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Department of Surgical Diseases No. 1

**Cancer of the hepatopancreatoduodenal
zone**

Study guide
for medical students

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The incidence of cancer of the organs of the hepatopancreatoduodenal zone (liver, gallbladder , main biliary tract, papilla and pancreas) is growing everywhere. Mortality does not tend to decrease. In RNO-Alania, the incidence of liver cancer in recent years has ranged from 5.2 to 7.8, gallbladder 8.4 and pancreas 8.9 per 100,000 population.

Liver cancer

Liver cancer can be **primary or secondary** . Primary cancer is formed from the cells of the organ, secondary - from malignant cells that entered with the blood flow from other internal organs affected by the tumor. Metastatic neoplasms are recorded several times more often. This feature is associated with the blood supply to the liver.

Primary liver cancer is a malignant neoplasm that occurs as a result of the degeneration of normal cells (hepatocytes) into cancerous ones. **Primary cancer** (*hepatocellular carcinoma*) is relatively rare and in the general structure of malignant neoplasms is from 3 to 5%. More than 600,000 cases of liver cancer are diagnosed in the world every year, and about 50% of patients die from this disease. Men are about twice as likely to get sick as women.

The causes of liver cancer

1. **Chronic viral hepatitis B and C.** Patients with chronic viral hepatitis have a significantly higher risk of developing liver cancer.
2. **Long-term alcohol use.** As a result of the onset of atrophic cellular degeneration, cirrhosis of the liver develops and, as a result, hepatocellular carcinoma.
3. **Parasitic diseases (opisthorchiasis).** The causative agent of the disease is the feline fluke, which belongs to the class of flatworm-type trematodes. For a long time, parasitizing in the bile ducts of the liver, it provokes the development of chronic inflammation of the bile ducts, epithelial dysplasia and impaired outflow of bile.
4. Eating foods **contaminated with the *Aspergellus flavus* fungus** , which produces aflatoxin B (see photo of the fungus below).

Classification and stages of liver cancer

Epithelial tumors of the liver

- Hepatocellular carcinoma (hepatocellular carcinoma).
- Hepatoblastoma (tumor of embryonic origin).
- Cholangiocarcinoma (cancer of the intrahepatic bile ducts).
- Mixed hepatocholangiocellular carcinoma.
- Undifferentiated cancer.
- Cystadenocarcinoma of the bile ducts.

Mesenchymal tumors of the liver

This group of malignant neoplasms includes tumors that arise from blood vessels:

- Neoplastic hemangioendothelioma (the basis of the tumor is vascular endothelial cells).
- Angiosarcoma, a neoplasm occurs from the endothelium and perithelium of the vessels.
- Epithelioid hemangioendothelioma (a characteristic feature of tumor cells is the presence of erythrocytes in their vacuoles, in some cases clear vascular channels are visible in the neoplasm).

Other types of liver tumors

- Fibrosarcoma (a tumor formed from connective tissue).
- Malignant fibrous histosarcoma.
- Mesenchymal neoplasms of undetermined origin.
- Leiomyosarcoma (neoplasm of smooth muscles).
- Malignant non-Hodgkin's lymphoma (tumor from lymphoid tissue).
- Teratoma (a tumor formed from gonocytes).
- Squamous cell carcinoma (squamous epithelial tumor).
- Mesothelioma (a tumor that develops from mesothelium cells), etc.

Mixed epithelial tumors

- Neoplasms with unspecified histiostructure.
- Cholangiocellular liver cancer and mixed epithelial tumors.

Metastatic tumors

In addition, there are macroscopic forms of liver cancer:

1. **Nodal form of liver cancer.** The nodular form occurs in 60-85% of all forms of primary cancer and in most cases is accompanied by cirrhosis. The liver is enlarged and in its structure contains tumor foci, which can be of various sizes from microscopic to several centimeters in diameter.
2. **Massive form.** The characteristic place of localization of the tumor is the right lobe of the liver, it has a fairly large size and is found in 25% of cancer cases. Cirrhosis with a massive form is quite rare.
3. **Diffuse form** - diagnosed less often than all others and occurs in 12% of cases of primary cancer. The size of the liver with this form is not increased, but its structure against the background of atrophic cirrhosis undergoes a change (miliary carcinomatosis of the liver develops).

- According to the Edmondson, Steiner system, the degree of malignancy of hepatocellular cancer is determined, it is based on a comparison of normal liver tissue and tumor:

- GX - Grade cannot be determined.

- GI - the degree of differentiation is high (cancer cells in general do not differ from hepatocytes, which are hyperplastic, and the presence of invasive growth determines the malignant nature of the process).
- GII - the degree of differentiation is moderate (tumor cells are similar in structure to hepatocytes, but their nuclei are changed and bile is contained in the lumen of the acini).
- GIII - the degree of differentiation is low (tumor cells have significantly altered nuclei, there are no bile pigments in the cytoplasm, and cell growth is observed in the vascular spaces).
- GIV - anaplastic carcinoma (undifferentiated).

TNM classification of liver cancer: T - primary tumor, N - lymph nodes, M - distant metastases.

- T - primary tumor:
- TX - insufficient data to assess the primary tumor.
- T0 - the primary tumor is not determined.
- T1 - solitary tumor without vascular invasion.

- T2 - solitary tumor with vascular invasion or multiple neoplasms less than five centimeters.
- T3a - multiple malignant neoplasms larger than five centimeters.
- T3b - invasion of large branches of the portal and hepatic veins by multiple tumors or single.
- T4 - malignant neoplasm with invasion of adjacent organs or visceral peritoneum, no invasion of the gallbladder.
- N - regional lymph nodes.
- NX - not enough data to assess the condition of the lymph nodes.
- N0 - there are no signs of metastases in regional lymph nodes.
- N1 - a lesion of regional lymph nodes is diagnosed: along the common hepatic artery, at the gate of the liver, etc.
- M - distant metastases.
- M0 - distant metastases are not diagnosed.
- M1 - distant metastases are diagnosed.

Categories T, N and M correspond to the pT, pN and pM categories, which means that the diagnosis is confirmed by a pathomorphologist by examining the tumor under a microscope. In addition to the above criteria, fibrosis (F) is used in the diagnosis of liver cancer:

- The absence or presence of moderately pronounced fibrosis is determined by the sum of points from 0 to 4 and is designated as F0.
- The presence of cirrhosis or severe fibrosis is determined by the sum of points 5-6, denoted by F1.

All of the above factors apply when grouping by stage:

- Stage I - T1 N0 M0
- Stage II - T2 N0 M0
- IIIA stage - T3a N0 M0
- IIIB stage - T3b N0 M0
- IIIC stage - T4 N0 M0
- IVA stage - T any N1 M0
- IVB stage - T any N any M1

Liver cancer symptoms

The result of the fact that the onset of the disease is always invisible, and its course is quite fast, is that the disease is almost always diagnosed at later stages.

Patients seek medical attention three months after the first symptoms of liver cancer appear. Most patients present with the following complaints:

- Pain in the right hypochondrium.
- Decreased appetite, weight loss.
- Severe weakness, lethargy, rapid fatigability.
- The abdomen increases in size.
- Increased body temperature.
- Nosebleeds.
- Yellowness of the skin.
- Vomiting, nausea, diarrhea.

In patients with primary liver cancer, 90% of cases have **hepatomegaly (large liver)** . The lower border of the liver increases to 10 cm, and the upper border reaches the fourth rib, while an increase in the size of the chest is noted.

When probing the borders of the liver, its sharp front edge, stony, dense texture and, in rare cases, a smooth surface are noted. But, nevertheless, in most patients, on palpation, the presence of many nodules is noted on the surface of the liver. They are firm to the touch and come in a variety of sizes. Sometimes there is a focal increase in the size of the liver.

More than half of patients have **ascites (accumulation of fluid in the abdominal cavity)** . It corresponds to the syndrome of portal hypertension, has a hemorrhagic nature, and the ascitic fluid does not contain tumor cells.

Against the background of liver cirrhosis, **collateral circulation** develops . This is evidenced by the presence of palmar erythema (palms become pink), an increase in the size of the spleen, the formation of spider veins, gynecomastia and other symptoms. About 15% of patients develop paraneoplastic syndrome, which manifests itself in the form of: a decrease in glucose levels, an increase in calcium concentration, erythrocytosis and an increase in cholesterol levels.

Symptoms of primary liver cancer are formed depending on the predominance of one or more symptoms. The main ones are as follows:

- *A shape resembling a liver abscess.*
- *Hypoglycemic.*
- *A form with a predominance of jaundice.*
- *Hepatomegalic form.*
- *Cirrhotic.*
- *Diffuse carcinomatous, etc.*

Metastatic liver disease is usually asymptomatic.

Severity and pain in the right hypochondrium appear only with a widespread tumor process. But even in this case, surgical treatment is possible in some patients. Modern diagnostic methods allow detecting liver metastases in the early stages.

In particular, **ultrasound tomography** is widely used in clinical practice . This is the main method for detecting tumor foci in the liver in patients under dynamic observation. For early diagnosis of disease progression, markers (tags - ed.) (Cancer embryonic antigen, CA-19-9) are widely used. The arsenal of modern means of diagnosing the degree of liver damage also includes **computed tomography, magnetic resonance imaging and positron emission tomography**. They are used as methods of clarifying diagnostics.

