasound (ultrasound), computed tomography (CT), magnetic resonance imaging (MRI), and angiography are used.

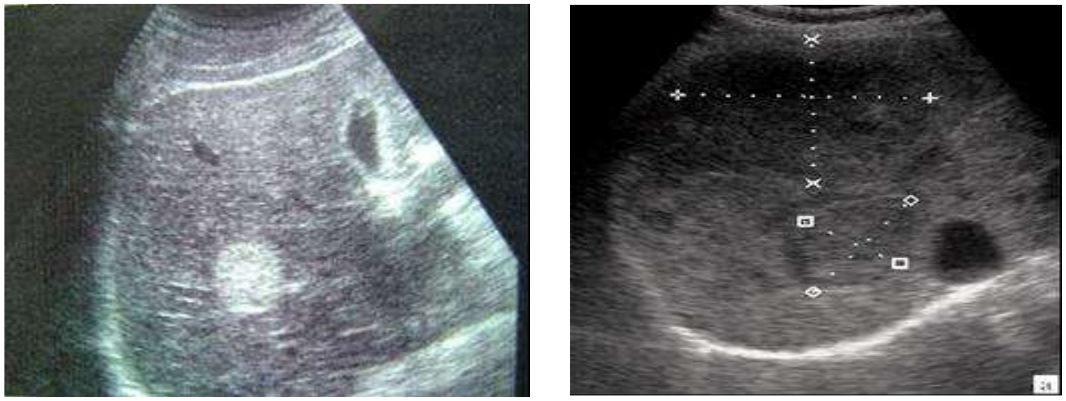


An instrumental examination of the patient begins with an ultrasound of the liver, given the non-invasiveness, economy, simplicity, and accessibility of this study. The detection of a liver lesion largely depends on its size, the presence of concomitant diffuse liver disease, the degree of vascularization of the lesion and its histostructure, as well as the presence or absence of necrosis foci in or around the

lesion, which determine the degree of echogenicity, as well as the radiopacity of the lesion.

Liver hemangiomas on ultrasound are clearly demarcated from surrounding tissues, uniformly hyperechoic, but their ultrasound signs vary significantly and are nonspecific. Acoustic amplification behind hemangiomas is observed in 75% of patients. Against the background of fatty infiltration of the liver, hemangiomas may be hypoechoic.

It should be emphasized that, despite the vascular nature of hemangiomas (morphologically, they are represented by venous lacunae), in most cases, no blood flow is recorded in them, in addition, there are no significant deviations in hemodynamic parameters in the hepatic artery, celiac trunk, and portal vein. The color Doppler mapping mode increases the sensitivity of the study. Hemangiomas have a characteristic appearance when using contrast agents: a gradual uneven accumulation of the drug, starting from the arterial phase, which spreads from the periphery to the center in subsequent phases of the study. In the delayed phase, the hemangioma may be fully contrasted. Full contrast enhancement is usually absent in large lesions, due to the presence of thrombosis or scarring in the center of the tumor.

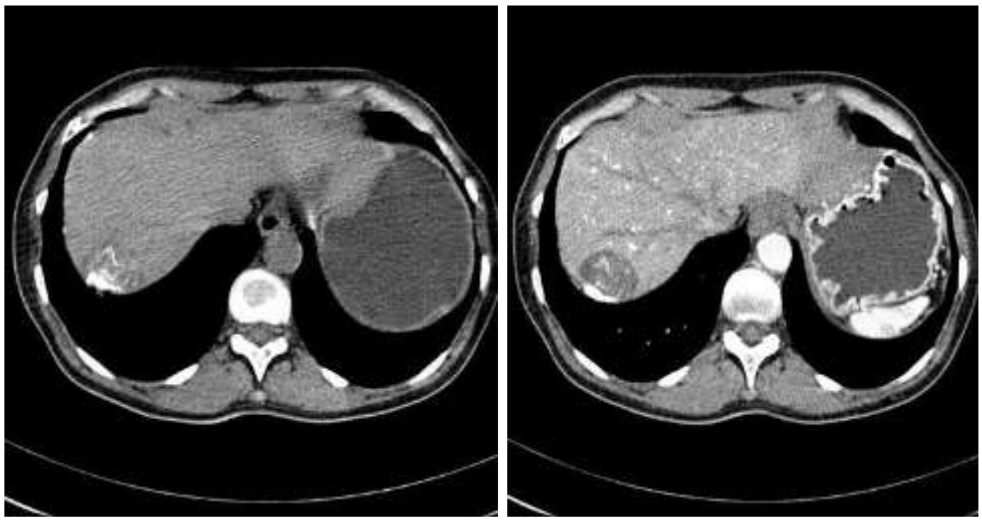


Ultrasound for hemangiomas of the liver: on the left - capillary type; right - cavernous type

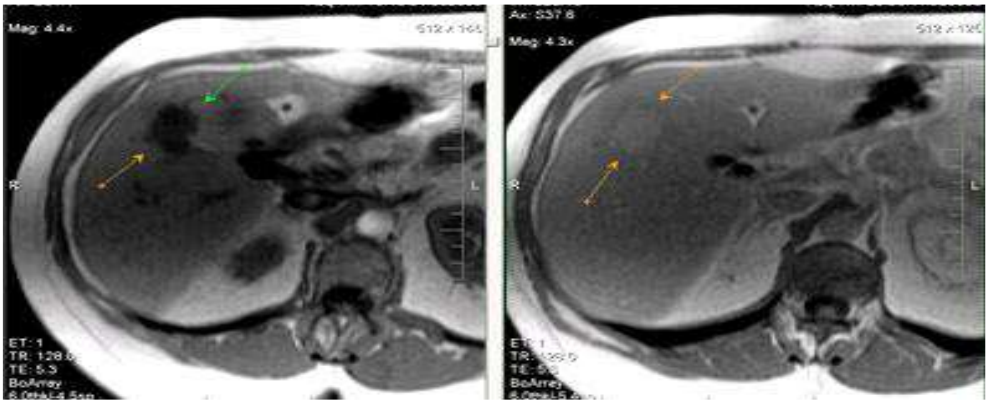
A highly informative examination method for liver tumors is CT, the value of which increases significantly with intravenous contrast. Therefore, when examining a focal liver mass, it is mandatory to obtain images before the injection of a contrast agent (native phase), in the arterial (30 seconds after its

administration), venous (60 seconds after administration), and delayed phases (a few minutes after administration). The characteristic CT signs of hemangiomas before intravenous enhancement are the clarity of contours, the uniformity of the structure with a density of up to 40N, as well as the presence of a hypodense area in the center (hyalinosis), the latter is more common in hemangiomas more than 5 cm in diameter. In the arterial phase, a pathognomonic sign is the accumulation of a contrast agent along the periphery of the tumor in the form of "tongues of flame".

MRI has high sensitivity (more than 90%) and specificity (90–100%) in the diagnosis of liver hemangiomas. In the pictures, hemangiomas have even borders. Sometimes they look like lobular homogeneous formations with partitions.



Giant hemangioma of the left lobe of the liver (CT with contrast): on the left, the native phase; right - arterial phase



Native (left) and postcontrast (right) MR images of hemangioma with diffuse enhancement

Radioisotope research methods are used when CT and MRI data are not enough to make a diagnosis. Planar scintigraphy with the introduction of 99mTc-

labeled erythrocytes has been used for many years to diagnose hemangiomas. The sensitivity in detecting hemangiomas larger than 2 cm is 82%, and the specificity is 100%.

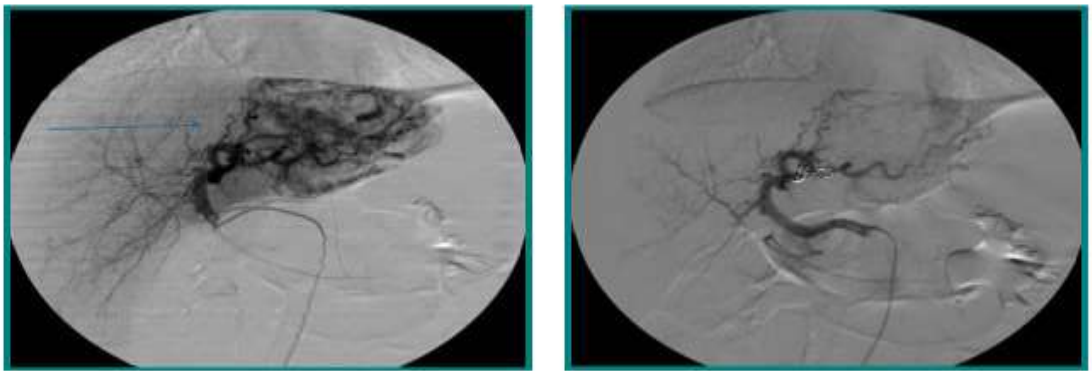
Percutaneous biopsy of a liver hemangioma, especially when superficially located, carries the risk of intra-abdominal bleeding. Characteristic signs of hemangiomas on CT, scintigraphy with 99mTc-labeled erythrocytes, and MRI make it possible to make a correct diagnosis in more than 95% of cases. The need for a biopsy rarely occurs when non-invasive research methods are not informative. For differential diagnosis, laparoscopy can be used.

Treatment of hemangiomas

Indications for surgical treatment, according to most authors, occur when the hemangioma is large (from 10 cm). With such tumor sizes, clinical signs may appear in the form of pain syndrome, symptoms of compression of neighboring organs. When hematomas rupture with intra-abdominal bleeding, there are indications for emergency surgery. Also, the operation is indicated when it is impossible to exclude a malignant process. With a tumor size of less than 10 cm and in the absence of clinical manifestations, dynamic observation with a control ultrasound every six months is indicated.

Surgical treatment in most cases is performed in the amount of peritumoral resection, since, given the benign nature of the neoplasm, one should strive to maximize the preservation of healthy liver parenchyma. Extensive anatomical resections of the liver are performed for giant hemangiomas, which almost

completely replace the volume of the anatomical lobe. To reduce the blood filling of the tumor and reduce the risk of blood loss with large hemangioma, preliminary X-ray endovascular occlusion of the feeding vessel with hydrogel emboli is possible. With small tumor sizes, sclerotherapy, laser, or cryodestruction of the tumor is possible.



Angiogram of the results of X-ray endovascular occlusion of liver hemangioma (left - before; right - after surgery)

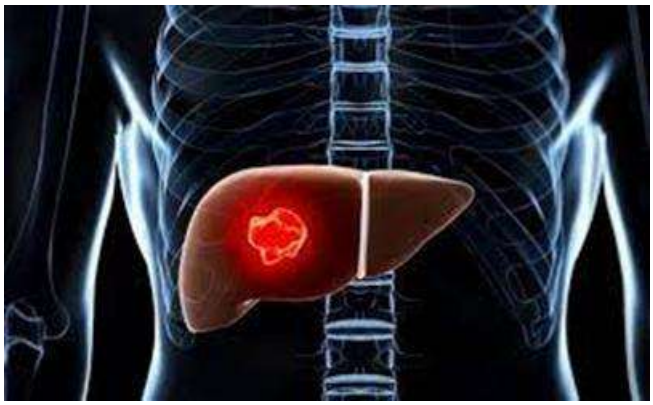
LIVER ADENOMA

(hepatocellular adenoma, HCA)

They are more common in women taking oral contraceptives, less often in men taking steroid hormones. A liver adenoma is a rare benign tumor of the liver. There are the following types of liver adenoma:

a) hepatocellular adenoma - consists of cells resembling hepatocytes;

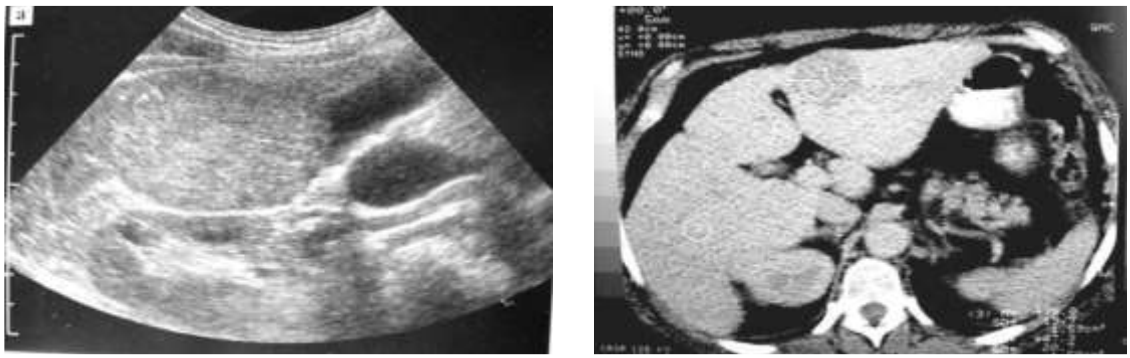
b) cystadenoma - consists of small proliferating bile ducts, lined from the inside with epithelium with the accumulation of mucus and formation of cysts.



Adenomas occur as one or more nodes with a diameter of 1 to 20 cm, delimited from the liver tissue and having a capsule. On the HCA section, a clearly

demarcated, sometimes encapsulated, fleshy white to the brown tumor, often unevenly stained due to foci of necrosis and/or hemorrhage. HCA has a histological and cytological similarity to normal liver parenchyma. Microscopically, the acini are disorganized, with several layers of normal hepatocytes visible, but no portal triads. An important difference from hepatocellular cancer is the preservation of connective tissue intercellular structures. The tumor never invades the liver vessels.

Instrumental diagnosis of liver adenomas is based on ultrasound data (a solid hyperechoic formation with clear boundaries), CT (a solid low-density formation that becomes iso- or slightly hyperdense with contrast enhancement). On angiography, the tumor appears as hypovascular lesions (the result of necrosis) surrounded by tortuous vessels. In some cases, the liver adenoma can be hyper vascularized, which makes it difficult to differentiate it from malignant tumors. When scintigraphy with Tc99, a filling defect is more often detected, which is associated with a small number of cells of the reticuloendothelial system in the tumor.