In patients with small metastases, it is possible to perform economical liver resections, which significantly reduces the risk of postoperative complications and allows the patient to quickly rehabilitate socially.

Of course, not everything is so simple. Despite the rapid (since the beginning of the 90s of the last century) development of surgical hepatology in Russia, liver resection (especially extensive) in our country remains the lot of several large specialized centers: in Moscow (Russian Cancer Research Center), St. Petersburg (Scientific - Research Institute of Oncology named after N.N.Petrov) . This makes it much more difficult for many patients to receive full-fledged medical care.

Diagnosis of liver cancer

To establish the prevalence of the tumor process, the stage of the disease and planning the treatment of liver cancer, the following diagnostic procedures and tests are used:

1. Physical examination of the patient.
2. Ultrasound of the liver and abdominal organs.
3. CT performed with intravenous bolus enhancement.

4. Angiography.
5. Fine-needle puncture cytobiopsy of the liver (the degree of fibrosis is determined, cytological and histological examination of the material is carried out).
6. Hepatoscintigraphy.

Cirrhosis of the liver

7. Fibroesophagogastroduodenoscopy.
8. Laboratory tests: detection of hepatitis B virus surface antigen (HBsAg), as well as antibodies to hepatitis B and C viruses. Determination of DNA / RNA of hepatitis B / C viruses, concentration of tumor markers (AFP, CEA), etc.

In addition to the above diagnostic techniques, if necessary, carry out: liver volumetry, MRI, irrigoscopy, colonoscopy, skeletal bone scintigraphy. If indicated, laparoscopy and / or diagnostic laparotomy can also be performed.

Liver cancer treatment

Surgery

The treatment of liver cancer in modern oncology is the most difficult section. It can only be carried out in modern specialized medical institutions. The only radical treatment is surgery. It can consist of both liver resection and liver transplantation.

Liver resection is one of the most difficult surgical interventions, since the organ has a large number of vessels in its structure, in order to avoid bleeding, it is necessary to very carefully and carefully carry out hemostasis. One of the positive

aspects of surgical interventions on the liver is the fact that it has a high regenerative capacity.

It should be noted that the resectability in the diagnosis of liver cancer can be from 16% to 66%. Postoperative mortality during liver resection varies from 1% to 15%. It is highest in the presence of liver cirrhosis.

There are more than fifty accesses for liver surgery. The most used methods are: **Kochera, Rio Branca, Fedorov** . If a major surgical intervention is performed, specialists use a thoracoabdominal approach.

Chemotherapy treatment

Chemotherapy treatment for liver cancer is ineffective. Life expectancy with an unresectable process does not exceed seven months.

In some cases, positive results are achieved with intra-arterial chemoembolization. In the process of its implementation, a chemotherapeutic **drug (cisplatin, adriamycin)** is injected into the renal artery , which is preliminarily diluted in a lipoid or mixed with microemboli (gelatinous sponge, hydrogel). After chemoembolization, the two-year survival rate is about 27%.

Radiation therapy

Radiation therapy is not used in the treatment of liver cancer. Research is currently underway, but the effectiveness of this treatment method is not yet available.

Cryotherapy for liver cancer

The principle of cryosurgery is intraoperative cooling of the tumor with liquid nitrogen, which is supplied using a special probe. However, the technique is ineffective when the size of the malignant neoplasm is **more than 5 centimeters**. The three-year survival rate after cryotherapy is about 20%.

Alcoholization

The method of alcoholization of tumor nodes is increasingly used. The method is based on the process of introducing an alcohol-containing solution, which is injected into the neoplasm with a needle through the skin. The procedure is carried out under the supervision of an ultrasound scan. The five-year survival rate after treatment with this method is 30-40%.

Radiofrequency ablation

Ablation is the local **destruction of a tumor without removing it** . And radiofrequency ablation is a technique that uses high-energy radio waves. The doctor, under the control of ultrasound or CT, inserts a needle-shaped sensor into the tumor through the skin, through which a high-frequency current enters the tumor. It heats up cancer cells and destroys them. It should be noted that the method is used if the neoplasm is no more than 5 cm in size, and the total number of them is no more than four.

Radioembolization

3A - metastases of cancer in the liver

3B - tumor reduction after chemoembolization

3C - Reduction of metastases after radiofrequency ablation (RFA)

3D - the result of therapy after 6 months

Metastatic liver cancer Liver

damage by malignant neoplasms in 95% of cases is secondary. Among all organs, the liver ranks first in the localization of metastases in it. As a rule, metastasis is carried out along the **hepatic artery and portal vein**, and in malignant tumors of other localizations, it is detected in 36% of cases.

So metastases of pancreatic cancer in the liver are detected in 50% of cases, with colorectal cancer from 25% to 50%, with breast cancer in 30%, with stomach cancer in 35% of cases. Clinical manifestations are determined by the primary focus.

The most effective treatment for secondary liver cancer is surgery. Indications for surgical treatment are metastases:

- *Malignant neoplasms of the small intestine.*
- *Colorectal cancer.*
- *Pancreatic cancer.*
- *Kidney and adrenal cancer.*
- *Melanomas, etc.*

If the liver is affected by metastases, the main conditions for its resection are sufficient functional reserves of the remaining part of the organ and radical removal of the primary focus. The staging of the metastatic process in the liver is of great importance in determining the indications for resection.

- **Stage I** is characterized by the presence of one metastasis, which occupies about 25% of the liver volume.
- **Stage II** is characterized by the presence of a single metastasis, which has a volume of 25% to 50% or multiple metastases with a volume of up to 25%.
- **Stage III** is determined by the fact that there are multiple and bilobar (in both lobes) foci, which occupy 25-50% of the total volume of liver tissue. It can also be a single metastasis that occupies more than 50% of the organ volume.

Metastases are operable and can be removed completely by liver resection. The volume of surgical intervention depends on the presence or absence of vascular invasion, localization and size of metastases.

Liver cancer prognosis

Liver cancer prognosis is poor. Patient survival over five years averages 10%. This is due to the fact that liver cancer is accompanied by the presence of concomitant diseases such as hepatitis, cirrhosis, etc. In addition, the cause of mortality after a course of complex treatment is cancer recurrence.

Disease prevention

The main areas of prevention of liver cancer are:

1. Timely measures to reduce the incidence and treatment of viral hepatitis B and C. For this purpose, vaccination of high-risk population groups, control studies of donor blood, etc. are carried out.

2. Heat treatment of fish, preventing the occurrence of opisthorchiasis invasion.
3. Prevention of alcoholism and tobacco smoking.
4. Quality control of products coming from the countries of Southeast Asia and South Africa for the presence of infection with the fungus *Aspergillus flavus*, which is a source of aflatoxins.
5. Timely and competent treatment and identification of hereditary diseases that can cause cirrhosis of the liver, and increase the risk of developing malignant neoplasms of the liver in the future.

Cancer of the bile th bubble

Gallbladder cancer is a disease in which malignant (tumor) cells invade the tissues of the gallbladder. Gallbladder cancer is a rare condition in which malignant (tumor) cells invade the tissues of the gallbladder. The gallbladder is a bean-shaped organ that sits on the lower surface of the liver in the upper abdomen. The organ is designed to store bile, a fluid that is produced in the liver and helps digest fats. When food reaches the stomach and intestines, bile flows from the gallbladder through the so-called bile duct, which is the tube that connects the gallbladder and liver to the beginning of the small intestine. The wall of the gallbladder consists of three main layers of tissue. - Mucous (inner) layer. - Muscular (middle) layer. - Serous (outer) layer. There are layers of connective tissue between these layers. Gallbladder cancer begins in the inner layer and spreads to the outer layers as it grows.

Etiology of gallbladder cancer:

It is not entirely clear what causes gallbladder cancer. Doctors know forms of gallbladder cancer when healthy gallbladder cells develop and undergo mutations in their DNA. As a result of mutations, cells grow uncontrollably and continue to live when other cells die. The accumulating abnormal cells form a tumor that can expand outside the gallbladder and spread to other parts of the body.

Gallbladder cancer in most cases begins in the glandular cells that line the lining of the gallbladder. Gallbladder cancer that begins in this type of cell is called **adenocarcinoma**.

Being female increases your risk of developing gallbladder cancer. All factors that increase the likelihood of developing this disease are called risk factors. Risk factors for developing gallbladder cancer include: - Female gender. - American origin.

Gallbladder Cancer Symptoms:

Jaundice, pain, and high fever can all be signs of gallbladder cancer. These and other manifestations can be caused by both gallbladder cancer and other diseases. If one of the following symptoms appears, you should consult your doctor: - Jaundice (yellow discoloration of the skin and whites of the eyes). - Pain in the upper abdomen. - High temperature (fever). - Nausea and vomiting. - Bloating. - Tumor formations in the abdomen. The onset of the disease is slow and subtle. Often, the clinical picture is masked for a long time by the manifestations of cholelithiasis. The most common symptom of gallbladder cancer is pain of a different nature, usually dull and persistent, resulting from the invasion of the tumor into the perineural lymphatic tract. Persistent dull pain in the right hypochondrium in the elderly is suspicious of gallbladder cancer, especially if it is accompanied by subfebrile condition. Along with pain, appetite worsens, dyspeptic symptoms and weight loss develop. Jaundice occurs in almost half of cases. The most characteristic sign of gallbladder cancer is a palpable, dense, lumpy tumor in the right hypochondrium. The liver is often enlarged, sometimes dense nodes of metastases are felt in it. In advanced stages, ascites and anemia may appear. Fever, leukocytosis in the blood, and increased ESR are common. V. Kh. Vasilenko, depending on the prevailing clinical syndrome, distinguishes five forms of gallbladder cancer: icteric, "tumor", dyspeptic, septic and "mute". In the latter form, the clinical picture is due to metastases.

Diagnostics of the gallbladder cancer:

In the early stages, gallbladder cancer is extremely difficult to diagnose. Difficulties in early diagnosis of gallbladder cancer are associated with the following factors: - In the early stages of gallbladder cancer, there are no significant clinical manifestations of the disease. - The clinical manifestation of gallbladder cancer symptoms resemble many other diseases. - The gallbladder is covered by the liver. Sometimes gallbladder cancer is found when the gallbladder is removed for other reasons. In patients with stones in the gallbladder, this malignant disease develops extremely rarely. To **establish the diagnosis** and extent of the process to adjacent tissues and organs, various tests and diagnostic procedures are used. Diagnostic methods that visualize the area of the bladder and adjacent tissues and organs help diagnose gallbladder cancer and determine the extent of the process. The process of establishing the prevalence of a disease is called staging. For planning therapy, the possibility of complete surgical removal of the tumor is important. Tests to identify, diagnose, and staging gallbladder cancer are usually done at the same time.

Among the most accurate diagnostic methods, one can single out **laparoscopy**, during which it is possible to take biological materials for further histological and cytological examination, as well as determine the size of the tumor, the degree of its growth and the presence of metastases.

In addition, for the initial diagnosis of the disease, the following are carried out:

- **Ultrasound of the gallbladder** and abdominal organs. This method is widely used in the examination of patients, as it has a number of advantages. This is the absence of harm to the patient, and the absolute painlessness of the procedure, which does not cause any complications, and a sufficiently high information content. In addition, ultrasound allows you to make the sampling of the puncture more accurate.
- **Computed tomography** . It allows you to take pictures of both healthy and affected areas of the body, which is especially important in the presence of distant metastases. In addition, during CT, a contrast agent is often injected into the patient's circulatory system, which makes the study even more accurate.
- **Examination of the patient** to determine the general condition of the patient, whether he has signs of illness, such as swelling, as well as any signs and symptoms not found in a healthy person. You should carefully ask the patient about his lifestyle, bad habits, diseases suffered from the wound, and the treatment being carried out.
- **A blood test** for the detection of cancer-embryonic antigen. By itself, an increase in the level of these antibodies in the blood does not yet indicate an indispensable oncological disease, but in combination with other symptoms gives rise to further research.
- **Percutaneous transhepatic cholangiography** . This method allows you to get an overall picture of the state of the gallbladder and the corresponding ducts. Its essence lies in the introduction of a thin needle into the liver and injecting a contrast agent. Then a series of images of the liver, gallbladder and connecting bile ducts are taken. If the normal circulation of bile is disturbed, drainage of bile with a stent should be performed before cholangiography. The procedure itself is carried out under the control of an ultrasound
- **Liver function tests:** A blood sample determines the content of certain substances that are produced by the liver. An increased concentration of these substances in the blood is indicative of gallbladder cancer.

- **Measurement of the level of cancer-embryonic antigen (CEA):** determination of the content of CEA in the blood. CEA is synthesized by both tumor and healthy cells and enters the general bloodstream. An increase in the concentration of this marker in the blood may indicate gallbladder cancer or other diseases.
- **Cancer Antigen 19-9 (CA 19-9):** Determination of the content of CA 19-9 in the blood. CA 19-9 is synthesized by both tumor and healthy cells and enters the general bloodstream. An increase in the concentration of this marker in the blood may indicate gallbladder cancer or other diseases.
- **Biochemical blood test:** in a laboratory study of blood, the content of certain substances in it is determined, for example, hormones synthesized by certain organs and tissues of the body. Deviations in concentrations (above or below normal values) may be a sign of a malfunction of the organ or tissue where these hormones are produced. In the blood, the content of hormones produced by the carcinoid tumor is determined. This test is used to diagnose carcinoid syndrome.
- **Radiography of the abdominal organs.** X-rays are a stream of high-frequency radiation. When these rays pass through the human body, a corresponding image of internal organs and tissues is obtained on a special film.
- **MRI (Magnetic Resonance Imaging):** This research method is based on radio-magnetic radiation, with the help of which a series of images of a person's internal organs are obtained. These pictures are displayed on a computer monitor and, if necessary, on film. This procedure is also called nuclear magnetic resonance imaging. With the help of an MRI, bone defects can be determined.
- **Carcinoembryonic antigen test (CEA):** A test that measures the level of CEA in the blood. CEA enters the bloodstream from both cancerous and normal cells. When there are more of them than usual, it may be a sign of gallbladder cancer;
- **Analysis CA 19-9.** (CA - a specific antigen produced by epithelial cells of the gastrointestinal tract) : a test that measures the level of CA 19-9 in the blood. CA 19-9 enters the bloodstream from both cancerous and normal cells. When there are more of them than usual, it can also be a sign of gallbladder cancer;
- **Endoscopic retrograde cholangiopancreatography:** the procedure used for X-ray ducts (tubes) that carry bile from the liver into the gall bladder and from the gallbladder into the small intestine. Sometimes gallbladder cancer causes these ducts to narrow and block, slowing the flow of bile and causing jaundice. An endoscope (thin tube) is passed through the mouth, esophagus, and stomach in the first part of the small intestine. The catheter (a smaller tube) is then inserted through the endoscope into the bile

ducts. The dye is injected through a catheter into the ducts and then x-rays are taken. If the canals are blocked by a tumor, a small tube can be inserted into the canal to unblock it. This tube (stent) can be left in place to keep the canal open. Tissue samples can also be taken;

- **Laparoscopy:** A surgical procedure in which organs in the abdomen are seen and checked for signs of illness. Small incisions are made in the abdominal wall, and a thin laparoscope tube is inserted into one of these incisions. Other instruments can be inserted through the same or different incisions to perform procedures such as removing organs or taking tissue samples for biopsies. Laparoscopy helps to find out if the cancer is in the gallbladder or has spread to nearby tissues and if it can be surgically removed.

- **Biopsy:** This is the removal of cells or tissue that can be viewed under a pathologist's microscope to check for signs of cancer. A biopsy can be done after surgery to remove the tumor. If the tumor is obvious and cannot be removed with surgery, a biopsy can be done using a fine needle to remove cells from the tumor.

Gallbladder Cancer Treatment:

The patient's chance of recovery (prognosis) and the choice of treatment are influenced by certain factors. **The prognosis (chance of recovery)** and the choice of treatment method is determined by the following: - Stage of cancer (spread of the process only to the biliary tract or to other organs and tissues). - Is complete surgical removal of the tumor possible? - Type of gallbladder cancer (how malignant cells look under a microscope) - Newly diagnosed disease or relapse (return) of the disease. The choice of treatment method depends on the age and general condition of the patient and the clinical symptoms caused by the disease. Gallbladder cancer is considered a curable process in localized (not common) stages of the disease. With advanced forms, palliative treatment is performed to improve the patient's quality of life and reduce the clinical manifestations and complications of gallbladder cancer. Patients should be aware of the possibilities of participating in clinical trials. The latter are carried out to improve the treatment of patients. Gallbladder cancer is usually staged at the same time as diagnosis. For more information on research methods for diagnosing and staging gallbladder cancer, see the General Information section. There are three **ways a tumor can spread** throughout the body. These include: 1. Germination into other tissues. A malignant neoplasm invades the surrounding healthy tissue. 2. Along the lymphatic system (lymphogenous pathway). Tumor cells penetrate the lymphatic system and through the lymphatic vessels can enter other organs and tissues of a person. 3. With blood flow (hematogenous). Malignant cells enter the veins and capillaries and are carried with the blood to other organs and tissues. When tumor cells with blood or lymph flow spread throughout the body, another (secondary) tumor may form. This