Diagnosis of liver adenoma: on the left - ultrasound; right – CT

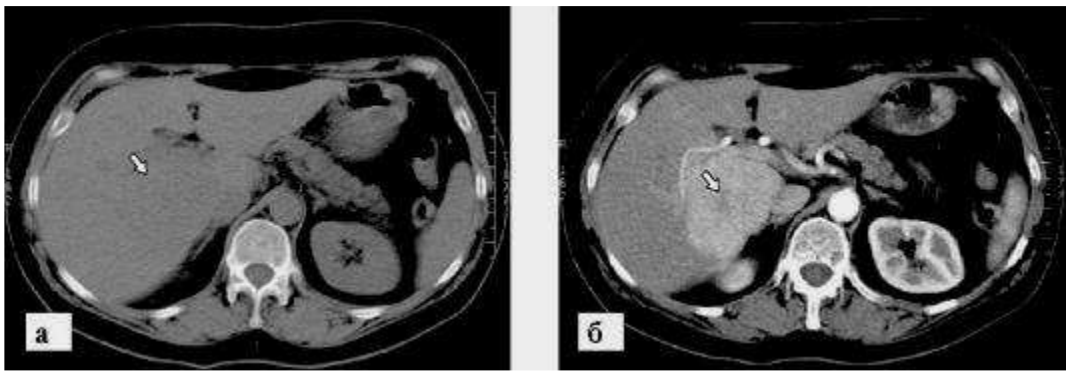
Therapy. In women, HCAs with an initial size of less than 5 cm rarely rupture and relatively rarely undergo malignancy. Women are advised to discontinue hormonal contraception and make lifestyle changes to reduce body weight. In men, in all cases of HCA, regardless of tumor size, resection, or radical treatment is indicated due to the very high incidence of malignancy. In all cases of suspected HCA after 6 months. after its detection, repeat MRI with contrast. If

HCA does not become less than 5 cm or increases in diameter ≥ 20%, surgical treatment is indicated. Liver resection for adenomas to prevent recurrence of the disease should be performed within healthy tissues in compliance with all principles of ablastics. With a small size of the formation, resection of 1–2 segments is performed with urgent histological examination, with large size of the tumor - hemihepatectomy.

NODAL FOCAL HYPERPLASIA
(fibronodular hyperplasia, FNH)

More often this tumor occurs in middle-aged women. The leading role in the development of nodular hyperplasia is played by an increased concentration of endogenous estrogen since this tumor occurs mainly in women of childbearing age. There is also evidence of its association with the use of oral contraceptives with a high content of estrogens. This tumor is benign and never undergoes a malignant transformation. This eliminates the need for the termination of pregnancy when it is detected, which is mandatory for liver adenoma.FNG is represented by rounded solitary formations of a dense consistency, sometimes consisting of several nodes, either not differing in color from healthy parenchyma, or slightly pink. Microscopically, there are signs of disorganization of the liver lobules, but a characteristic manifestation is a presence of a stellate scar in the center of the tumor, formed by fibrous tissue, including proliferated bile ducts, inflammatory cell infiltrates, venous and arterial vessels with thickened walls. Microscopically, FNH may resemble cirrhosis with regenerative nodules. On CT and angiography, the tumor quickly accumulates contrast agent into the arterial phase and has clear contours (Figure 25). In rare cases, FNH is larger than 10–15 cm. FNH can be multifocal, and also associated with liver hemangioma and very rarely with liver adenoma.

With accurate diagnosis and asymptomatic course, surgical treatment is not indicated. It is necessary to differentiate between cirrhosis, liver metastases.

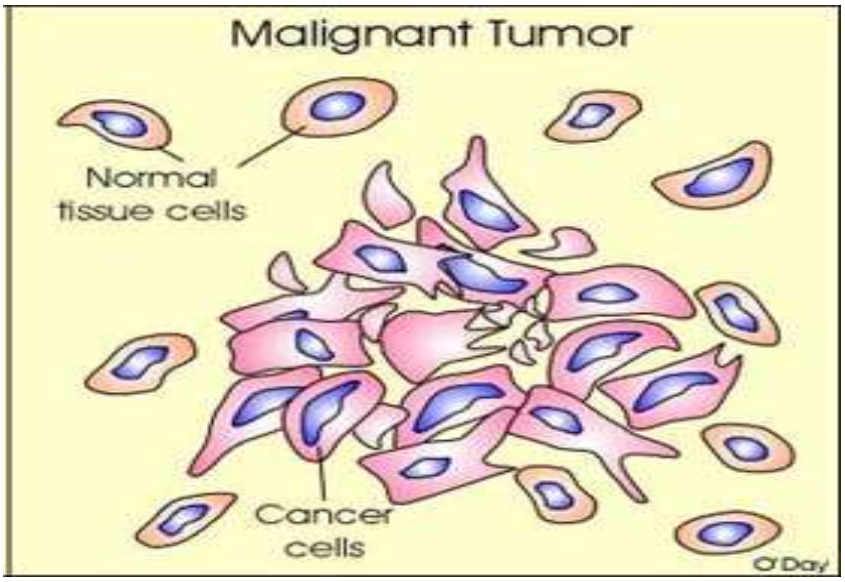


CT with FNG of the liver: a — on the tomogram before contrasting, a local change in the structure of the liver parenchyma is barely noticeable (arrow); b — in the arterial phase of contrast, a hypervascular formation with a scar in the center is visible (arrow)

Operations for HCA and FNH are performed according to the type of anatomic liver resection, and peritumoral resection is also possible. Planned interventions for benign liver tumors are accompanied by low mortality (up to 1%) and a small number of postoperative complications (up to 7%). At the same time, in emergency operations for tumor rupture, the mortality rate reaches 5–8%.

MALIGNANT NEOPLASMS OF THE LIVER

Malignant tumors of the liver include primary cancer, various types of sarcomas, as well as metastatic lesions of the liver with tumors of other localizations. Metastatic lesions significantly predominate over primary tumors, accounting for up to 95% of all malignant neoplasms of the liver.



Primary malignant tumors of the liver

By the international histogenetic classification of liver tumors (Hamilton, 2000), the following types of primary malignant tumors are distinguished:

Epithelial tumors:

• hepatocellular carcinoma (hepatocellular carcinoma);

• intrahepatic cholangiocarcinoma (cancer of the intrahepatic bile ducts);

• cystadenocarcinoma of the bile ducts;

• combined hepatocellular and cholangiocellular carcinoma (mixed hepatocholangiocellular carcinoma);

• hepatoblastoma;

• undifferentiated carcinoma (cancer).

Non-epithelial tumors:

• epithelioid hemangioendothelioma;

• angiosarcoma;

• embryonic sarcoma (undifferentiated sarcoma);

• rhabdomyosarcoma (occurs mainly in children of the first 5 years of life).

Tumors of mixed structure:

• carcinosarcoma;

• Kaposi's sarcoma;

• rhabdoid tumor.

CLINICAL AND ANATOMICAL CLASSIFICATION OF PRIMARY LIVER CANCER

T-primary tumor:

a) Tx - insufficient data to evaluate the tumor;

b) T0 - the primary tumor is not determined;

c) T1 — solitary tumor up to 2 cm in greatest dimension without vascular invasion;

d) T2 - solitary tumor up to 2 cm in greatest dimension with vascular invasion, or multiple tumors up to 2 cm in greatest dimension without vascular

invasion, limited to one lobe, or solitary tumor more than 2 cm in greatest dimension without vascular invasion;

e) T3 Solitary tumor greater than 2 cm in greatest dimension with vascular invasion, or multiple tumors greater than 2 cm in greatest dimension with vascular invasion, limited to one lobe, or limited to one lobe multiple tumors, any of which are more than 2 cm with or without invasion vascular invasion;

f) T4 - multiple tumors in both lobes or a tumor affecting the main branch of the portal or hepatic vein, or a tumor that spreads to neighboring organs other than the gallbladder, or a tumor that invades the visceral peritoneum.

N - regional lymph nodes (portal nodes of the liver located in the hepatoduodenal ligament):

a) Nx - insufficient data to evaluate regional lymph nodes;

b) N0 - lymph nodes of the gate of the liver and hepatoduodenal ligament are not affected;

c) N1 - there is a lesion of the lymph nodes of the gate of the liver or hepatoduodenal ligament.

M - distant metastases:

a) Mx - insufficient data to determine distant metastases;

b) M0 - no data on the presence of distant metastases;

c) M1 — the presence of distant metastases;

d) G — histopathological differentiation;

e) Gx - the degree of differentiation cannot be established;

f) G1 — high degree of differentiation;

g) G2 — average degree of differentiation;

h) G3 — low degree of differentiation;

i) G4 — undifferentiated tumors.

Macroscopically, primary liver cancer is represented by 3 types:

- massive form: has 2 options; in the first variant, the tumor is represented by one large node; in the second variant - one large node with metastases on the periphery;

- **nodular form**: in the parenchyma of one or both lobes, there are several tumor nodes of approximately the same size;

– **diffuse form**: less common and represented by uneven tumor infiltration or multiple small tumor nodes resembling areas of regenerative hyperplasia; as a rule, the defeat of both lobes.

Microscopic forms of the most common primary tumors:

1. **HCC (hepatocellular carcinoma, hepatoma, malignant hepatoma).** It occurs mainly in adults and accounts for 58 to 76% of all primary tumors. In men, it occurs 2 times more often. Often associated with cirrhosis. The color of the tumor depends on the secretion of bile and can vary from grayish-white to greenish-brown. More characteristic soft texture. Tumor cells resemble hepatocytes. The most common tumor variant is trabecular carcinoma. In addition, according to the WHO classification, it is recommended to distinguish pseudo glandular (acinar), compact and scirrhous variants.

There were no significant differences between the type of structure and epidemiological, biological, and clinical characteristics. In HCC, vascular invasion is often observed with the appearance of tumor thrombi in the vessels of the portal vein system, including thrombosis of its main trunk with the development of portal hypertension syndrome. With thrombosis of the hepatic veins or the inferior vena cava, Budd-Chiari syndrome may develop.

2**. CCR (HC, cholangioma, cancer of the intrahepatic bile ducts).** The tumor is represented by cells resembling the epithelium of the bile ducts. The cells are multinucleated giant, do not contain bile pigment, extra- and intracellular mucus may be present. It occurs in 7-35% of cases of primary liver cancer at the age of 50-70 years, equally common in women and men. Rarely associated with cirrhosis of the liver.

3**. Mixed hepatocholangiocellular carcinoma.** Contains elements of both HCR and CCR. The tumor is characterized by bile production and signs of mucus secretion. Occurs very rarely.

4. **Hepatoblastoma.** It accounts for 1-6% of all malignant tumors in children

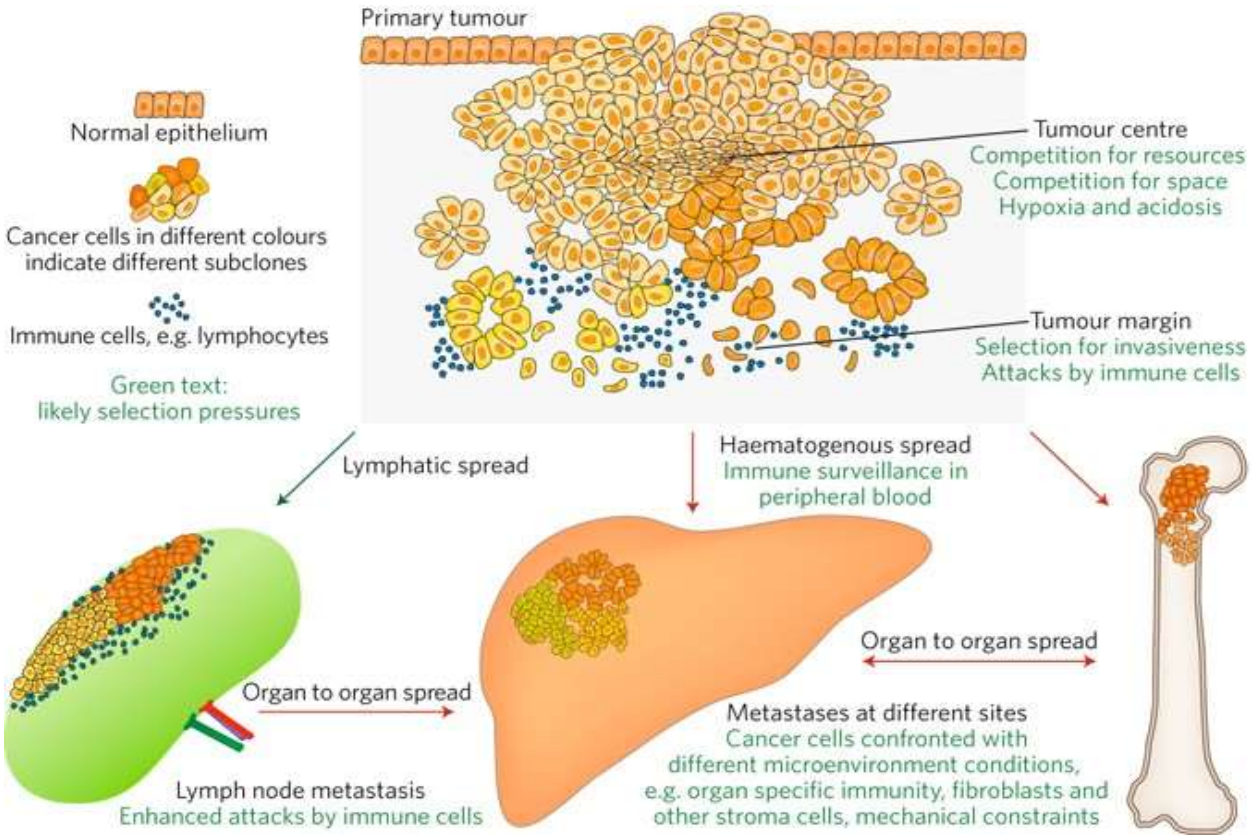
and 44-75% of all malignant liver tumors in children. Tumor cells are similar to primitive cells of the liver parenchyma or a combination of these cells with mesenchymal elements. The tumor is usually well-demarcated and partially encapsulated. It is found mainly in children under 2 years of age, it can be combined with congenital malformations. Microscopically, the tumor is represented by 2 variants: epithelial and mixed (epithelial-mesenchymal). The epithelial variant consists of 2 types of cells - embryonic and fetal. With a mixed type, sarcoma elements are added, most often corresponding to osteogenic sarcoma, chondro- or rhabdomyosarcoma.

Ways of metastasis:

1. **Hematogenous (main) path**: liver, lungs; less often bones, adrenal glands, kidneys.

2. **Lymphogenic pathway**: lymph nodes of the hepatoduodenal ligament, pancreatoduodenal lymph nodes.

3. **Implantation path**: parietal and visceral peritoneum, diaphragm.



METASTATIC TUMORS OF THE LIVER

Pathological and anatomical characteristics of metastatic liver tumors repeat the signs of tumors from the primary source. The most frequent localization of malignant neoplasms with metastases to the liver are the stomach, pancreas, colon, mammary gland, lung. Less commonly, tumors of the esophagus, ovaries, prostate, kidneys, skin melanoma metastasize to the liver. Of the metastasis pathways, the most significant is the hematogenous pathway during portal embolism of tumor cells to the liver. Metastases of adenocarcinoma of the digestive tract, mammary gland, lung, as a rule, are represented by dense whitish nodules of irregular or rounded shape. When metastasizing ovarian cancer, metastases are most often multiple whitish with clear contours, cystic or solid cystic structure, and soft texture. Metastases of renal cell carcinoma have clear contours, light brown color, and almost do not differ inconsistency from the liver tissue. Histological examination of metastases most often repeats the histological characteristics of primary tumors. Sometimes the difference may be in the degree of differentiation, which can make it difficult to establish the organ affiliation of the metastasis.

CLINICAL SIGNS OF LIVER CANCER

In the initial stages, liver tumors are asymptomatic or masked by symptoms of benign liver damage. This applies primarily to viral cirrhosis of the liver (hepatitis B and C) or alcoholic etiology, which is the main cause of primary liver cancer. Therefore, in many cases, liver cancer is detected at a fairly advanced stage. This indicates the importance of screening examinations of patients after hepatitis B and C, suffering from liver cirrhosis (1 time in 6 months, abdominal ultrasound and determination of a-fetoprotein). The main clinical signs of liver tumors are:

- deterioration of the general condition of the patient in the presence of previous hepatitis or cirrhosis;

- unintentional weight loss, loss of appetite, feeling of fullness in the stomach even after taking a light meal;

- nausea or vomiting;

- the appearance of first periodic, and then constant pain in the upper abdomen, right hypochondrium with irradiation to the right shoulder and subscapular region; pain may radiate to the right supraclavicular region with irritation of the diaphragm and/or its germination;

- unexplained increase in body temperature;

- with the progression of the process and a significant increase in the tumor, it can be palpated in the right hypochondrium and epigastric region in the form of a dense, bumpy, painless, or slightly painful tumor formation; in the case of tumor development against the background of cirrhosis, the latter begins to be palpated against the background of an enlarged tuberous liver;

- enlargement of the spleen, which is defined as a tumor-like formation in the left hypochondrium; enlargement of the spleen is a manifestation of the development of portal hypertension syndrome;

- an increase in the volume of the abdomen due to the accumulation of fluid in the abdominal cavity (ascites); ascites is an unfavorable symptom characteristic of the neglect of the process and is often one of the manifestations of portal hypertension syndrome;

- progression of the disease with compression or involvement in the tumor process of intra- and extrahepatic ducts, leading to the development of obstructive jaundice syndrome, the clinical manifestations of which are yellowing of the skin, sclera and visible mucous membranes, skin itching; urine turns dark (color of beer) and stool becomes discolored (gray);

- against the background of an enlarged abdomen, dilated veins on the anterior abdominal wall can be determined as a manifestation of portal hypertension syndrome; in the final stage of the disease, varicose veins of the esophagus may be complicated by esophageal-gastric bleeding (hematemesis, coffee grounds vomiting, melena, black stools, symptoms of anemia).

Hepatocellular carcinoma (hepatoma)

Hepatocellular carcinoma (HCC) is the most common epithelial malignant tumor of the liver (up to 85%). The ratio of men and women is 3–8:1. The greatest number of diseases is noted at the age of 40 to 50 years. Predisposing factors are cirrhosis of the liver (80–90% of patients have cirrhosis of the liver induced by hepatitis B), viral hepatitis C, chronic liver disease, alcohol abuse, aflatoxin poisoning, hormone therapy, hemochromatosis, Wilson-Konovalov disease, primary biliary cirrhosis of the liver, tyrosinemia, and glycogenosis.

There are 3 main macroscopic forms of hepatocellular cancer: nodular, massive, and diffuse. The massive form of cancer has 2 variants: in the first, it is represented by a single large node (massive simple form), in the second - by one large node with metastases on the periphery (a massive form with satellites).

Macroscopically, the tumor is represented by solitary or several nodes of a densely elastic consistency, whitish in color, on a cut with multiple foci of hemorrhage, necrosis, and local impregnation with bile (Figure 26). The tumor may have a clearly defined capsule, diffusely infiltrate the liver or protrude above the surface of the liver in the form of a fungus, i.e., local and diffuse forms of HCC

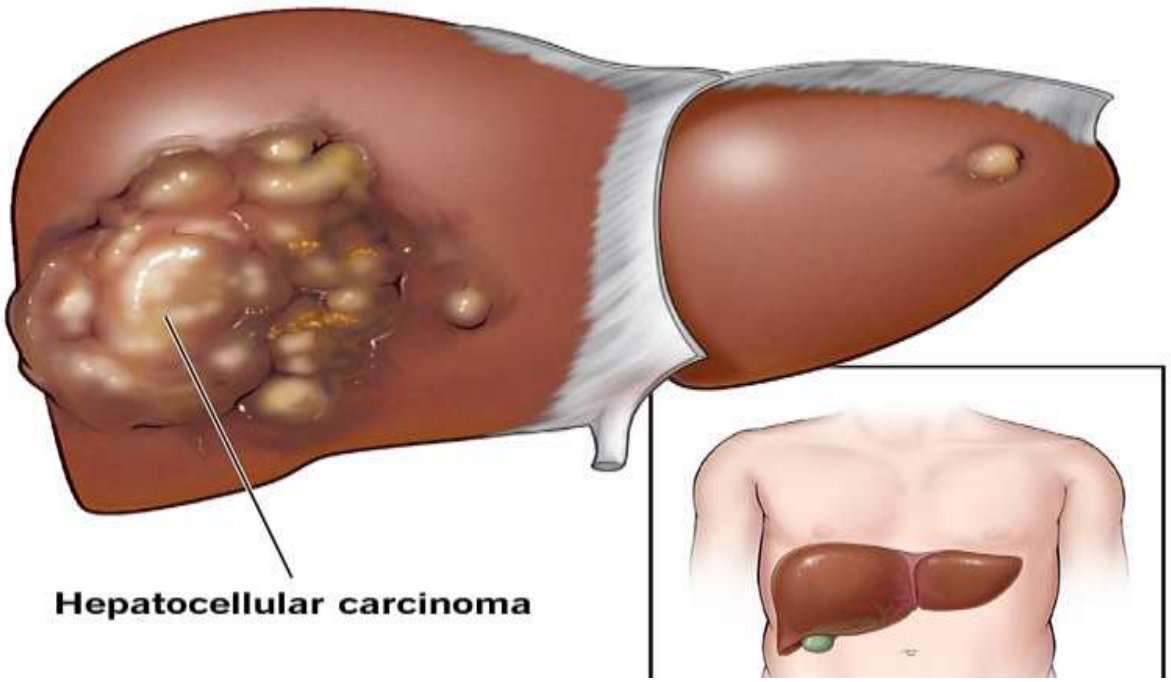
are isolated. The latter form is difficult to differentiate from cirrhosis of the liver. Microscopically, HCC is presented as a trabecular accumulation of atypical polymorphonuclear hepatocytes with the disappearance of stroma elements and accumulation of bile between tumor cells. Less common are other histological forms of HCC: fibrolamellar, sclerosing, and mixed.

Ways of metastasis of primary liver cancer:

• hematogenous (the main route of metastasis; most often the liver and lungs are affected, less often bones, adrenal glands, kidneys);

• lymphogenous (to the lymph nodes of the hepatoduodenal ligament, parapancreatic, gastroduodenal);

• implantation (in the diaphragm, parietal and visceral peritoneum).



Symptoms of HCC are non-specific and usually appear already at advanced stages of the disease. The main symptom is a feeling of heaviness and dull pain in the right hypochondrium. Other common symptoms are weight loss, progressive general weakness, early satiety, anorexia, nausea, vomiting, jaundice. The most common objective clinical signs are hepatomegaly, ascites, splenomegaly, jaundice, fever, exhaustion.

Diagnosis of malignant tumors of the liver

If a patient has a focal formation in the liver, certain diagnostic and therapeutic tactics should be followed:

• to verify the nature of the focal formation, if it is malignant, to establish the stage of the process;

• determine tumor resectability;

• if there are indications for liver resection, decide on the patient's tolerance for surgery and choose the extent of the liver resection;

• if the tumor is unresectable or the patient is inoperable, choose an alternative method of treatment. Each patient with focal liver formation should undergo a comprehensive examination, including:

• physical examination;

• laboratory research methods (biochemical parameters, coagulogram, tumor markers, assessment of liver functional reserves);

• Ultrasound and color duplex mapping;

• helical CT scan of the abdominal organs with intravenous bolus enhancement to determine the volume of the tumor and unaffected liver parenchyma remaining after resection of the lobe;

• MRI of the abdominal cavity;

• X-ray or spiral CT scan of the chest;

• esophagogastroduodenoscopy, colonoscopy;

• angiographic examination: celiacography, lower cavography (according to indications);

• biopsy of a liver tumor (according to indications);

• percutaneous transhepatic cholangiography (according to indications).

The study of the level of tumor markers provides some assistance in the differential diagnosis of malignant and benign liver tumors, as well as in the early detection of tumor recurrence.

Alpha-fetoprotein (AFP). Most adults have a plasma AFP concentration of less than 10 ng/mL. An increase in AFP concentration from 10 to 100 ng/ml can be observed in patients with benign liver diseases. A level above 500 ng/ml indicates

the presence of hepatocellular carcinoma. At the same time, an increase in the level of AFP is observed in hepatocellular cancer only in 30–90% of patients.

Carcinoembryonic antigen (CEA). More than 90% of healthy non-smokers have plasma CEA levels below 5 ng/mL. An increase in the level of CEA is observed in patients with various benign diseases of the gastrointestinal tract (liver disease, peptic ulcer, chronic pancreatitis, etc.). An increase in its level is also noted in liver failure since this antigen is eliminated mainly by the liver. The concentration of CEA increases in cancer of the colon, stomach, pancreas, lung, breast, ovaries.

Carboanhydrate antigen (CA19-9). An increase in CA19-9 levels is observed in the majority of patients with pancreatic and bile duct cancers, in 40-60% of gastric cancers, and in 20-40% of colorectal cancers.

CA125. The level of this marker is increased in ovarian cancer (80%), pancreatic cancer (60%), colorectal cancer (20%). Benign diseases of the gastrointestinal tract also lead to an increase in the level of CA125 (chronic pancreatitis, hepatitis, liver cirrhosis).

The level of tumor markers correlates with the stage of the tumor process, their sensitivity increases in advanced stages of cancer.

Instrumental diagnostics

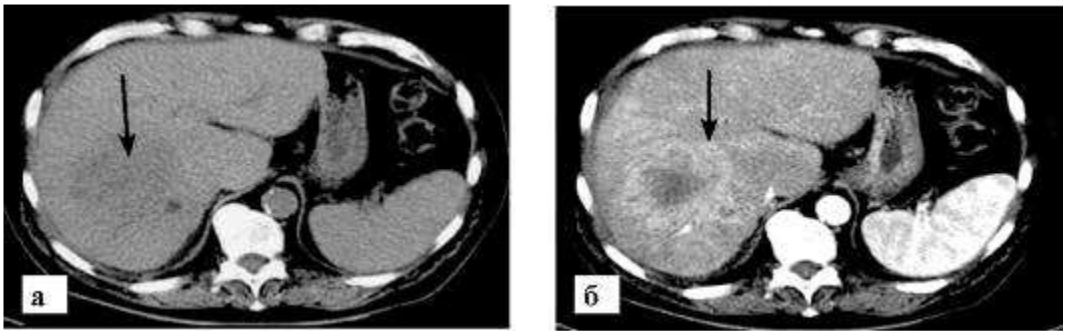
Ultrasound examination makes it possible to judge the size and structure of focal liver formation, its segmental localization, relationships with the main vessels of the liver, and is also able to reveal signs of extrahepatic spread of the process (presence of ascites, swollen lymph nodes), which is essential for the choice of treatment tactics. In some cases, the sensitivity of ultrasound exceeds the capabilities of CT, which can be observed with small focal liver formations.

Ultrasound picture of a hepatoma: a volumetric formation of varying echogenicity (like a "lump of plasticine") with tuberous contours without a capsule, often with a hypoechoic rim, deflecting and growing the vessels of the liver; Doppler study recorded an increase in blood flow.

Hepatocellular carcinoma (diffuse form)

Color duplex scanning of the vessels of the abdominal cavity will be performed primarily in order to determine the relationship of a focal liver formation with the main vessels.

Computed tomography (CT) and magnetic resonance imaging (MRI) with contrast enhancement is more informative diagnostic methods. At the same time, in the arterial phase, uneven central contrast of the tumor is observed, and in the parenchymal phase, the contrast agent is washed out more quickly from the tumor, which is especially noticeable against the background of contrasting of the unchanged parenchyma.



CT scan for hepatocellular carcinoma (arrow): a — in the liver parenchyma, before contrasting, an area with reduced density is visible; b - in the arterial phase, its inhomogeneous contrasting is noted. The contours of the tumor are bumpy, indistinct

Angiographic study. The need for its implementation has significantly decreased with the introduction of complex ultrasound and spiral computed tomography into clinical practice.

Fine-needle biopsy of the liver is indicated only in complex differential diagnostic cases, when the choice of treatment tactics depends on the nature of the neoplasm, the decision on surgical or conservative treatment.

Methods of direct contrast of the bile ducts are used for liver tumors with obstructive jaundice (with cholangiocarcinomas, tumors of the liver gates). It is most advisable to perform percutaneous transhepatic cholangiography, which ends with the imposition of a cholangiostomy for the purpose of biliary decompression, which is the final treatment option for common inoperable tumors, and for resectable neoplasms, it is performed as the first stage of surgical treatment

Cholangiocellular carcinoma

Cholangiocellular carcinoma (CCC) occurs in patients over 50 years of age. It makes up 25% of all malignant liver tumors; comes from the bile epithelium as cholangitis and extrahepatic bile ducts. Clinically, it is always manifested by obstructive jaundice with dilatation of the bile ducts, an increase in the level of alkaline phosphatase; at the same time, the level of the oncomarker carbonic anhydrase CA-19-9 was significantly increased. In 90% of bile duct tumors are adenocarcinomas, in 10% squamous cell carcinoma, carcinoid and leiomyosarcoma are detected.