process is called metastasis. The primary tumor and secondary (metastatic) neoplasms are related to the same type of cancer. For example, if breast cancer spreads to the bones, then the tumor cells found in the bones are malignant breast cancer cells. And a neoplasm in the bones is referred to as metastatic breast cancer, not bone cancer. There are the following **stages in the development of gallbladder cancer: Stage 0 ("Cancer in situ" or Carcinoma in situ)** In stage zero, abnormal cells are located in the inner (mucous) layer of the gallbladder. These cells can transform into malignant cells and infect the surrounding healthy tissue. Stage zero is also called "cancer in place". **Stage I** At **stage I**, a malignant tumor is already forming. Stage I is subdivided into stage IA and stage IB. - Stage IA: the tumor affects only the inner (mucous) membrane to the connective tissue layer or to the muscle layer. - Stage IB: the tumor invades the muscular layer of the gallbladder to the layer of connective tissue. **Stage II** Stage II is divided into stage IIA and stage IIB. - Stage IIA: The tumor has spread to the visceral peritoneum (tissue covering the gallbladder) and / or to the liver and / or adjacent organs (eg stomach, small intestine, large intestine, pancreas, extrahepatic bile ducts). - Stage IIB: the tumor spreads to: - 1. beyond the mucous layer to the connective tissue layer and adjacent lymph nodes; or - 2. to the muscle layer and adjacent lymph nodes; or - 3. Behind the muscle layer to the connective tissue membrane and to the adjacent lymph nodes; or - 4. Through the visceral peritoneum (tissue covering the gallbladder) and / or to the liver and / or one of the adjacent organs (eg stomach, small intestine, large intestine, pancreas, extrahepatic bile ducts) and to adjacent lymph nodes ... **Stage III** In stage III, the cancer spreads to the main blood vessel in the liver or to adjacent organs and can affect nearby lymph nodes. **Stage IV** In stage IV, cancer affects regional lymph nodes and / or organs and tissues distant from the gallbladder. To plan the treatment of gallbladder cancer, in addition to the stages of the disease, I use the division into groups. There are two groups: - **Localized (Stage I)** Cancer is located only in the wall of the gallbladder and can be completely removed by surgery. - **Inoperable form (stage II, stage III, stage IV)** If cancer grows through the wall of the gallbladder into the surrounding tissues and organs and into the abdominal cavity, the tumor is considered unresectable (cannot be completely removed by surgery). The exception is patients in whom the malignant process affects only the lymph nodes. **Recurrence of gallbladder cancer** Recurrence of gallbladder cancer after treatment is called relapse (return) of the disease. Cancer can develop again in the gallbladder or anywhere else in the body. **Gallbladder Cancer Treatments** There are various therapies for treating gallbladder cancer. Some approaches are considered the standard of therapy (treatment that exists today), some are being investigated in clinical trials. Clinical trials are conducted to improve existing therapies or to provide evidence of the effectiveness of new approaches. If such studies prove superior to the treatments under study, they may become the new standard of care. Many patients can discuss with their doctor about participation in clinical trials. Some trials are continuing to recruit untreated patients. **There are three standard treatments:**

- **Surgical method** For cancer of the gallbladder, cholecystectomy, surgical removal of the gallbladder and surrounding tissues, is performed. Removal of regional (adjacent) lymph nodes is also possible. For surgical interventions on the gallbladder, a laparoscope is often used. A laparoscope with a video camera attached to it is inserted into an opening (incision) in the abdomen. Surgical instruments to perform the operation are inserted through another opening. Due to the risk of contamination of these holes with malignant cells, healthy tissue surrounding the incisions must also be surgically removed.

- **Radiation therapy** Radiation therapy is a method of treating a tumor using high-frequency X-rays or other types of radiation. The method allows you to achieve complete destruction of malignant cells or slow down tumor growth. There are 2 types of radiation therapy. With external radiation therapy, beams from a device next to the patient are directed to the tumor. In internal radiation therapy, radioactive substances are drawn into needles, tubes, or catheters, which are inserted into tissues near the tumor or directly

into the neoplasm. The choice of radiation therapy method depends on the type and stage of the malignant process. New treatments are being developed in clinical trials.

- **Chemotherapy** Chemotherapy is a method of treating cancer with cytotoxic drugs, which work to kill tumor cells or slow down malignant growth. When chemotherapy drugs are taken orally, intravenous or intramuscular administration, the drug enters the general bloodstream, destroying tumor cells circulating throughout the body (systemic chemotherapy). When chemotherapy is injected directly into the spinal canal, an affected organ, or a cavity in the body, such as the abdominal cavity, it is called regional chemotherapy. The type of administration of chemotherapy drugs depends on the type and stage of the malignant process. Clinical trials continue to explore new treatment regimens.

- **Radiosensitizers** Radiosensitizers are drugs that increase the sensitivity of a tumor to radiation therapy. The combination of radiation therapy and radiosensitizers can kill more malignant cells. Patients can ask their doctor about participating in clinical trials. For some patients, participation in clinical trials may be the best treatment choice. Clinical trials are part of the cancer research process. They are being conducted to determine whether new tumor treatments are effective and safe, and to what extent they are superior to standard therapies. Most of today's cancer treatment standards are based on previous clinical trials. Patients participating in studies may receive standard therapy or be among the first to receive new treatment. Patients participating in clinical trials also influence the improvement of cancer treatments in the future. Even if a clinical trial does not lead to the discovery of new effective methods of combating the disease, very often, based on the results obtained, it is possible to answer the most important questions and help in further study of the problem. You can participate in clinical trials before, during, or after your cancer treatment. Some studies recruit patients without prior therapy. Other trials are examining the effect of the drug in patients who did not respond to previous treatments. There are also studies of new methods of preventing relapses (recurrences) of the disease or reducing the side effects of the drug. After the end of treatment, the patient must be observed by a doctor. After treatment, in order to assess the effectiveness of treatment, it may be necessary to repeat some of the diagnostic procedures carried out earlier to establish a diagnosis or stage of the process. Based on the results obtained, a decision is made to continue, change or end the treatment. This procedure is called restoring. Some tests will need to be repeated regularly

even after treatment is completed. The data of such examinations help to assess the patient's condition and detect a relapse (return) of the disease in time. This process is called dispensary observation or regular preventive examinations.

Types of standard treatment

Surgery for early stage gallbladder cancer

There may be the following options for surgery if the patient is diagnosed with gallbladder cancer in the early stages:

- **Cholecystectomy.** Early gallbladder cancer, which is limited to the gallbladder region, is treated with surgery to remove the gallbladder (cholecystectomy). This operation can be performed using the standard open method, or it can be performed by laparoscopic access.

- **Surgery to remove the gallbladder and part of the liver.** Cancer of the gallbladder that extends beyond the gallbladder into the liver is sometimes treated with surgery to remove the gallbladder, part of the liver, and biliary tract that surrounds the gallbladder.

It is still not clear to clinicians if additional treatment after successful surgery can increase the chances that gallbladder cancer will not return. Some studies have shown this to be the case, so in some cases your doctor may recommend chemotherapy, radiation therapy, or a combination of both after surgery. It is imperative for each patient to discuss the potential benefits and risks and decide which is right for whom.

Treatment of advanced stages of gallbladder cancer

Surgery cannot cure gallbladder cancer that has spread to other parts of the body. Instead, doctors use treatments that can relieve cancer symptoms.

Treatment options for later stages:

- **Chemotherapy.** Chemotherapy is a drug treatment that uses chemicals that kill cancer cells. Chemotherapy in cancer treatment uses drugs to stop the growth of cancer cells, or to kill these cells and stop the process of their division. Chemotherapy drugs are taken by mouth or injected into a vein or muscle. Medicines enter the bloodstream and can reach cancer cells throughout the body (systemic chemotherapy). Alternatively, drugs are injected directly into the cerebrospinal fluid, organ, or body cavity (such as the abdomen) to target cancer cells in these areas (regional chemotherapy). The method of chemotherapy depends on the type and stage of the malignant process;

(radiation) therapy, or radiation . It is a cancer treatment that uses high energy X-rays or other types of radiation to kill cancer cells. There are two types of radiation therapy - external and internal. External beam radiation therapy uses equipment outside the body to direct radiation to cancer. Internal radiation therapy uses radioactive materials in sealed needles, seeds, wires, or catheters that are placed in the immediate vicinity of the cancer. The method of radiation therapy depends on the type and stage of the cancer being treated;

- **Radiation therapy with sensitizers.** Radiosensitizers are drugs that make tumor (cancer) cells more sensitive to radiation therapy. Combining radiation therapy and radiosensitizers can kill more cancer cells;

- **Hyperthermia therapy:** treatment in which body tissues are exposed to high temperatures, which damage and kill cancer cells or make them more sensitive to the effects of radiation therapy and certain anticancer drugs;

- **Palliative surgery to dilate the bile ducts.** With enlarged gallbladder cancer, an obstruction can form in the bile ducts and cause further complications. Procedures for clearing this block can help. For example, surgeons can place a hollow metal tube (stent) in the canal and keep the canal open, or surgically redirect blocked bile ducts.

Survival projections

It should be remembered that gallbladder cancer is a completely curable disease if the tumor is concentrated in the walls of the organ itself. In this case, a timely operation to remove the gallbladder can save the patient and return him to normal life. At later stages, the operation becomes impossible, however, here, too, our specialists select the appropriate palliative treatment that can significantly improve the patient's standard of living.

Cancer of Vater's papilla

It is found in 0.1-1.7% of those who died from malignant tumors. In the group of patients with tumor lesions of the organs of the papcreatoduodenal zone, this localization is not uncommon and occurs in 12–20% of cases.