According to the localization of CCR, the following forms are distinguished:

• Intrahepatic (25%).

• Extrahepatic cholangiocarcinomas:

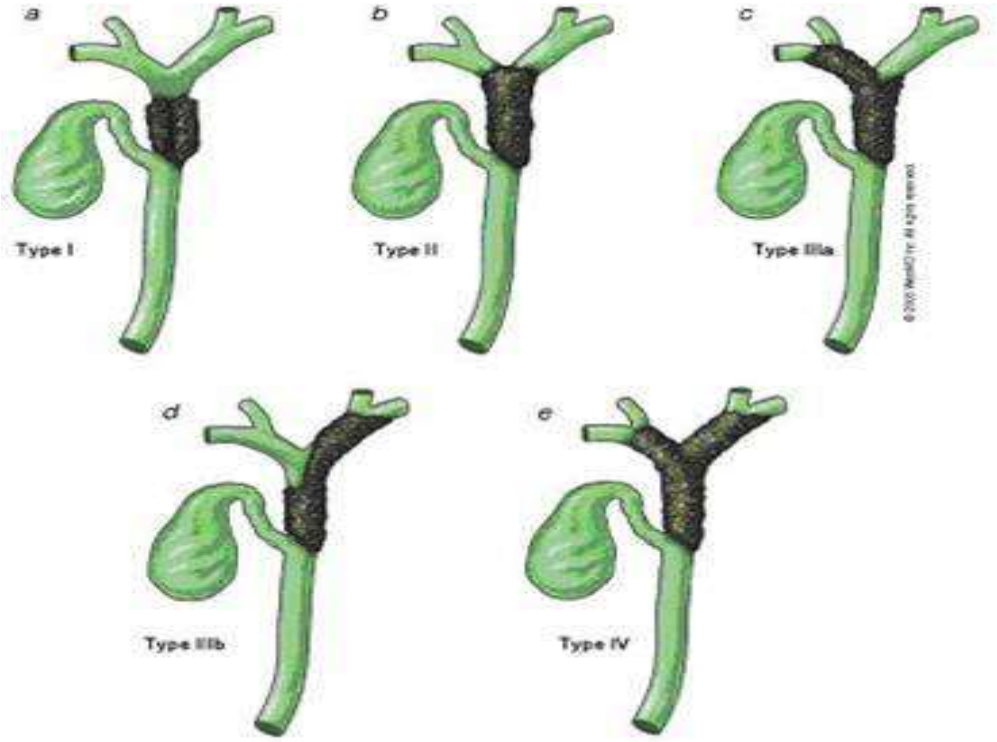
- proximal (Klatskin's tumors): come from the epithelium of the bile ducts in the gap between the place where the cystic duct enters the common hepatic duct and the segmental hepatic ducts of the second-order (50%);

- distal (choledochus to the ampulla) - 25%. About 5% of cases are

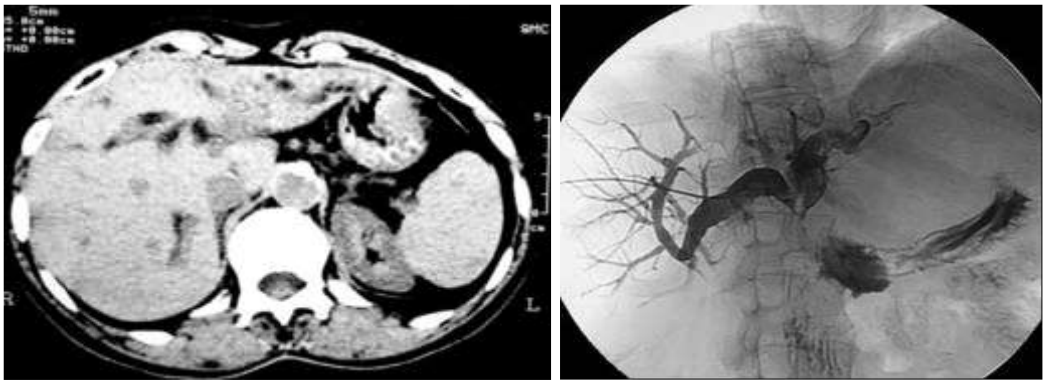
multifocal tumors. Among Klatskin tumors, depending on the nature of the damage to the ducts, several types are distinguished (Bismuth-Corlette classification). The second type of localization is more common.

Instrumental diagnostic methods: ultrasound, CT, MRI (magnetic resonance cholangiography), ERCP (endoscopic retrograde cholangiopancreaticography), PTCG (percutaneous transhepatic cholangiography).

With ultrasound, a volumetric formation of various echogenicity with the presence of calcifications is determined, the expansion of the bile ducts is proximal to the tumor; vessels are rarely involved in the pathological process; Doppler sonography showed that the tumor was poorly vascularized.



Bismuth-Corlette classification of common hepatic duct tumor



Diagnosis of CCC: on the left — CT with intrahepatic localization; on the right -

PTCG with extrahepatic localization (Klatskin's tumor)

Surgical tactics in malignant liver tumors

The resectability of HCC is 15–40%.

Signs of unresectable tumor:

• extensive bilobar liver damage;

• ascites;

• multiple metastases in the lymph nodes;

• distant metastases;

• bilateral involvement of the vessels of the portal of the liver;

• invasion into the inferior vena cava.

Relative contraindication to resection - single metastases in regional lymph nodes, lung, pancreas. In some cases, it is possible to perform resection of the inferior vena cava or portal vein when they are involved in the tumor process.

The decision on the patient's tolerance for liver resection is made taking into account the assessment of the general condition of the patient and the assessment of the preoperative functional reserve of the liver. At the same time, with normal functional indicators and the absence of severe concomitant diseases of the cardiovascular system and respiratory organs, it is considered possible to perform 80% of the resection volume. If the level of albumin is below 35 g/l, protein C is less than 70%, the presence of severe concomitant diseases, old age, the volume of the liver parenchyma remaining after resection should be at least 40% of the preoperative volume of the unaffected parenchyma. With cirrhosis of the liver in stages B and C according to Child-Pugh, resection interventions on the liver of any size are unbearable for the patient. With cirrhosis in stage A according to Child-Pugh, it is possible to perform liver resection in the amount of segment- and subsegmentectomy, and with high rates of the functional reserve of the liver, extensive anatomical resections of the liver can be performed.

If it is necessary to perform extensive liver resections in patients with a low functional reserve or an insufficient volume of residual parenchyma after resection, a method has been developed for embolization of the portal vein of the liver lobe affected by the tumor in order to stimulate compensatory hypertrophy of the liver lobe remaining after resection.

The main method of radical surgical treatment of HCC, which allows achieving a significant prolongation of life or even complete cure of patients, is anatomical liver resection (right-sided or left-sided hemihepatectomy, including the extended version). For small HCC in patients with cirrhosis, it is possible to perform segmentectomy, subsegmentectomy, or enucleation (if cirrhosis is severe and the tumor is represented by a single node). Without treatment, the prognosis of the disease is extremely unfavorable: the median survival is 2–6

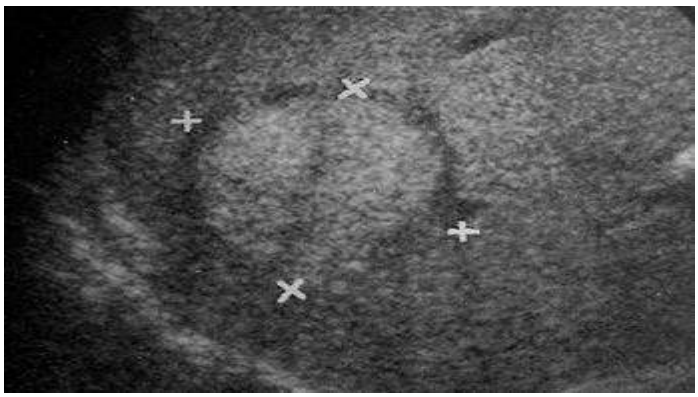
months. Postoperative mortality after liver resections for HCC in the absence of cirrhosis is 2-6%, and in the presence of cirrhosis - 10-20%. The long-term prognosis determines the presence of cirrhosis of the liver: in patients without cirrhosis, the 5-year survival rate reaches 50%, with cirrhosis in stages B and C according to Child-Pugh - less than 25%. Intrahepatic recurrence of HCC develops in 40–80% of patients.

Treatment of HCC. With intrahepatic localization - anatomical resection of the liver (more often hemihepatectomy).In Klatskin's tumors - resection of the hepaticocholedochus with the imposition of hepaticojejunostomy on the loop turned off according to Roux. At the same time, radical surgery is possible in no more than 50% of cases. With a combination of resection of hepaticocholedochus with hemihepatectomy, the radicality can be increased up to 65%. Postoperative complications occur in 40-50% of cases, operative mortality is up to 20%, 5-year survival does not exceed 20%. When performing palliative biliary operations, endobiliary drainage and prosthetics, as well as chemotherapy and radiation therapy, the life expectancy of patients does not exceed 3–16 months.

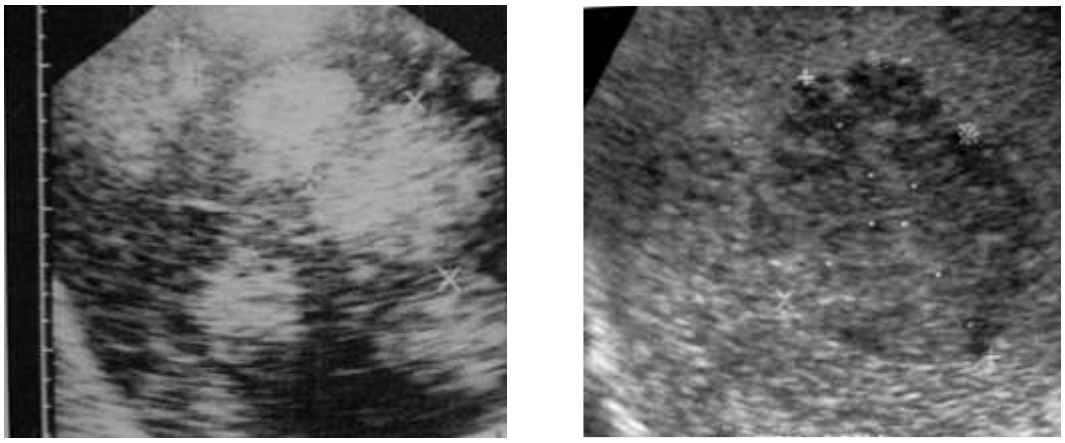
Metastases to the liver

They occur 18-20 times more often than primary liver tumors. Most often, tumors of the stomach, pancreas, colon, breast, lung metastasize to the liver, less often - tumors of the esophagus, ovaries, prostate, kidney, skin melanoma. It is believed that almost all malignant tumors, with the exception of primary brain tumors, can metastasize to the liver. Metastasis to the liver often occurs through the portal vein system from tumors that affect the organs of the abdominal cavity. Less commonly, metastases occur as a result of embolism of the branches of the hepatic artery, which is observed when the primary tumor is localized in the lung, kidneys, and adrenal glands. Metastases detected simultaneously with the primary tumor are called synchronous, and those detected sometime after the removal of the primary tumor are called metachronous. There are solitary (single) and multiple lesions. In 90% of cases, metastases are multiple.

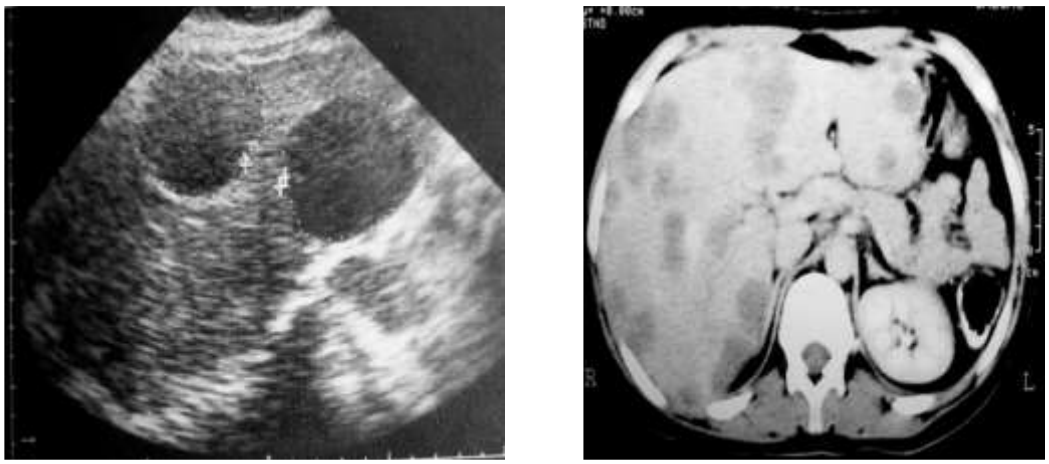
The classic ultrasound picture of a metastatic lesion is a bull's-eye metastasis - an echogenic central part with a hypoechoic periphery.



The features of the ultrasound type of liver metastasis depending on the primary location of the tumor are described. Hyperechoic metastases are characteristic of tumors of the gastrointestinal tract, kidneys, chorionic carcinoma, carcinoid. Hypoechoic metastases are characteristic of lymphoma, bronchial cancer, melanoma. Metastases with calcifications are characteristic of colon tumors, ovarian cystadenocarcinoma, gastric adenocarcinoma, leiomyosarcoma, osteosarcoma, neuroblastoma, breast adenocarcinoma, melanoma. Cystic metastases are most typical for leiomyosarcoma of the digestive tract, cystadenocarcinoma of the ovary and pancreas, mucinous carcinoma of the colon, and squamous cell carcinoma.



Ultrasound picture of liver sites: on the left - multiple hyperechoic confluent metastases of kidney cancer; on the right - hypoechoic melanoma metastases



Cystic stasis of ovarian cancer: on the left - ultrasound picture; right - CT scan

In doubtful cases, diagnostic laparoscopy or laparotomy can be used to visualize the formations in the liver and biopsy.

Treatment of metastatic liver lesions. With single lesions of one lobe of the liver, it is possible to perform a simultaneous operation (removal of primary cancer and resection of the liver, followed by radiation and chemotherapy).

Signs of unresectable liver tumors are extensive bilobar lesion, involvement in the process of large vessels (inferior vena cava, portal vein), widespread tumor thrombosis of the portal vein trunk, bilobar involvement in the process of afferent and efferent vessels of the liver, the presence of other distant metastases (to the lungs, carcinomatosis peritoneum with ascites, etc.). However,

in recent years, with solitary lung metastases in patients with resectable colorectal liver metastases, the tactics of surgical treatment of metastases of both localizations have been adopted.

Treatment results. The resectability of colorectal liver metastases is 8–30%. In the absence of liver cirrhosis, resection of up to 80% of the liver parenchyma is considered possible. The average life expectancy for liver metastases without treatment is 6 months. Systemic chemotherapy slightly increases life expectancy, on average, up to 9 months. Survival after surgery for colorectal cancer metastases for 1 and 5 years is 90% and 37%, respectively.

Liver resection combined with local impact on the tumor

In the case of bilobar lesion, it is possible to perform hemihepatectomy on the side with a larger lesion volume, in combination with excision of single metastases in the opposite lobe or using one of the methods of local tumor destruction.

There are 3 main ways of local tumor destruction.

• Intratumoral administration of ethanol: percutaneous intratumoral administration of 99.5% alcohol under ultrasound guidance or directly during surgery, resulting in the death of tumor cells due to cellular dehydration, the development of microvascular thrombosis, and coagulation necrosis with the formation of subsequent fibrosis. Contraindications: tumor size more than 5 cm in diameter or the presence of more than 3 tumor nodes. The efficiency of the method is low.

• Cryoablation: tissue necrosis is caused by direct exposure to cold (an applicator with liquid nitrogen at a temperature of -180 °C) with the formation of microvascular thrombosis.

• Thermal ablation. The most widely used radiofrequency ablation (RFA) is a local hyperthermic effect at temperatures above 50°C with the development of coagulation necrosis and its subsequent replacement with connective tissue. The effectiveness of the method is quite high: complete tumor necrosis in the case of

hepatocellular cancer develops in 80% of cases, with metastases of colorectal cancer - 70% with a tumor node size of no more than 4 cm. hemothorax) is less than 4%.RFA has been increasingly used in recent years as an independent method for the treatment of liver metastases, as well as a method for the treatment of resectable hepatocellular cancer against the background of cirrhosis of the liver in stages A and B according to Child-Pugh. One-year, 2- and 3-year survival is 95; 86 and 80% respectively.

Regional chemotherapy

The purpose of using regional chemotherapy in the preoperative period is the destruction of micrometastases, as well as reducing the mass of the tumor, which facilitates subsequent resection. It allows 15% of patients with unresectable metastases of colorectal cancer to reduce the size of the tumor and perform a radical operation. Postoperative chemotherapy is indicated after liver resection for colorectal cancer metastases and can increase the 5-year survival rate from 30% (with surgical treatment only) to 50%.

Liver transplant

Liver transplantation can be indicated for hepatocellular cancer against the background of severe cirrhosis and the impossibility of resection due to low functional reserves of the liver. At the same time, the best long-term results were noted in the fibrolamellar form of the tumor (3-year survival rate - more than 70%).

Thus, the surgical tactics for the treatment of liver cancer are as follows:

• In case of a resectable tumor and the absence of cirrhosis (the presence of compensated cirrhosis), liver resection is indicated in the amount of hemihepatectomy, segmentectomy (bisegmentectomy).

• With bilateral lesions, a combination of liver resection with one of the methods of local destruction of the tumor is possible.• In the case of a resectable tumor and decompensated cirrhosis, liver transplantation is indicated, if it is impossible, percutaneous RFA of the tumor.

• Unresectable tumor is an indication for chemo infusion and

chemoembolization of the hepatic artery in order to reduce the size of the tumor and transfer it to a respectable state.

• If an intrahepatic tumor recurrence is detected after radical resections, liver resection or local destruction of the tumor is indicated.

• With a widespread form of the tumor, distant metastases, systemic chemotherapy is possible.

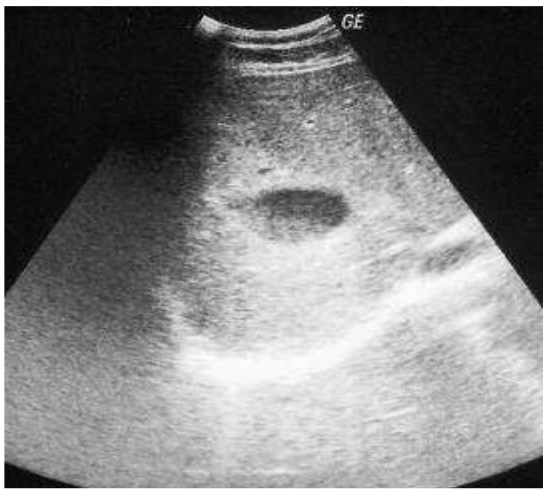
POST-TRAUMA LIVER LESIONS

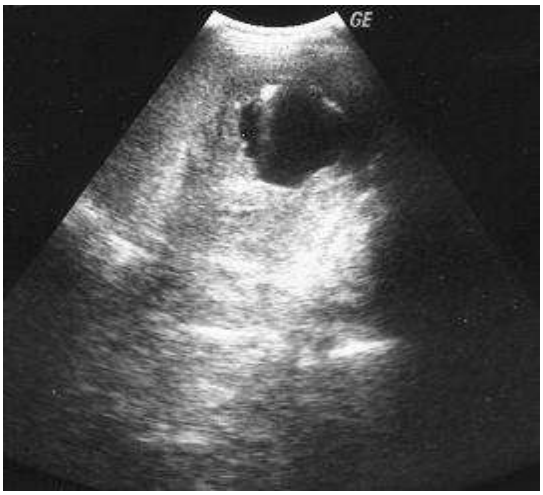
Hematomas are classified as post-traumatic liver cysts. Damage to the liver with subsequent formation of a hematoma may be closed or accompanied by rupture of the capsule and intra-abdominal bleeding. With blunt trauma, hematomas are most often localized in the peripheral parts of the liver along the line of impact. The ultrasound picture of a hematoma is due to the nature of the injury, the processes of organization of clots, or ongoing intracavitary bleeding. Initially, an edematous fragment of the hepatic parenchyma of slightly increased echogenicity without clear boundaries with a hypoechoic, often contourless area inside is determined ethnographically. Less often, in the area of damage, a focus of violation of the structure of the parenchyma with a hypoechoic areola is visualized. The accumulation of blood at the site of injury corresponds to a (hypo)echoic liquid formation without a capsule with a perifocal weakly echoic rim of the hepatic parenchyma. The subsequent process of organization of the hematoma is accompanied by the increasing heterogeneity of its contents over time due to the appearance of fibrin filaments and clots in the form of partitions and formations of mixed or unevenly increased echogenicity.

Further development of the echographic picture of a hematoma can go in several ways: In the process of organization with a decrease in the hematoma, the liquid component disappears from its contents. Ultrasound at the site of injury visualizes a volumetric formation of unevenly increased echogenicity with elements of calcification, surrounded by a rim of compacted hepatic parenchyma in the form of a false capsule. In the case of the predominance of lysis processes, a liquid formation of the seroma type with signs of a simple solitary pseudocyst is formed at the site of the hematoma.

Suppuration of the hematoma is accompanied by a typical picture of a liver abscess.

Continued bleeding into the hematoma cavity from a damaged but not thrombosed vessel causes an echographic picture corresponding to the beginning of the organization processes (liquid content with clots and fibrin threads).





Ultrasound picture of hematoma of the liver: on the left - in the process of organization; right - an outcome with pseudocyst formation

With a subcapsular location of the hematoma, ultrasound is recommended in dynamics to exclude possible complications (an increase in the size of the hematoma as a result of ongoing bleeding, a breakthrough of the contents into the abdominal cavity). Differential diagnosis of hematomas is difficult, due to the peculiarities of their internal contents, especially in the process of organization, and is carried out with simple cysts, abscesses, benign and malignant focal lesions of the liver.

PARAIEOPLASTIC SYMPTOMS OF LIVER CANCER

Some liver tumors produce hormones and biologically active substances that affect metabolism and present with certain clinical and laboratory features:

- an increase in the level of calcium in the blood (hypercalcemia), which is accompanied by nausea, constipation, muscle weakness, lethargy;

- a drop in blood glucose levels (hypoglycemia), which is accompanied by weakness and fainting;

- in men: an increase in the size of the mammary glands (gynecomastia) and/or a decrease in the size of the testicles;

- an increase in the level of red blood cells (erythrocytosis), which is accompanied by flushing and redness of the face;

- increased blood cholesterol levels.

These unusual symptoms often cause doctors to suspect nervous system or other disorders instead of liver cancer.

GENERAL PRINCIPLES OF LABORATORY AND INSTRUMENTAL DIAGNOSIS OF LIVER TUMORS

tumor markers. Tumor markers are macromolecules, main proteins with a carbohydrate or lipid component, the presence, and concentration of which in the peripheral blood correlates to a certain extent with the presence and growth of a tumor. An ideal marker should have 2 main properties:

- be secreted into the blood in sufficient quantities;

- its detection should allow making a conclusion about the localization of the tumor producing it.

Unfortunately, at present, it has not been possible to identify ideal markers with 100% specificity and sensitivity. However, a number of markers are used for screening and diagnosing neoplastic diseases. Detection of an elevated level of markers should serve as the basis for an in-depth examination, including the liver. In view of the fact that it is often necessary to differentiate primary liver cancer from metastatic, the following are the characteristics of markers that are widely used in the clinical differential diagnosis (this is especially true in the presence of liver metastases from an unidentified source):

- cancer-embryonic antigen (CEA) - a glycoprotein found in cancer of the colon (60%), breast, pancreas, lung, ovaries; after radical operations in 47% of cases allows to detection relapses; found in non-malignant diseases (hydronephrosis, cholelithiasis, hepatitis);

- prostate-specific antigen (PSA) - glycoprotein, excreted by the prostate, normal limit < 3.7 ng / ml; used in the diagnosis of prostate cancer;

- cancer antigen 15-3 (CA 15-3) - a glycoprotein used in breast cancer in combination with CEA; limit of normal < 28 U / ml;

- carbohydrate antigen 19-9 (CA 19-9) - a glycoprotein used in pancreatic cancer, a marker of the 2nd group of choice in colorectal cancer; limit of normal < 37 U / ml;

- cancer antigen 125 (CA 125) - a glycoprotein used in ovarian cancer; limit of normal < 35 U / ml;

- neuron-specific enolase (NSE) - enolase dienzyme, used in small cell lung cancer, neuroblastoma, carcinoid tumors; limit of normal < 12.5 ng/ml;

- human chorionic gonadotropin (hCG) - a glycoprotein used in non-seminoma germ cell tumors, choriocarcinoma; limit of normal < 0–5 U/ml;

- tissue polypeptide antigen (MPA) - preliferative antigen, used in bladder cancer; limit of normal < 80 U / ml;

- calcitonin - a polypeptide used in medullary thyroid cancer; limit of normal

< 100 ng/ml;

- cancer antigen 72-4 (CA 72-4) - a glycoprotein used in stomach cancer, mucus-forming ovarian cancer;

- 2-microglobulin (2-m) - used for multiple myeloma, non-Hodgkin's lymphomas; limit of normal < 1-2 mg / ml;

- antigen of squamous cell carcinoma (SCC) - after birth, it is rapidly eliminated from the systemic circulation. Its increase in blood serum is observed in HCC, hepatoblastoma (in children), non-seminoma geminogenic tumors of the testis and ovaries. The degree of increase in AFP correlates with the stage of the disease.

The determination of AFP is possible in the differential diagnosis, for example, of cirrhosis and HCC of the liver. Histologically verified seminoma tumors of the testicle or ovary can be regarded as containing non-seminoma elements only on the basis of an increase in AFP.

AFP can increase in benign diseases: hepatitis, cirrhosis, hereditary tyrosinosis, ataxia-telangiectasia, but to a much lesser extent than in cancer. AFP rarely rises adenocarcinomas of various localization, as well as with metastatic liver damage by various tumors.

Normally, AFP rises during pregnancy (up to 250 U / ml), a more significant increase may be a sign of threatened abortion. With some anomalies in the development of the fetus and with Down's syndrome, the level of AFP in the mother's blood serum decreases.

Reference marker values are: < 10 U/ml in men and non-pregnant women, in pregnant women up to 250 U/ml at 32 weeks of gestation. Indicators > 400 U / ml with a high degree of probability indicate the presence of a malignant process.

RADIOLOGICAL METHODS FOR DIAGNOSTICS OF LIVER TUMORS.

Ultrasound examination (ultrasound). The most simple, affordable, and informative diagnostic method. Allows diagnosing formations in the liver are less than 1 cm. It can be performed using various sensors and techniques: native tissue

harmonics, color Doppler mapping, dynamic echo contrast angiography, stimulated acoustic emission, etc.

Intraoperative Doppler Ultrasound. It is the gold standard for the study of the liver during surgical interventions.

X-ray computed tomography (CT) step-by-step, spiral, or multislice. CT diagnostics become more informative when using intravenous administration of a contrast agent with an assessment of the liver and neoplasms in the arterial, venous, and delayed phases of contrast enhancement.