Pathogenesis and etiology

Neoplasms of the *large duodenal papilla* arise from the epithelium of the ducts (common bile, pancreatic, papilla ampulla) or from the epithelium of the duodenal mucosa. The tumor is usually small (from 0.5 to 2–2.5 cm), has the appearance of a round or ovoid formation protruding into the duodenal lumen. In most cases, it is exophytic, grows slowly and does not go beyond the papilla for a long time. With infiltrative cancer, the surrounding tissues (duodenum, head of the pancreas, common bile duct) are quickly involved in the process. Microscopically, the tumor is most often adenocarcinoma. Metastases are relatively rare - in 25%. Regional lymph nodes are affected by metastases, then the liver and, less often, other organs.

Clinic

Symptomatology is similar to that in cancer of the head of the pancreas, however, the clinical course differs in features that have diagnostic value, and also affect the prognosis and choice of treatment. The localization of the tumor at the level of the papilla determines the relatively early onset of jaundice. The pre-icterus period is shorter than with pancreatic cancer. Jaundice in more than half of patients has an undulating character. Tumors of the large duodenal papilla ulcerate rather quickly. This circumstance contributes to the penetration of infection from the duodenum into the bile and pancreatic ducts. Cholangitis occurs more often than with cancer of the head of the pancreas (in 40-50% of cases), manifests itself with chills, high fever (up to 38-39 ° C), pain in the liver. Infection of the pancreatic duct leads to outbreaks of pancreatitis, which are confirmed by increased rates of urine diastasis and clinical signs: paroxysmal pain, vomiting, fever and high leukocytosis. For cancer of the large duodenal papilla, bleeding from the tumor is characteristic. The degree of blood loss is different: from the presence of occult blood in the stool to significant bleeding, accompanied by severe anemia.

Diagnostics

The inflammatory component in cancer of the greater duodenal papilla gives rise to serious diagnostic errors. Pain syndrome, fever, wavelike jaundice give rise to diagnoses such as cholecystitis, cholangitis, pancreatitis. After the use of antibiotics, inflammation is removed, the condition of some patients improves and they are prescribed, mistakenly considering recovered. Internal bleeding in rare cases is regarded as a symptom of peptic ulcer disease. As a result, despite the rather early appearance of such a clear sign of the disease as jaundice, the correct diagnosis is established after 1-3 months, and sometimes after 1-2 years. With the doctor's oncological alertness and a comprehensive assessment of the history data, clinical, X-ray and [endoscopic examinations](#), the number of diagnostic errors will significantly decrease. A positive Courvoisier symptom is detected in 50–75% of cases. In other patients, the gallbladder cannot be palpated due to a significant increase in the liver or changes in the gallbladder (cholecystitis, cholelithiasis). The combination of cancer of the large duodenal papilla with cholelithiasis and cholecystitis was in 14% of cases. Courvoisier's symptom, as you know, indicates distal obstruction of the biliary tract and is equally characteristic of cancer of the large duodenal papilla, malignant tumors of the head of the pancreas and the distal common bile duct. Clarification of the topical diagnosis is facilitated by the method of duodenography and [fibroendoscopy](#).

Treatment

In cancer of the large duodenal papilla, pancreatoduodenal resection is performed.

Cancer of the Vater papilla

PROBLEM No. 1

Patient N., 55 years old, was admitted to the clinic with complaints of dull pain in the right hypochondrium. From the anamnesis: has been sick for 3 months.

Examination: On palpation in the right hypochondrium, the edge of the liver is determined by a softish consistency. Laboratory indicators of homeostasis are not deviated from the norm. With ultrasound and CT in the right lobe of the liver, a rounded formation up to 5 cm in diameter. Tumor markers: alpha-fetoprotein, CA-19.9, CEA within normal limits. With selective angiography of the celiac trunk in the 6th and 7th liver segments in the parenchymal phase, a rounded formation of 10x15x16 cm with areas of accumulation and retention of contrast agent in

irregular vascular spaces up to 3-4 cm is determined . No pathology was found on the part of other organs and systems.

Your conclusion:

1. Hepatocellular carcinoma.
2. Fibronodular hyperplasia of the right lobe of the liver.
- 3. Cavernous hemangioma of the liver.**
4. Hepatocellular liver adenoma.
5. Cystadenoma of the liver.

Pancreas cancer

Pancreatic cancer is a malignant neoplasm originating from the epithelium of the glandular tissue or pancreatic ducts .

Pancreatic cancer is a disease in which malignant (cancerous) cells form in the tissues of the pancreas. Pancreatic cancer occurs when cells in the pancreas are damaged and these malignant cancer cells begin to grow out of control.

Anatomical structure of the pancreas

The pancreas is an unpaired organ, 16-22 cm long, has the shape of a pear lying on its side. The wide end of the pancreas is called the "head", the middle part is called the "body" and the narrow end is called the "tail." The pancreas is located in the abdomen, between the stomach and the spine.

The pancreas has two main working functions in the body:

Pancreatic cancer risk factors

- **Age.** Most cases of pancreatic cancer occur in people over the age of 55.
- **Smoking.** Heavy cigarette smokers are two to three times more likely to develop pancreatic cancer than non-smokers.
- **Obesity and lack of physical activity.** Pancreatic cancer is more common in people who are very overweight and people who do not have much physical activity.
- **Diabetes.** Pancreatic cancer is more common in people with type 2 diabetes.
- **Paul.** More men than women are diagnosed with pancreatic cancer.
- **Race.** African Americans are more likely than Asians or fair-skinned people to be diagnosed with pancreatic cancer.
- **Family history.** The risk of developing pancreatic cancer becomes higher if the patient's mother, father, and siblings have had the disease.
- **Cirrhosis of the liver.** People with cirrhosis have a higher risk of developing pancreatic cancer.
- **Exposure to chemicals.** Exposure to certain “professional” pesticides, dyes, and chemicals used in metallurgy can increase the risk of developing pancreatic cancer.
- **Genetic syndromes.** Some inherited gene mutations, such as BRCA2, increase the risk of pancreatic cancer.
- **Chronic pancreatitis.** Long-term inflammation of the pancreas is also associated with an increased risk of pancreatic cancer.

Pancreatic cancer types

There are several types of pancreatic cancer, including:

- **Adenocarcinoma of the pancreas.** The most common pancreatic cancer is in the lining of the pancreatic ducts.
- **Squamous cell carcinoma.** This is a rare form of pancreatic cancer. Some neuroendocrine tumors in the pancreas can be benign or malignant (cancerous).
- **Insulinoma.** A rare tumor in the pancreas that secretes insulin, a hormone that lowers blood glucose levels.
- **Gastrinoma.** A tumor that secretes above average levels of gastrin, a hormone that stimulates the stomach to produce acid and enzymes. Gastrinoma can lead to peptic ulcer disease.
- **Glucagonoma.** A tumor that secretes glucagon, a hormone that raises blood glucose levels, which often leads to rashes.

Clinical classification

The clinical **TNM** classification applies only to exocrine pancreatic carcinomas and pancreatic neuroendocrine tumors, including carcinoids.

T - primary tumor

- Tx - primary tumor cannot be assessed
- T0 - lack of data on the primary tumor
- Tis - carcinoma in situ
- T1 - tumor no more than 2 cm in greatest dimension within the pancreas
- T2 - tumor more than 2 cm in greatest dimension within the pancreas
- T3 - The tumor has spread outside the pancreas but does not involve the celiac trunk or superior mesenteric artery
- T4 - The tumor invades the celiac trunk or superior mesenteric artery

Notes:

Tis also includes pancreatic intraepithelial neoplasia III.

N - regional lymph nodes

- Nx - Regional lymph nodes cannot be assessed
- N0 - no metastases in regional lymph nodes
- N1 - there are metastases in regional lymph nodes

Notes: Regional lymph nodes are peri-pancreatic nodes, which can be subdivided as follows:

node group	localization
Upper	above the head and body
Lower	below under the head and body
Front	anterior pancreatic-duodenal, pyloric (only for head tumors) and proximal mesenteric
Rear	posterior pancreatic duodenal, common bile duct lymph nodes and proximal mesenteric
Splenic	nodes of the hilum of the spleen and tail of the pancreas (only for tumors of the body and tail)
Celiac	only for head tumors

M - distant metastases

- M0 - no distant metastases;
- M1 - there are distant metastases.

Metastasis

Lymphogenous metastasis of pancreatic cancer has 4 stages. At the first stage, pancreatoduodenal lymph nodes (near the head of the pancreas) are affected, at the second - retropyloric and hepatoduodenal, then celiac and superior mesenteric lymph nodes, and at the fourth stage - retroperitoneal (paraaortic) lymph nodes.

Hematogenous metastasis leads to the development of distant metastases in the liver, lungs, kidneys, bones.

In addition, implantation transfer of tumor cells along the peritoneum is observed.

Pancreatic cancer symptoms

The following are the most common symptoms of pancreatic cancer. However, each individual may experience symptoms differently. Symptoms may include:

- **abdominal pain** in the upper or middle part, - **back pain**; - **loss of appetite**; - jaundice (yellowing of the skin and eyes, dark urine); - indigestion; - nausea; - vomiting; - increased fatigue (fatigue); - **an enlarged belly** from a swollen gallbladder; - pale, greasy and loose stools in the toilet; - **weight loss** for no apparent reason; - feeling very tired.

Pancreatic cancer is difficult to detect and diagnose at an early stage for the following reasons:

- there are subtle signs or symptoms in the early stages of pancreatic cancer;
- the signs of pancreatic cancer are similar to those of many other diseases;
- The pancreas is hidden behind other organs such as the stomach, small intestine, liver, gallbladder, spleen and bile ducts.

Other tumors of the pancreas

- Carcinoid tumors
- Neuroendocrine and islet cell tumors - insuloma

Pancreatic cancer diagnostics

In addition to a complete medical history of the patient and physical examination, the diagnosis of pancreatic cancer can be as follows:

- **Ultrasound examination (also called "sonography")**. It is a diagnostic imaging technique that uses high-frequency sound waves to create images of internal organs. Ultrasound is used to view the internal organs of the abdomen, such as the liver, pancreas, spleen, and kidneys, and to assess blood flow through various vessels. Pancreatic ultrasound can be done using external or internal devices;
- **Transabdominal ultrasound**. The technician places an ultrasound device on the abdomen to create an image of the pancreas;
- **Endoscopic ultrasound examination**. The doctor inserts an endoscope, a small flexible tube with an ultrasound device at the end, through the mouth and stomach, and into the small intestine. When he slowly removes the endoscope, images of the pancreas and other organs are ready;
- **Computed tomography (CT)** is a diagnostic procedure that uses a combination of X-rays and computer technology to produce horizontal and axial images of the body. CT scans show detailed images of any part of the body, including bones, muscles, fat, and organs. CT scans are more detailed studies than general x-rays;
- **Magnetic resonance imaging (MRI)** - a diagnostic procedure that uses a combination of a large magnet, radio frequencies and a computer to obtain detailed images of organs and structures in the body;
- **Endoscopic retrograde cholangiopancreatography (ERCP)**. A procedure that allows a doctor to diagnose and treat problems in the liver, gallbladder, bile ducts, and pancreas. The procedure combines an X-ray and the use of an endoscope - a long, flexible, illuminated tube. The endoscope is guided through the patient's mouth and throat, then through the esophagus, stomach, and duodenum (the first part of the small intestine). The doctor can examine the inside of these organs and look for any abnormalities. The tube then passes through the desired area (pancreas) where a dye is injected to allow the bile and pancreatic ducts to be seen on the x-ray ;

- **Endoscopic retrograde cholangiography (ERCHRg)**. The needle is inserted through the skin and into the liver, where a dye (contrast) is injected (injected) so that the structures of the bile ducts can be seen on an x-ray. This test is usually done when ERCP is not possible;
- **Biopsy of the pancreas**. A procedure in which a sample of tissue from the pancreas is removed (with a needle or during surgery) for examination under a microscope;
- **Laparoscopy** is a surgical procedure in which the doctor looks at the organs in the abdomen to check them for signs of illness. Small incisions are made in the abdominal wall and a laparoscope (thin tube) is inserted into one of these small incisions. The laparoscope may have an ultrasound probe at the end for examining internal organs (such as the pancreas). This is a laparoscopic ultrasound. Through the same or different incisions, other instruments can be inserted to perform the necessary procedures - taking samples of pancreatic tissue, samples of fluid from the abdominal cavity to check for cancer, etc.;
- **Blood and urine tests** - biochemical tests in which a blood sample is tested to measure the amount of certain substances, such as bilirubin, released through the blood into organs and tissues in the body. An unusual (higher or lower than usual) amount of a substance can be a sign of illness in an organ or tissue;

- **Test for tumor markers**. A procedure in which a sample of blood, urine, or tissue is tested to measure the amount of certain substances, such as CA 19-9 and the embryonic cancer antigen (CEA), which is responsible for tumors in organs, tissues or cells of the body. Certain substances are associated with specific types of cancer when they are found in the body in an overestimated range. These are the so-called "tumor markers";
- **Positron emission tomography (PET)**. A type of nuclear procedure in medicine. For this test, a radioactive substance - usually associated with a type of sugar - is injected into a vein before the body is scanned. Radioactive sugar builds up in cancer cells, which will show up in images. PET scans are often done in conjunction with CT scans.

Pancreatic cancer stages

There are three ways cancer spreads in the body:

- 1. Through the fabric.** Cancer cells invade the surrounding normal tissues;
- 2. Through the lymphatic system.** Cancer cells invade the lymphatic system and travel through the lymphatic vessels to other places in the body;
- 3. Through the blood.** Cancer cells invade veins and capillaries and, with blood, to other places in the body.

When cancer cells break away from the primary tumor and travel through the lymph nodes or blood to other areas of the body, other, secondary tumors can form. This process is called "metastasis". Secondary (metastatic) tumors are of the same type of cancer as the primary tumor. For example, if breast cancer spreads to the bones, the cancer cells in the bones are actually breast cancer cells. And the disease is metastatic breast cancer, not bone cancer.

Pancreatic cancer is divided into the following stages:

- **stage 0 (cancer in place).** Abnormal cells are found in the lining of the pancreas. These abnormal cells can become cancer and spread to nearby healthy tissue.
- **1st stage.** In stage I, cancer has formed and is found only in the pancreas. In stage IA, the tumor is 2 cm or less. Stage I is divided into stages IA and IB, depending on the size of the tumor. At stage IB, the tumor is larger than 2 centimeters.
- **Stage 2.** Cancer can spread to nearby tissues and organs, and possibly to lymph nodes in the pancreas. Stage II is divided into stages IIA and IIB, depending on the places where the cancer has spread. Stage IIA: The cancer has spread to nearby tissues and organs, but has not spread to nearby lymph nodes. Stage IIB: The cancer has spread to nearby lymph nodes and can spread to nearby tissues and organs.
- **Stage 3.** The cancer has spread to large blood vessels near the pancreas and can spread to nearby lymph nodes. These include: the superior mesenteric artery (next to the pancreas, departs from the aorta slightly below the celiac trunk at the level of the XII thoracic or I lumbar vertebra and supplies the large intestine), the celiac trunk (a short vessel 1-2 cm long, extending from the anterior surface of the aorta), common hepatic artery and portal vein.
- **Stage 4.** Cancer can be of any size and has spread to distant organs - the lungs, liver, and abdomen (the space in the abdomen that contains the intestines, stomach,

and liver). Cancer can also spread to tissues and organs near the pancreas or lymph nodes.

TNM system

To determine the stage of pancreatic cancer, the TNM system is used (an abbreviation from the English terms "Tumor" - "tumor" - the size of the tumor and the degree of its ingrowth into the tissue; "Lymph Node" - "lymph node" - damage to the lymph nodes; "Metastasis" - "metastases" - the presence or absence of metastases).

TNM categories define the stages of cancer (numbered 0 through IV).

The "T" in this system denotes the grade of the primary tumor in the pancreas:

- TX - insufficient information to assess the primary tumor
- T0 - no evidence of a primary tumor (primary tumor node not defined).
- Tis Carcinoma in situ - cancer in situ. The cells are cancerous, but the tumor does not go beyond the site of its origin (precancerous condition, intraductal papillary mucinous neoplasms with high-grade dysplasia).
- T1 - the tumor is limited to the pancreas, its size is 2 cm or less. T1A - the tumor does not exceed 2 cm in the largest dimension. T1B - The tumor is larger than 2 cm in its largest dimension.
- T2 - the tumor grows into one of the neighboring organs: the duodenum, bile duct or tissue near the pancreas, it is more than 2 cm in diameter.
- T3 - the tumor grows outside the pancreas, into one of the neighboring organs: the stomach, spleen, colon, closely located large vessels, but it is not connected with the blood vessels of the celiac trunk or superior mesenteric artery.
- T4 - The tumor is present in the blood vessels of the celiac trunk or superior mesenteric artery (two blood vessels that run next to the pancreas).

"N" - regional lymph nodes. The system detects if the cancer has spread (metastases) to the lymph nodes in the pancreatic region: - NX - Regional lymph nodes cannot be assessed. - N0 - there are no metastases in the regional lymph nodes (the cancer has not spread to the lymph nodes, they are not affected by metastases). - N1 - metastases have affected regional lymph nodes (cancer has spread to the lymph nodes).

"M" - distant metastases, the tumor has spread to other organs outside the pancreas:

- MX - insufficient information to determine distant metastases.
- M0 - distant metastases were not found - they, most likely, are not.
- M1 - distant metastases are found.

Once the T, N, and M designations are assigned to a specific patient, they can be combined.

Pancreatic cancer treatment

There are different types of treatments for patients with pancreatic cancer. Some approaches are considered the standard of therapy currently in use, and some of them are still undergoing clinical trials - to improve existing therapies or to gain the necessary information about new therapies - to further, more effectively, treat patients with pancreatic cancer. If clinical trials show that a new treatment is better than standard treatment, then the new treatment may become the accepted standard treatment.

Depending on the type and stage of pancreatic cancer, it can be treated with the following: Surgery may be needed to remove a tumor, a section or an entire pancreas, and often parts of other organs. The type of surgery depends on the stage of the cancer, the location and size of the tumor, and the general health of the patient.