Magnetic resonance imaging (MRI) is one of the best methods for diagnosing liver tumors. Refers to non-ionizing diagnostic methods. The advantages of MRI include the possibility of obtaining high-quality images in any arbitrarily defined plane, which significantly increases the visibility of the image of pathological processes in complex anatomical areas and facilitates their topical diagnosis. MRI can be combined with the use of contrast agents. There are 4 types of MRI contrast agents:

– extracellular (vascular) agents (compounds); are used most often, are gadolinium chelates, are administered intravenously, and are distributed both in the extracellular spaces of the parenchyma and in tumor foci, but to varying degrees, which contributes to differential diagnosis;

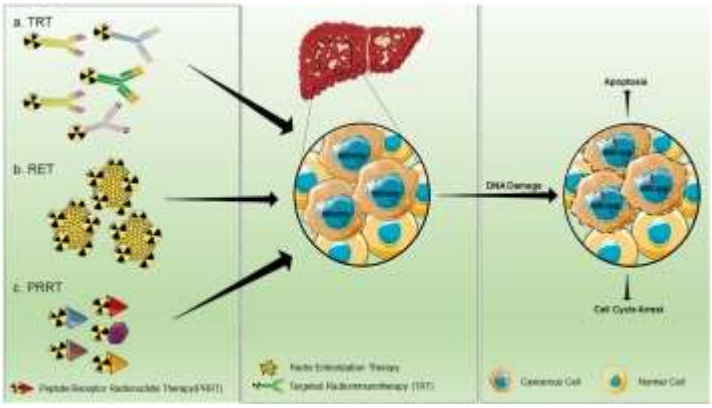
– reticuloendothelial agents (compounds) are small particles of superparamagnetic iron oxide (SPIO); after intravenous administration, they are concentrated in the reticuloendothelial system, mainly in Kupffer cells. As a result, the normal liver parenchyma looks dark, and focal neoplasms remain light;

– blood pool agents; are ultra-small particles of iron oxide (USPIO);

- hepatobiliary agents; accumulated by hepatocytes and then excreted into the biliary system.

radionuclide methods. The most significant is positron emission tomography (PET); it is a complex of a small cyclotron, a radiochemical laboratory, and a positron emission tomograph proper. With the help of a cyclotron, ultrashort-lived, positron-emitting radionuclides (18F, 11C, 13N, 15O,

etc.)) with a half-life of 2 minutes to 2 hours. The radiochemical laboratory provides the synthesis and quality control of radiopharmaceuticals administered intravenously. Using a tomograph, a patient is scanned to obtain anatomical and topographic images of the distribution of positron-emitting labeled compounds. The use of PET allows for 40-60 minutes to identify foci of the tumor process in the liver, brain tissues, lungs, lymph nodes, bones, etc.

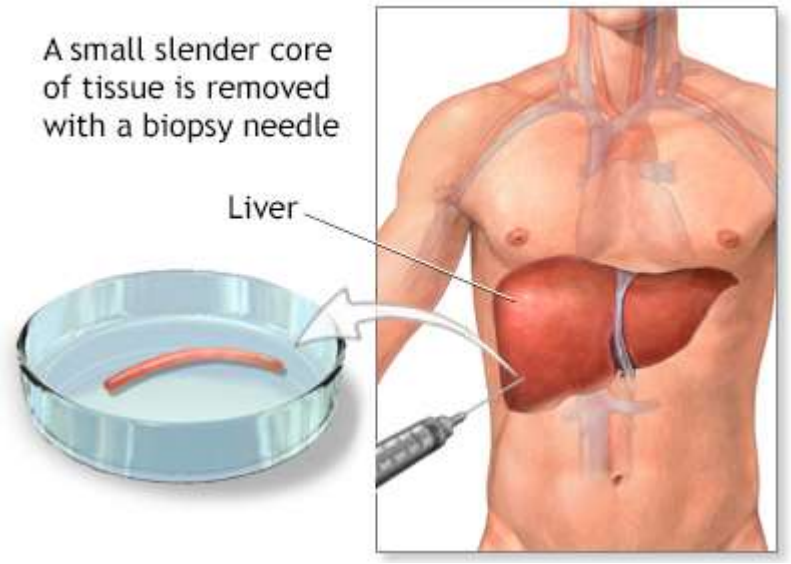


Angiography. The method is invasive and therefore is prescribed strictly according to indications. Allows before the operation to determine the anatomical features of the blood supply to the liver, to clarify the localization of the tumor, its prevalence, degree of vascularization, connection with the main vessels, the presence of arterio-portal shunts. Angiography is also the first stage of all medical endovascular interventions.

Puncture aspiration biopsy, trephine biopsy under ultrasound and CT guidance. Puncture biopsy of a focal liver lesion remains one of the main methods for diagnosing and verifying diagnosis. In 90–95% of cases, a puncture biopsy makes it possible to establish the cytological and morphological affiliation of the tumor. Needle biopsy is also necessary for the differential diagnosis of primary or metastatic liver damage. Such a clarifying diagnosis can radically change the tactics of treatment. Upon receipt of morphological confirmation of liver metastasis, an extended examination of the patient is indicated to detect the primary tumor focus.

Needle biopsy is usually performed under ultrasound guidance and does not entail serious complications. A possible complication of puncture biopsy may be

bleeding in case of abundant vascularization of the tumor, cirrhotic changes in the liver parenchyma, impaired hemocoagulation, the presence of ascites, in which tamponade of the puncture zone with the abdominal or chest walls is difficult. In some cases, needle aspiration biopsy can be performed under CT guidance.



Laparoscopy. If it is necessary to further assess the extent of the liver tumor, verify the diagnosis, especially in case of metastatic liver damage from an unknown source, it is possible to perform diagnostic laparoscopy. During laparoscopy:

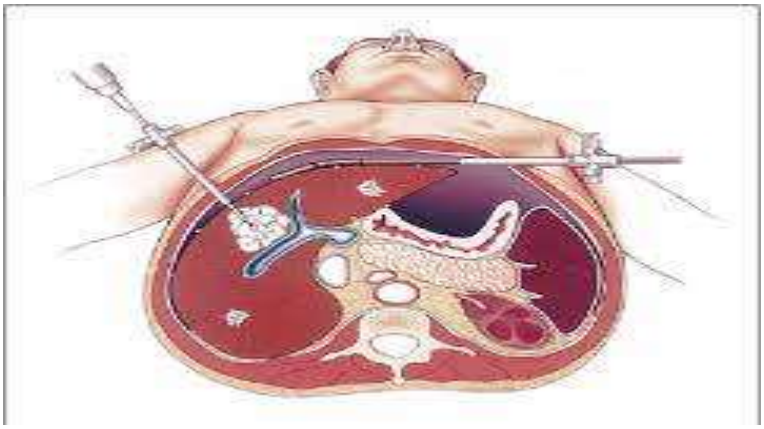
- assessment of the tumor node (nodes), the presence of affected lymph nodes, tumor invasion of adjacent anatomical structures;

- a sampling of ascitic fluid for cytological examination, performing a biopsy of the tumor node and lymph nodes in the absence of verification of the diagnosis with puncture biopsy;

– marginal resection of the liver to assess the activity and etiology of liver cirrhosis;

- additional assessment of the stage of liver cancer and the operability of the tumor;

- in some cases, laparoscopy can act as a therapeutic method: laparoscopic resection of the liver, especially in benign tumors; palliative or preoperative external drainage of the biliary tract in obstructive jaundice.



TREATMENT

When developing a treatment plan for a patient with liver cancer, the following important factors should be considered:

- liver cancer can be primary or metastatic;

- stage (prevalence) of cancer and functional state of the liver; we assess the stage of liver cancer only in case of primary liver cancer; it is fundamentally important to establish the number of tumor nodes, the lesion of a segment or segments of one lobe, the lesion of both lobes; assessment of the functional state of the liver in order to determine the possible volume of liver resection;

- the possibility of developing certain side effects (for example, the development of liver failure, bleeding);

- the general condition of the patient, age, comorbidities (cardiovascular and pulmonary);

– prognosis for tumor operability and cure; life expectancy; the ability to alleviate the symptoms of cancer. As a rule, the treatment of patients with liver cancer requires an integrated approach, including surgery, chemotherapy, radiation therapy, and various ablation methods.

CLASSIFICATION OF LIVER SURGERY

The surgical method of treatment is the main one in the complex therapy of liver cancer and consists in performing liver resections of various sizes. Liver resection is most often performed in the volume of anatomical resection according

to the surgical anatomy of the liver

In some cases, it is possible to perform atypical resections without taking into account portal blood flow. Types of anatomical resection interventions are presented in Table.

LIVER TRANSPLANTATION

The advantage of liver transplantation is the ability to completely remove the diseased organ and replace it with a healthy one, which, of course, increases the radicalness of treatment. However, post-transplant immunosuppression sharply increases the risk of tumor progression and often leads to rapid death of the patient. In 1996 V. Mazzaferro et al. published criteria for selecting patients for transplantation in HCC, which they called the "Milan criteria". The principles of selection and indications for transplantation are based on the size and number of tumor nodes:

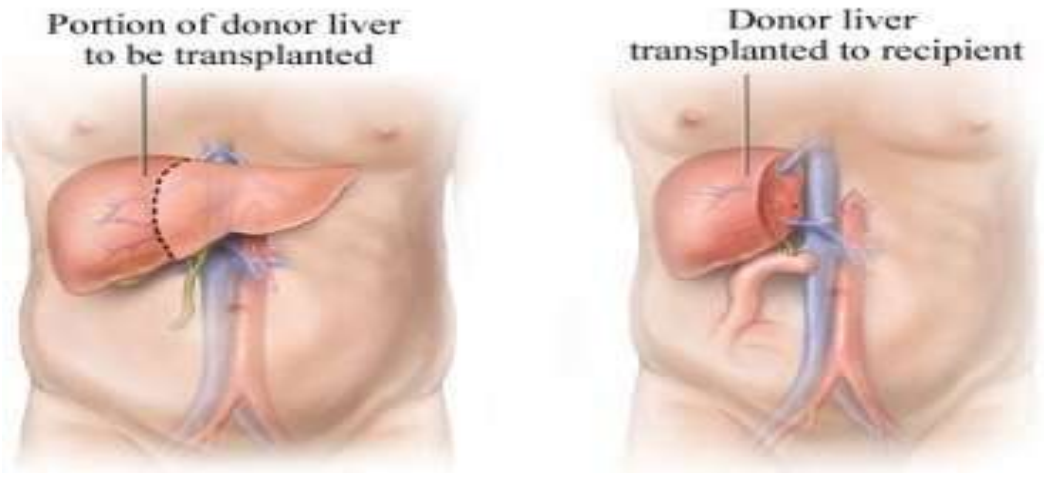
– single tumor up to 5 cm in diameter;

- a maximum of 3 foci no more than 3 cm.

As a result of using these criteria, the 5-year survival averaged 87%.

Liver transplantation can be performed in 2 options: allotransplantation from a cadaveric donor and from a living donor (most often related transplantation). According to the Organ Procurement and Transplantation Network (System for the collection, storage, and transplantation of donor organs), in the United States in 2008, 1600 liver transplants were performed on patients with cancer. The 5-year survival rate for these patients ranged from 60% to 70%. This not only reduces the risk of cancer recurrence but also ensures the normal function of the new liver.

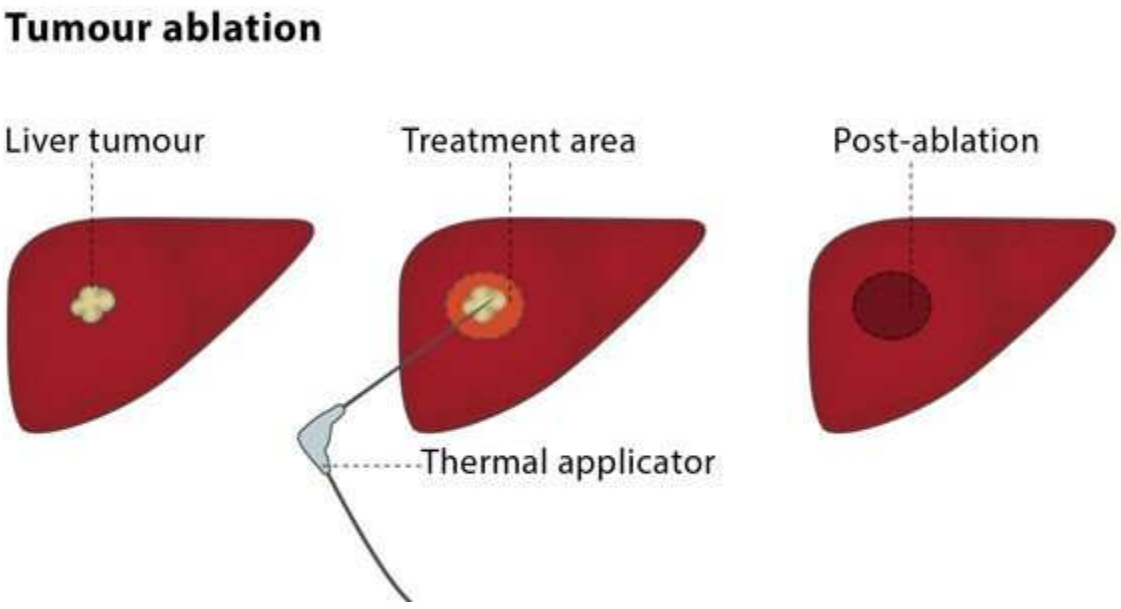
In recent years, the donation from a living person (usually a close relative) has become increasingly popular. Such transplantation, as a rule, is successful but carries certain risks for the donor. About 250 living donor liver transplants are performed annually in the United States. And only a small number of them occur in patients with liver cancer.



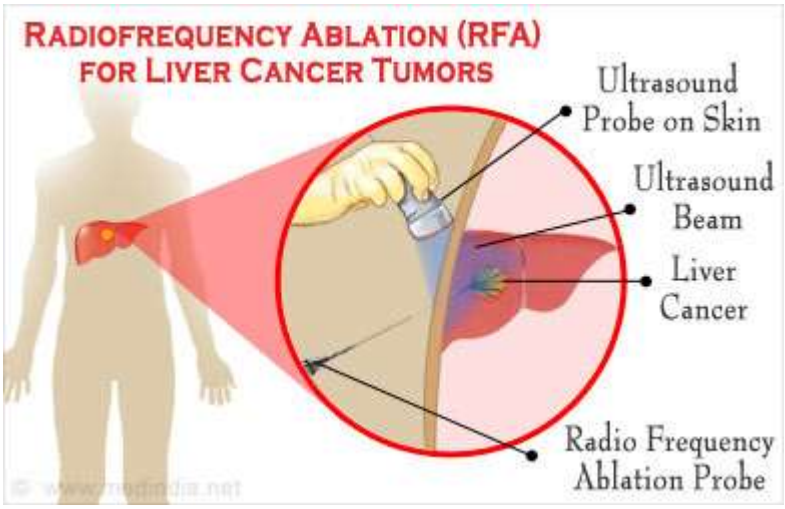
If a liver transplant is needed, patients are placed on a waiting list. In most situations, some other treatment, such as embolization or ablation, can be performed during the waiting period.