- **Whipple procedure.** This procedure involves removing the head of the pancreas, part of the small intestine, gallbladder, part of the common bile duct, and part of the stomach and lymph nodes in the region of the head of the pancreas. Most pancreatic tumors occur in the head of the pancreas, which is why the Whipple procedure is the most commonly performed surgical procedure for pancreatic cancer. This procedure is quite complicated and risky, with complications such as bleeding, infections and stomach problems.

- **Distal pancreas resection.** If the tumor is in the body and tail of the pancreas, the tail is removed, and sometimes parts of the body of the pancreas, along with the spleen, are removed. This procedure is commonly used to treat neuroendocrine tumor islet cells.

- **Pancreatectomy.** Removed: the entire pancreas, part of the small intestine and stomach, common bile duct, spleen, gallbladder and some lymph nodes. This type of surgery is not done often.

- **Palliative operations.** In later stages of cancer, surgery may not be done to try to cure the cancer (this is no longer possible), but to relieve problems such as blocked bile ducts. During this operation, the doctor will cut off the gallbladder or bile ducts and sew them to the small intestine in order to create a new pathway around the blocked area.

- **Endoscopic stent.** If the tumor is blocking the bile duct, surgery can be done with a stent (thin tube) through which the bile from the area is drained. The doctor may place a stent through a catheter that hangs out of the body so that bile drains downward, or a stent may be placed around the blocked area and help bile drain into the small intestine.

- **Gastric bypass surgery.** If a tumor blocks the flow of food from the stomach, the stomach can be sewn directly into the small intestine so that the patient can continue to eat normally.

- **External radiation (external radiation therapy).** A treatment that accurately transfers high levels of radiation directly to cancer cells. The radiation machine is operated by a therapist. Since radiation is used to kill cancer cells and shrink tumors, special shields can be used to protect the tissue surrounding the treated area. Radiation therapy is painless and usually lasts a few minutes. It can be given alone or in combination with surgery and / or chemotherapy.

- **Chemotherapy.** It is the use of anticancer drugs to kill cancer cells. In most cases, chemotherapy works by interfering with the ability of the cancer cell to grow or multiply. Different groups of drugs fight cancer cells in different ways. The oncologist will recommend an individual treatment plan for each individual person. Chemotherapy can be given alone or in combination with surgery and radiation therapy.

- **Targeted therapy.** Systemic therapy against tumor and distant micrometastases or metastases; a type of treatment that uses drugs or other substances to identify and attack cancer cells without harming normal cells. Tyrosine kinase inhibitors (TKIs) are low molecular weight compounds that prevent phosphorylation of tyrosine residues of intracellular proteins and thereby block further signal transmission to the cell nucleus; drugs of damaging therapy, block the signals necessary for tumor growth. Erlotinib is a type of TKI used to treat pancreatic cancer.

- **Medicines to relieve or reduce pain.** There are treatments for pain caused by pancreatic cancer. Pain can occur when a tumor presses on nerves or other organs near the pancreas. When the pain medication is no longer working, there are procedures that act on the nerves in the abdomen and relieve pain. The doctor may remove some of the nerves to block the pain.

New types of treatment for pancreatic cancer

Biological therapy. It is a treatment that uses the patient's immune system to fight cancer. Biotherapy agents are usually made in a laboratory and are used to boost levels or restore the body's natural defenses against cancer. This type of cancer treatment is also called "immunotherapy". Many patients can discuss with their doctor about participating in a clinical trial. For some patients, participation in clinical trials may be the best treatment choice. Clinical trials are part of the cancer research process. They are being conducted to find out if new cancer treatments are safe, effective, and better than standard treatments.

Pancreatic cancer treatment options by stage

- **Stages I and II.** Treatment may include:

- surgery;
- surgery followed by chemotherapy;
- surgery followed by radiation therapy (radiation, radiation therapy).

- **Stage III.** Treatment may include:

- palliative surgery or stenting, bypassing blocked areas in the canals or in the small intestine;
- chemotherapy followed by radiation therapy;
- radiation therapy followed by chemotherapy;
- chemotherapy with or without targeted therapy.
- **IV stage.** Treatment may include:
 - palliative surgery to relieve pain, block nerves and other symptoms;
 - palliative surgery or stenting, bypassing blocked areas in the canals or in the small intestine;
 - chemotherapy with or without targeted therapy.

Nutrition for Pancreatic Cancer

Patients with pancreatic cancer have special nutritional needs. Surgery to remove the pancreas can affect its ability to take in pancreatic enzymes that help digest food. As a result, patients may have trouble digesting food and absorbing nutrients into the body. In such cases, it is necessary to change the way you eat.

Pancreatic cancer prognosis

The long-term prognosis for people with pancreatic cancer depends on the size and type of the tumor, the extent of the lymph node involvement, and the extent of metastases (tumor spread) at the time of diagnosis.

PANCREAS CANCER Statistics (ICD-9: 157)

The highest incidence rates of pancreatic cancer are recorded among the black population of the United States (Alameda: m-16.3; f. 9.4), and the lowest rates are observed in Asian countries, among the white population of North America and Europe, where the incidence ranges from 3.0-9.0 among men and 2.0-6.0 among women.

In Russia, as a whole, the incidence of pancreatic cancer is comparable to European indicators, however, in some of its regions there is a very high incidence, such as in the **Magadan region**.

Smoking is an important and established risk factor for pancreatic cancer!

Situational tasks

PROBLEM No. 1

The patient is 17 years old. Complains of heaviness in the epigastric region, a feeling of distention in the upper abdomen after eating. The above complaints appeared three months ago. Endoscopic examination of the upper parts of the digestive tract revealed the presence of a flat exophytic formation on a broad base

with the presence of a shallow superficial ulceration in the center. Computed tomography of the abdominal organs did not reveal any pathological changes.

X-ray examination of the upper parts of the digestive tract was able to visualize the pathological formation located in the prepyloric region along the greater curvature immediately in front of the gatekeeper. The form of education is oval. The dimensions are 7x4 mm, the contours are quite clear and even. In the center of the formation there is a depot of a contrast agent measuring 3x2 mm. The walls of the stomach are elastic throughout. The motor-evacuation function of the stomach is preserved. The bulb and loop of the duodenum are not changed.

Your conclusion:

1. Stomach cancer
2. Stomach ulcer
3. Menetrie's disease
4. **Heterotopia of pancreatic tissue into the stomach wall.**

PROBLEM No. 2

A 49-year-old patient complained of girdle pain in the upper abdominal cavity, not related to food intake and time of day. The pains were relieved by taking 4 baralgin tablets. I first noticed pain 2 months before treatment. An ultrasound examination of the abdominal cavity, performed 9 months before the visit, revealed a pancreatic cyst and the patient was warned about the safe course of the disease. However, soon there were pains of a girdle nature and the patient turned to the outpatient department of the Institute of Surgery, where he was asked to conduct a CT scan of the abdominal cavity.

CT examination revealed the presence of a significant amount of fluid in the abdominal cavity, expansion of the pancreatic body up to 27 mm, inhomogeneity of the image of the pancreatic body and polycyclic contours. The density of the parenchyma in the tail area is 12-19 H. units. In the body of the pancreas, a cyst with dimensions of 19x18 mm with a content of 2 H units was visualized. In the remaining parts of the body of the pancreas, areas with a density of up to 30 H.U. are noted. with inclusions of less dense: up to 21 N. A group of enlarged and indurated lymph nodes was found in the hepatoduodenal ligament. In addition, infiltrative changes were identified around the aorta along the passage of the celiac trunk to the level of the left renal pedicle, including the beginning of the mesenteric artery. Due to the infiltrative changes in this area, the contour of the aorta in the anterior section could not be identified separately. The left adrenal gland is enlarged.

Your conclusion:

1. Pancreatic cyst
2. **Cancer of the body of the pancreas in combination with a cyst of the body, complicated by lymphogenous metastasis to the nodes of the lesser omentum, ascites, lesion of the left adrenal gland and infiltration of the para-aortic region.**
3. Chr. pancreatitis
4. Retroperitoneal lymphadenopathy.

PROBLEM No. 3

Patient G., 52 years old, complains of increased appetite, nervousness, fainting and tachycardia attacks that occur during fasting. Has been ill for 4 months. To prevent attacks of the disease, I ate up to 1 kg of sugar per day.

Examination: General analysis of blood and urine without pathology. The blood glucose level during an attack is 40 mg%. Ultrasound and CG of the abdominal organs did not reveal any pathology. Selective angiography of the superior mesenteric artery and celiac trunk in the region of the tail of the pancreas revealed a rounded formation, hypervascular in the arterial phase of contrasting, measuring 1 cm .

Your conclusion:

1. Chronic pancreatitis with a predominant lesion of the tail of the pancreas.
2. Diabetes mellitus, decompensation.
3. Cancer of the tail of the pancreas.
4. **Pancreatic tail insulinoma.**
5. Glucagonoma of the tail of the pancreas.