ABLATION

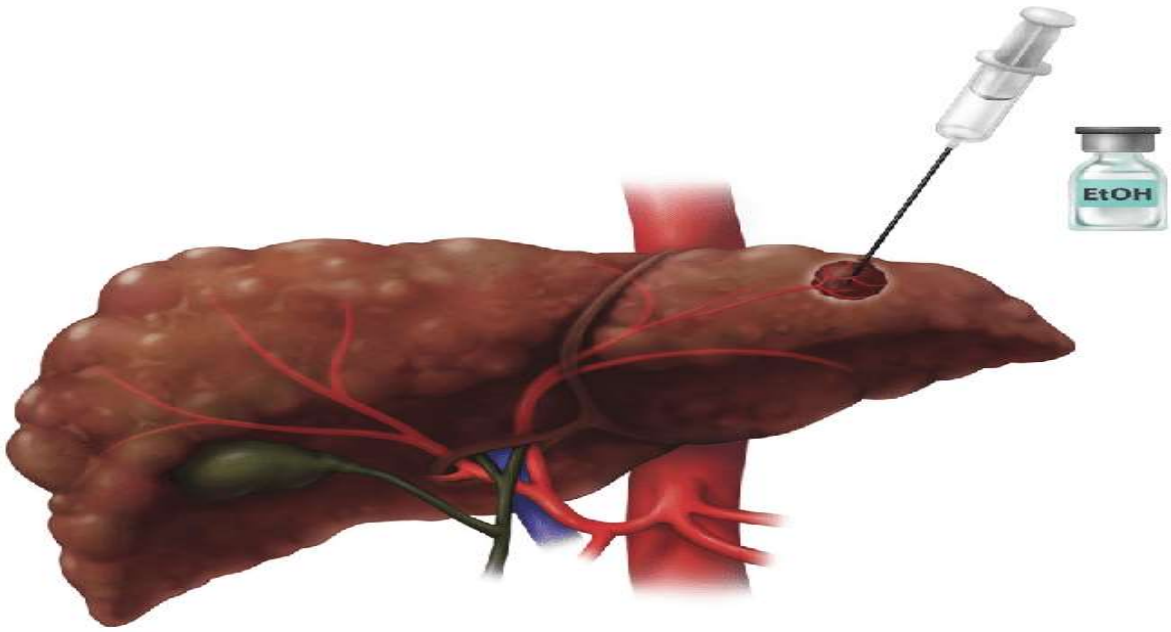
Ablation is a method of local destruction of the tumor without removing it. The procedure is used when there are several small tumors that cannot be removed surgically and/or as an additional method. In some cases, such treatment is used in patients awaiting liver transplantation. Ablation is best suited to treat tumors no larger than 3 cm in diameter. For larger tumors (3 to 5 cm in diameter), the method is used in conjunction with embolization.



Radiofrequency ablation (RFA). This technique involves the use of high-energy radio waves. Under the control of an ultrasound machine or a CT scanner, the doctor inserts a thin needle-shaped probe through the skin into the tumor. Then, a high-frequency current is applied through the probe tip directly into the tumor, which heats the tissues and destroys the cancer cells.



Ablation with ethyl alcohol. The technique is also known as percutaneous ethanol injection. During the procedure, a high concentration of alcohol is injected directly into the tumor, which destroys the cancer cells. Typically, the needle is inserted through the skin under the guidance of an ultrasound or CT scanner. Can be used intraoperatively.



Microwave thermotherapy. A relatively new procedure that uses microwave radiation to heat and destroy diseased tissue.

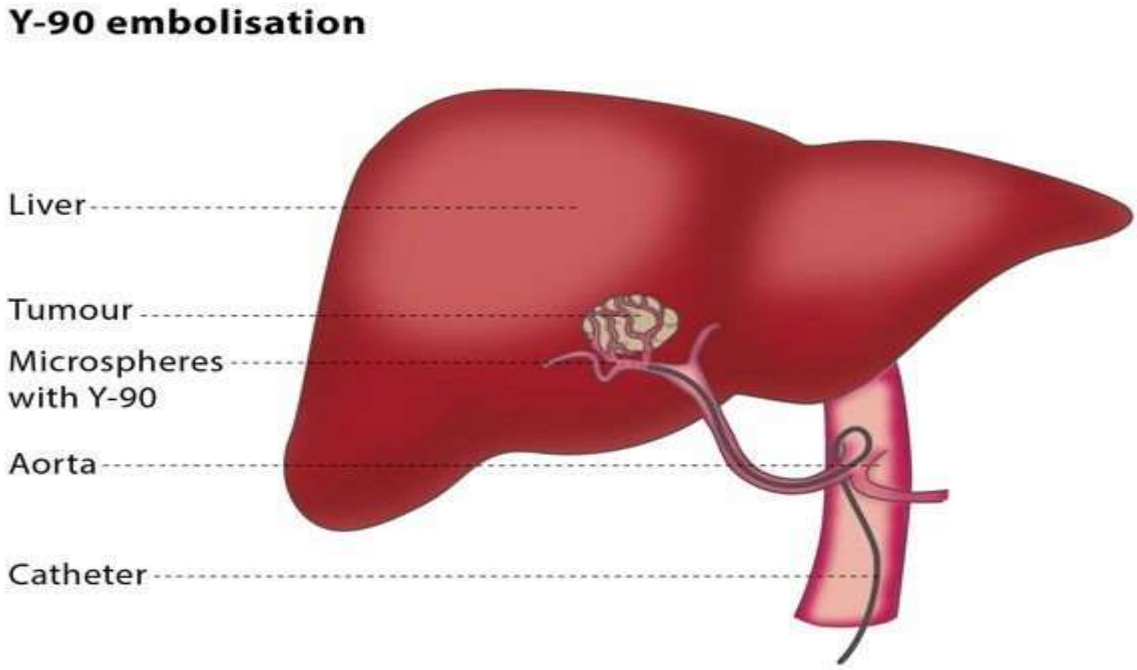
Cryosurgery (cryotherapy). The method is based on the destruction of the tumor when it is frozen with liquid nitrogen using a metal sensor. Under ultrasound guidance, the probe is inserted through the skin directly into the tumor. After that, gas is supplied through the sensor to the tumor. Cryosurgery can destroy larger tumors than other ablation techniques, but in some cases requires general anesthesia. Cryosurgery is more often used intraoperatively as an adjunct to surgical treatment.

EMBOLIZATION

Embolization is a technique of introducing certain substances into the vessels in an attempt to reduce or completely stop the blood supply to the tumor. For embolization, the hepatic artery is used using X-ray endovascular technology. Embolization can act as an alternative treatment option when surgical treatment is not possible and as a method of preoperative preparation aimed at reducing the size of the tumor. The technique is used for large tumors (usually more than 5 cm in diameter). In some cases, when the size of the tumor ranges from 3 to 5 cm, embolization and ablation are used together. arterial embolization. The technique is also known as transarterial embolization (TAE). During the procedure, a thin, flexible tube (catheter) is inserted into an artery in the inner thigh and passed up to the hepatic artery. Usually, a contrast agent is injected into the vessel at the same time, which allows the doctor to track the movement of the catheter using angiography (a special type of X-ray examination). As soon as the catheter is in the hepatic artery, the doctor injects a suspension of small particles into it, which clog the vessel. This technique may be contraindicated in patients with hepatitis and cirrhosis due to the risk of liver failure. Therefore, most often they try to use selective embolization of the right or left hepatic arteries, depending on the localization of the tumor.

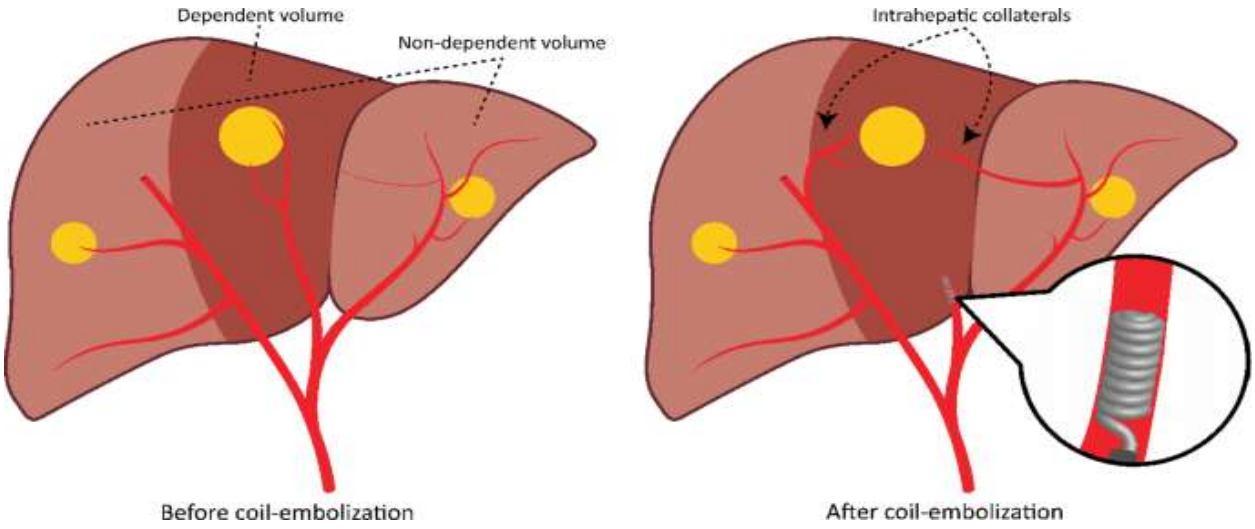
Radioembolization. The latest development in the treatment of liver cancer and liver metastases is SIRT (Selective Internal Radiation Therapy) - selective

internal radiation therapy, which involves a combination of embolization and radiation therapy. The SIRT method was developed in 1987 in Australia. The essence of SIRT is the introduction into the hepatic artery of microscopic particles (35 μm microspheres), known as SIR-Spheres and containing yttrium-90, which penetrate the tumor tissue



These radioactive particles emit targeted (directional) beta radiation with a half-life of about 64 hours, which leads to the destruction of the tumor while maintaining the integrity of the healthy liver tissues around it. The targeted nature of SIRT allows for 40 times more radiation to be delivered to the liver tumor than would be possible with conventional radiotherapy.

Another way to deliver ionizing radiation to a tumor is to inject a radioactive oily substance called lipiodol I-131 into the hepatic artery.



RADIATION THERAPY

long-focus radiation therapy. The tumor is focused on the radiation emanating from the apparatus located outside the patient's body. In some cases, external beam radiation therapy is used to shrink the tumor or relieve symptoms such as pain. Despite the fact that liver cancer cells are very sensitive to radiation, the use of radiotherapy at high doses is limited due to damage to healthy tissue. To minimize the damaging effect of radiation on healthy liver tissue, the following methods are used:

– three-dimensional conformal radiation therapy (3D-CRT); 3D CRT is a variant of external beam radiation therapy in which the location of the tumor is clearly determined using a computer. Radiation beams, which fully correspond to the shape of the tumor, approach it from different angles, which reduces damage to healthy tissues;

– stereotactic radiation therapy (STRT); STRT uses a focused beam of high power radiation. The treatment is given in one or more sessions, instead of prescribing low-dose radiation every day for several weeks. At the same time, several rays approach the tumor at different angles. In order to accurately direct the radiation, for the duration of each session, the patient is placed in a special frame, adjusted to the parameters of his body;

– proton therapy; relatively new method of radiation therapy. The essence of the method lies in the impact on tumor tissues by a proton beam accelerated in a cyclotron to enormous speeds (60% of the speed of light). Benefits of Proton Therapy:

a) due to the high mass of protons, the proton beam moves in a strictly directed direction, slightly scattering away from the impact axis, which makes it possible to focus the proton flux exactly on the tumor. Almost the entire radiation dose is released into the tissue in the last millimeters of the particle path; this maximum is called the Bragg peak;

b) due to the absence of irradiation of tissues outside the tumor, it became possible to use high doses of radiation.

CHEMOTHERAPY

Unfortunately, primary liver cancer is resistant to most chemotherapy drugs. To reduce the size of the tumor, drugs such as doxorubicin (adriamycin), 5-fluorouracil, cisplatin are most effective. However, even these drugs act only on 20% of tumors, and their action is short-lived. Chemotherapy can be used in the form of systemic chemotherapy and more effective selective intra-arterial by injecting the drug into the hepatic artery. The drugs used are floxuridine, cisplatin, mitomycin C, and doxorubicin.

In recent years, sorafenib (Nexavar) has been used as systemic chemotherapy as a targeted therapy drug that blocks angiogenesis and growth

factors. This drug has been shown to slow the progression of advanced liver cancer.

A variant of selective intra-arterial chemotherapy is chemoembolization. This method, also known as transarterial chemoembolization, involves a combination of embolization and chemotherapy. Two treatment options are used. The first technique involves the use of chemotherapy drugs, previously coated with small particles of another substance. In the second approach, a chemotherapy drug is first introduced through the catheter, after which the lumen of the artery is embolized.

FORECAST

If the tumor is limited to the liver, the number of tumor nodes and invasion of large vessels are of primary prognostic value. An increase in the level of AFP and the severity of its increase do not affect the prognosis. Survival for resectable hepatocellular carcinoma depends on the following factors:

1. Number, size, and localization of nodes. With a single tumor, the five-year survival rate is 45%, with multiple tumors - 15-25%. For tumors 2-5 cm in size, the five-year survival rate is 40-45%, for larger ones it is 10%. The prognosis

is better in patients without liver cirrhosis and with tumor localization in the left lobe or in the lower (V and VI) segments of the right lobe.

2. Involvement of veins. All patients with tumor thrombi in the portal or hepatic veins die within 3 years, while in the absence of damage to large vessels, the five-year survival rate is 30%.

3. Volume and type of operation. With radical resection, the five-year survival rate is 55% compared to 5% with residual tumor. After hemihepatectomy, the five-year survival rate reaches 85%, after segmentectomy - 20%. In operated patients, 90% of relapses occur in the liver.

4. Functional reserves of the liver (they are assessed by the accumulation of indocyanine green 15 minutes after administration) also affect survival.

5. For metastatic and inoperable liver cancer, chemotherapy causes remission in less than 20% of patients and does not prolong life (median survival is 3–6 months).

PREVENTION

One of the most important factors determining the success of the treatment of liver cancer in the early diagnosis of the disease when surgical removal of the tumor is possible. In order not to miss the moment, patients with a high risk of developing cancer (persons over 40 years old, suffering from hepatitis B and C; patients with cirrhosis of the liver) are recommended to have an ultrasound scan of the liver every 6 months, as well as the determination of AFP in the blood, a specific tumor marker (in healthy AFP in the blood is not detected).

TESTS

1. The most common objective sign in liver cancer:

a) fever;

b) yellowness of the skin;

c) symptoms of portal hypertension;

d) hepatomegaly;

e) symptom of Courvoisier.

Answer: e.

2. The most common complaint of patients with primary liver cancer:

a) weight loss

b) general weakness;

c) pain in the right hypochondrium;

d) jaundice;

e) temperature increase.

Answer: c.

3. Which of the following liver tumors is malignant:

a) adenoma;

b) hemangioma;

c) lipoma;

d) cholangiocarcinoma.

Answer: d.

4. Which of the following liver tumors is benign:

a) adenoma;

b) hepatoblastoma;

c) hepatocellular tumor;

d) cholangiocarcinoma.

Answer: a.

5. Among all cases of primary liver cancer, 90% are:

a) adenoma;

b) hemangioma;

c) hepatocellular tumor;

d) cholangiocarcinoma.

Answer: c.

6. Most often, liver cancer develops against the background of:

a) hepatitis B;

b) hepatitis C;

c) alcoholism;

d) drug addiction.

Answer: a.

7. What disease is most often associated with liver cancer:

a) gastritis;

b) cirrhosis;

c) cholelithiasis;

d) colitis.

Answer: b.

8. The main treatment for liver cancer:

a) vaccination;

b) chemotherapy;

c) radiation therapy;

d) surgical.

Answer: d.

9. A positive reaction to alpha-fetoprotein is more common with:

a) primary liver cancer;

b) metastatic liver cancer;

c) benign neoplasms of the liver;

d) correct answers a and b;

e) is not typical for tumor lesions of the liver.

Answer: a.

10. Primary liver cancer metastasizes:

a) hematogenous;

b) lymphogenic;

c) intraorganically;

d) meet all the listed types of metastasis.

Answer: Mr.

11. In primary liver cancer, distant metastases are more common in:

a) bones

b) retroperitoneal lymph nodes;

c) lungs;

d) the brain.

Answer: b.

12. The most reliable method for diagnosing liver tumors is:

a) ultrasound examination;

b) computed tomography;

c) angiography;

d) laparoscopy;

e) all of the above methods have the same information content.

Answer: b.

13. For primary liver cancer of the listed biochemical tests, the most characteristic increase in activity:

a) alkaline phosphatase;

b) alanine and aspartic transaminases;

c) lactate dehydrogenase;

d) Y-glutamine transpeptidase;

e) all of the listed enzymes.

Answer: d.

14. Liver tumors of small sizes are more often diagnosed with:

a) ultrasound examination;

b) X-ray computed tomography;

c) angiographic examination;

d) radioisotope research;

e) the size of the tumor does not affect the accuracy of the listed methods.

Answer: b.

15. The most effective treatment for primary liver cancer is:

a) surgical;

b) systemic chemotherapy;

c) regional chemotherapy;

d) radiation treatment;

e) b and c are correct.

Answer: a.

16. Palliative (symptomatic) operations for primary liver cancer should be performed in the following cases:

a) tumor obstruction of hollow organs (bile ducts, intestines, ureter, etc.

b) the collapse of the tumor with intra-abdominal bleeding or the development of peritonitis;

c) planning in the postoperative period of chemotherapeutic treatment in order to reduce the volume of the tumor; d) in all of the above cases.

Answer: a.

17. The earliest and most frequent complaint of patients with liver metastases from the following are:

a) pain in the right hypochondrium and epigastric region;

b) skin itching;

c) the presence of jaundice;

d) the presence of ascites;

e) splenomegaly.

Answer: a.

18. Among the malignant neoplasms of the liver, the following prevail:

a) primary cancer;

b) metastases;

c) sarcomas;

d) all of the above occur with approximately the same frequency. Answer: b.

19. The main factor contributing to the occurrence of hepatocellular liver cancer is:

a) carriage of the hepatitis A virus;

b) the carriage of hepatitis B virus;

c) chronic opisthorchiasis;

d) food contamination with aflatoxins.

Answer: b.

20. The risk factor for liver cancer in developed countries is:

a) ionizing radiation;

b) smoking;

c) alcohol abuse;

d) the abuse of fatty foods.

Answer: c.

21. Against the background of what pathology does hepatocellular liver cancer often develop?

a) cirrhosis of the liver;

b) opisthorchiasis;

c) both diseases;

d) neither one nor the other disease.

Answer: a.

22. Measures to prevent hepatocellular liver cancer are (tick 2 correct answers):

a) vaccination against hepatitis B virus;

b) cure of opisthorchiasis;

c) fight against alcoholism;

d) elimination of bacterial infection in the intrahepatic bile ducts.

Answer: a, c.

23. Radiation therapy in patients with primary liver cancer:

a) is one of the leading methods of radical treatment;

b) used for palliative purposes;

c) is used for symptomatic purposes;

d) is used in exceptional cases.

Answer: Mr.

24. In case of locally advanced unresectable hepatocellular liver cancer, the

following is performed:

a) chemoembolization of the hepatic artery;

b) radiation therapy;

c) systemic chemotherapy;

d) all of the above.

Answer: a.

25. Liver metastasis is often observed when the primary tumor is localized in:

a) organs of the gastrointestinal tract;

b) lungs; c) mammary gland;

d) female genital organs;

e) in all of the above localization of the primary tumor.

Answer: a.

SITUATIONAL TASKS

1. A 52-year-old woman came to the clinic with complaints of yellowness of the skin, severe weakness, lack of appetite, dull pain in the right hypochondrium. She considers herself ill for about 2 weeks when her husband noticed the

yellowness of her sclera. She had a respiratory illness 1-2 months before, after which she lost her appetite. Lost weight. History of cholecystitis. She has been in the dispensary for 8 years after suffering from infectious hepatitis.

Objective examination data. A malnourished patient. The skin is slightly icteric in color. The sclera is icteric. Peripheral lymph nodes are not enlarged. During auscultation in the lungs, vesicular breathing is heard, the accent of the II tone is on the aorta. Pulse - 76 beats 1 min. BP - 180/100 mm Hg. Art. The abdomen is moderately swollen. On palpation, the liver protrudes from under the costal edge by 5-6 cm, its edge is dense, slightly painful.

Questions:

1. What is your proposed diagnosis, clinical group?

2. Make a differential diagnostic series of diseases.

3. Make a plan for examining the patient.

4. Make a plan for treating the patient.

5. Forecast of the patient's ability to work?

6. Make an action plan for the early diagnosis of liver cancer.

Sample answers:

1. Diagnosis - suspicion of liver cancer, clinical group Ia.

2. Differential diagnosis - liver cancer, metastatic liver disease, cirrhosis of the liver.

3. Examination plan - biochemical and complete blood count, blood test for alpha-fetoprotein, abdominal ultrasound with Doppler mapping, liver tumor biopsy under ultrasound control, helical CT, hepatoscintigraphy, laparoscopy.

4. Treatment plan - depending on the prevalence of the process in the liver: liver resection, radiofrequency thermal ablation of the tumor, total hepatectomy with liver transplantation, chemoembolization of tumor vessels.

5. The prognosis is doubtful.

6. Measures for the early diagnosis of liver cancer: determination in risk groups (those who have had viral hepatitis B or C, suffering from chronic liver diseases, cirrhosis) once every 6 months, the level of alpha-fetoprotein, ultrasound

of the liver.

2. A 56-year-old patient was admitted to a surgical hospital with complaints of aching pain in the right hypochondrium, jaundice.

From the anamnesis, it is known that for three months the unstable stool, constipation, weakness increases. Lost 6 kg. 10 years ago, she suffered from viral hepatitis C.

Objective examination data: The patient's condition is moderate. Sclera pale yellow. The abdomen is soft and painless. An enlarged, dense liver with an uneven surface is palpated. Ascites are not clearly defined.

Complete blood count: Hb - 80g / l, leukocytes - 6 thousand, ESR - 54 mm/h.

Biochemical blood test: alkaline phosphatase - 780 U / l, bilirubin - 58 μmol/l

Questions:

1. What is your proposed diagnosis?

2. Make a plan for additional diagnostic measures.

3. Make a plan for treating the patient.

4. Forecast of the patient's ability to work?

Sample answers:

1. Supposed diagnosis: primary liver cancer.

2. Additional diagnostic measures: ultrasound with Doppler mapping and CT of the abdominal organs, x-ray examination of the gastrointestinal tract, fibro gastro duodenoscopy, liver angiography, liver biopsy under ultrasound control, liver hapatoscintigraphy

3. If the patient is operable and the tumor is resectable, resection or hepatectomy with liver transplantation is performed, with unresectable hepatocellular cancer, intra-arterial chemoembolization is performed, followed by an assessment of the effect and a radical operation when the process is transferred to an operable state.

4. The prognosis of the patient's ability to work is unfavorable.

3. A 45-year-old patient was admitted to the clinic with complaints of dull, aching, constant pain in the right hypochondrium, epigastric region. Sick for several years. From the anamnesis of life: the patient works in agriculture.

Objectively: the general condition is satisfactory. Skin and mucous membranes of normal color. Pulse 80 beats/min, good filling and tension. The tongue is moist and clean. When examining the abdomen - bulging of the anterior abdominal wall in the right hypochondrium. On palpation of the liver, a rounded, elastic consistency tumor-like formation is determined.

Questions:

1. What is your preliminary diagnosis?

2. What instrumental studies are needed to make a diagnosis and what are the expected results?

3. With what diseases it is necessary to make a differential diagnosis.

4. Name the immunological methods for diagnosing echinococcosis.

5. Determine the treatment tactics and what operations are indicated for echinococcosis.

Sample answers:

1. Focal (volumetric) formation of the liver.

2. X-ray of the chest and abdomen: high position of the right dome of the diaphragm, liver enlargement, calcifications in the liver. Ultrasound of the abdominal organs - the ultrasound picture of cystic liver damage is more often determined. Characteristic of an echinococcal cyst is the presence of a fibrous capsule, which is represented by a hyperechoic rim, a hypoechoic layer, which is a lymphatic "slit" that separates the fibrous capsule from the chitinous membrane, on the inner surface of which germinal elements in the form of "hydatid sand" can be determined. CT characteristic is the visualization of the chitinous membrane and daughter vesicles of the fibrous capsule. Partial or total calcification of the cyst walls can be determined.

3. Differentiate with diseases: liver cancer, cirrhosis of the liver, liver cysts of another etiology, liver metastases in cancer of other organs.

4. Immunological methods for diagnosing echinococcosis: latex agglutination reaction (RLA), indirect hemagglutination reaction (RIHA), enzyme immunoassay (ELISA), antibody unit reaction.

5. Surgical treatment is indicated after antiparasitic treatment.

4. A 42-year-old patient consulted a general practitioner about a cold. On palpation of the abdomen, an increase in the liver was found more due to the left lobe, which is of soft elastic consistency, the contour is not even.

A hemangioma of the left lobe of the liver was suspected.

Questions:

1. With what diseases it is necessary to carry out differential diagnostics?

2. What studies are needed to make a final diagnosis?

3. Specify possible complications.

4. List the methods of treatment.

Sample answers:

1. It is necessary to differentiate with diseases: non-parasitic liver cysts, liver echinococcosis, primary and metastatic liver tumors, liver abscesses.

2. It is necessary to perform: ultrasound of the abdominal organs, X-ray computed tomography and magnetic resonance imaging of the abdominal organs, laparoscopy, angiography of the liver.

3. Possible complications of the disease: liver failure due to replacement of liver tissue, tumor rupture with life-threatening bleeding, thrombosis with further development of necrosis, tumor malignancy.

4. Treatment: for small hemangiomas (up to 5 cm), sclerosis under ultrasound control, for tumors larger than 6 cm - enucleation, atypical liver resection, if the hemangioma occupies a lobe of the liver - hemihepatectomy, hepatic artery embolization is possible.

5. Patient I., 36 years old. For 4 years, he has been ill with viral hepatitis C. During examination in the right lobe of the liver, against the background of cirrhotic changes, a volumetric formation up to 7.0 cm in diameter is determined.

Questions:

1. What is your presumptive diagnosis?

2. Define diagnostic and therapeutic tactics,

Sample answers:

1. Presumptive clinical diagnosis - primary liver cancer.

2. To determine the treatment tactics (surgical or drug treatment), an additional examination is indicated: ultrasound or CT of the abdominal cavity, X-ray examination of the lungs, puncture biopsy of the focus in the liver, determination of the level of tumor markers - AFP, CEA, determination of the functional safety of the liver parenchyma using radioisotope diagnostic methods. In the absence of other manifestations of the disease, it is possible to operate the volume of a right-sided hemihepatectomy.

6. A 55-year-old patient was admitted with complaints of headache. A month before admission, during an examination in one of the medical institutions, an ultrasound and CT scan of the abdominal cavity revealed a tumor of the left kidney. It is known that the patient has been suffering from urolithiasis for 3 years.

Upon admission, palpation on the left in the meso- and hypogastrium is determined by a tumor-like formation measuring 14x15 cm, densely elastic consistency, limited mobility, painless, with clear contours.

SCT with bolus intravenous injection of a nonionic contrast agent in the retroperitoneal space on the left shows a volumetric formation of a rounded shape with dimensions of 13x14x20 cm. The formation density is uneven: along the entire length of the image, areas of low-density alternate with areas of increased density. The upper pole of the formation is located between the lower pole of the spleen, the tail of the pancreas, and the upper pole of the left kidney. In the distal direction, the formation is located along the lateral edge of the left kidney, displaces it medially, and deforms.

The kidney is partially flattened on the formation. There is a small calculus in the lower calyx of the left kidney. The renal parenchyma accumulates a sufficient contrast agent. In the distal direction, the pathological formation deforms the psoas muscle and displaces the intestinal loops forward and to the right.

Questions:

1. What is your proposed diagnosis?

2. Make a differential diagnostic series of diseases.

Sample answers:

1. Diagnosis - non-organ retroperitoneal tumor.

2. Differential diagnosis with diseases: colon cancer, kidney cancer, urolithiasis.

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