Duodenal cancer

Cancer of the duodenum is often difficult to distinguish from cancer of the greater duodenal papilla, the head of the pancreas, and the common bile duct. Secondary cancer of the duodenum, resulting from the germination of cancer of adjacent organs, is more common. Duodenal cancer occurs equally frequently in men and women over 50, and almost never occurs at a young age.

Etiology of Duodenal Cancer :

The etiological factors of malignant tumors are currently practically unknown, including pancreatic tumors. Therefore, most researchers

consider it more appropriate to talk about risk factors for this disease and precancerous pathological changes. The main risk factors for pancreatic cancer are currently considered: diabetes mellitus, cholelithiasis, chronic pancreatitis, smoking, excessive consumption of alcohol, coffee, meat and animal fats, as well as a genetic predisposition to this pathology. The role of endogenous carcinogens is undoubted, in particular benzidine, B-naphthylamine, halantrene, nitrosamines, etc. The effect of ionizing radiation on the occurrence of pancreatic tumors has not been sufficiently studied. It is not meat protein that causes pancreatic cancer, but animal fat. Its effect may be mediated due to an increased release of cholecystikinin (pancreozymin), leading to gradual hyperplasia and metaplasia of the epithelium of the pancreatic ducts. As for tobacco, it has not yet isolated a specific substance responsible for the increase in the incidence of pancreatic cancer. Speaking of coffee consumption, it is not known which component of the drink is responsible for the development of pancreatic cancer. So the extraction of caffeine from coffee does not lead to a decrease in morbidity. Opinions about the effect of alcohol on the occurrence of pancreatic cancer are contradictory. Most often, this disease can occur in persons suffering from alcoholism. Taking small doses of alcohol, especially grape wine, can be considered to a certain extent as a protective factor, just as in coronary heart disease. The role of chronic pancreatitis as a precancerous condition is highly controversial. Pancreatic cancer can be considered a complication of chronic pancreatitis, but the possibility that pancreatitis develops in patients with pancreatic cancer cannot be ruled out. Until now, it is impossible to say with confidence whether pancreatic cancer develops against the background of chronic pancreatitis, or both of these diseases have a common etiology. Speaking about diabetes mellitus, it is impossible to say with complete certainty that this is a precancerous condition of this pathology, since most often it is secondary. There is a lot of controversy about the role of heredity in the occurrence of pancreatic cancer. Most authors emphasize that the predisposition to the development of pancreatic cancer is usually realized only in old age, but does not manifest itself in younger people. Thus, it is necessary to state that the etiological factors of pancreatic cancer are not completely clear and require further in-depth study.

Pathogenesis during Duodenal Cancer:

It is customary to distinguish the following three localizations of cancer in the duodenum:

1. Most often, the tumor is located in the descending section, in the parapapillary region. Cancer of this localization (periampullary, peripapillary) accounts for 75% of cancers of the duodenum. In all likelihood, some of these tumors originate from the epithelium of the mucous membrane of the common bile duct or pancreas. In any case, with a developed tumor, it is difficult to establish not only macroscopically, but even histologically its initial localization. 2. Cancer of the upper horizontal part of the duodenum, the so-called suprapapillary cancer, accounts for 16%. 3. Less often, cancer is located in the lower horizontal part of the duodenum (infrapapillary or prejunal cancer) - in 9%. Unlike stomach cancer, duodenal cancer is characterized by a slight tendency to metastasis, which is usually limited to regional lymph nodes in the region of the head of the pancreas, the portal of the liver. These metastases are observed in approximately 15–20% of patients. It must be remembered that sometimes with a small primary cancer of the duodenum, significant metastases in the region of the head of the pancreas are possible, which gives a false idea of primary cancer of the head of the pancreas. This diagnosis is facilitated by the development of obstructive jaundice. Hematogenous metastases and generalization of cancer along the peritoneum are extremely rare in duodenal cancer.

Duodenal Cancer Symptoms:

The symptoms of pancreatic cancer are the result of three clinical phenomena associated with a growing tumor: obstruction, compression and intoxication. The phenomenon of compression is manifested by painful sensations as a result of germination or compression of the nerve trunks by the tumor of the pancreas. The phenomenon of obstruction occurs if a growing tumor obstructs the common bile duct, duodenum, pancreatic duct,

compresses the splenic vein. Obstruction of the common bile duct leads to the appearance of biliary hypertension, which is associated with the occurrence of obstructive jaundice, pruritus, enlargement of the liver and gallbladder, the appearance of discolored feces and dark urine. Biliary hypertension is a severe pathological condition that determines the future fate of the patient. It leads to dysfunctions of the liver, cardiovascular and nervous systems, metabolism, causes bradycardia, headache, apathy, and increased irritability. The outcome of prolonged and intense jaundice is hepatic and hepatic-renal failure, cholemic bleeding. Germination of a tumor of the duodenum leads to obstruction. clinically resembling pyloric stenosis. The phenomenon of intoxication is manifested by weight loss, decreased appetite and general weakness. These symptoms are often observed in pancreatic cancer, since they are caused not only by the influence of the tumor itself, but also by a violation of intestinal digestion. Typical symptoms in the clinical picture of pancreatic cancer are: pain, jaundice, pruritus, weight loss, loss of appetite, fever. Pain is the most common symptom, observed in 70–85% of patients. In almost half of them, it appears several weeks before jaundice and, regardless of the location of the tumor, is the first sign of the disease. The notion that painless jaundice is characteristic of cancer of the head of the pancreas in the past is erroneous. Pain most often occurs as a result of germination or compression of the nerve trunks by the tumor, less often it is caused by blockage of the bile or Wirsung duct or peritoneal phenomena due to exacerbation of concomitant pancreatitis. The location of the pain depends on the location of the tumor. In head cancer, pain is felt in the right hypochondrium or epigastric region, cancer of the body and tail is characterized by pain in the left hypochondrium and epigastric region, but may also manifest as fighting sensations in the right hypochondrium. Diffuse lesions are characterized by diffuse pain in the upper abdomen. In some patients, the pain remains localized in one place. In others, it radiates to the spine or interscapular region, less often to the right scapula. With tumors that block the Wirsung duct and are accompanied by pancreatitis, paroxysmal girdle pain occurs. The intensity of pain varies from patient to patient. Some patients describe it as a feeling of pressure, bloating or dull, constant aching pain, others complain of acute pain in the right hypochondrium or epigastric region. Sometimes, against the background of dull constant pain sensations, bouts of acute pain occur, which last from several minutes to several hours. It is noted that pain often appears or intensifies in the evening or at night, in the position of the patient on his back. After plentiful and especially fatty foods, as well as after drinking alcohol. The pain is stronger with cancer of the body of the gland, especially when the solar plexus is germinated or compressed by the tumor. At the same time, it becomes extremely strong, unbearable, and can acquire a shingles in nature. Patients take a forced position, tilt the spine forward. Leaning on the back of a chair or bending over a pillow

pressed to the stomach. This "hook" posture is quite typical for patients with advanced pancreatic cancer. Jaundice is the most prominent symptom of pancreatic head cancer. Occurs in 70-80% of patients. It is caused by the growth of a tumor of the bile duct and stagnation of bile in the biliary system. Occasionally occurs with cancer of the body and tail, in such cases it is caused by compression of the common bile duct by metastases to the lymph nodes. The first symptom of the disease is jaundice, often preceded by pain or weight loss. Jaundice is mechanical. It develops gradually. Its intensity is growing steadily. Depending on the duration of the blockage, the shade of the icteric coloration of the skin changes. Initially, the skin is bright yellow with a reddish tint due to accumulated bilirubin. Subsequently, as bilirubin oxidizes, jaundice acquires a greenish tint. Jaundice is accompanied by a change in the color of urine and feces. Feces are discolored. The urine turns brown and resembles beer in color. Sometimes changes in urine and feces occur before jaundice appears. Itching is caused by irritation of the skin receptors by bile acids. With jaundice due to pancreatic cancer, itching occurs in most patients. Usually it occurs after the onset of jaundice, more often with a high content of bilirubin in the blood, but sometimes patients notice itching of the skin even in the pre-icterus period. Itching significantly worsens the well-being of patients, does not give them rest, causes insomnia and increased irritability, often leads to numerous scratches, traces of which are visible on the skin. Weight loss is one of the most important symptoms. It is caused by intoxication due to a developing tumor and a violation of intestinal digestion as a result of blockage of the bile and pancreatic ducts. Weight loss is observed in most patients, sometimes it is the first symptom of the disease, preceding the onset of pain and jaundice. Decreased appetite occurs in more than half of patients. Often there is an aversion to fatty or meaty foods. Weight loss and decreased appetite are combined with increasing weakness, fatigue, and sometimes nausea and vomiting. Sometimes there is a feeling of heaviness after eating, heartburn, intestinal function is often disrupted, flatulence, constipation, and occasionally diarrhea appear. The stool is copious, gray-clayey in color with an unpleasant fetid odor, and contains a large amount of fat. Symptoms of cancer of the head of the pancreas During the course of the disease, pre-icteric and icteric periods are distinguished. The pre-jaundice period lasts about six months. At this time, patients may complain of a feeling of heaviness in the right hypochondrium, weight loss, nausea, impaired stool, weakness, increased fatigue, and itching. The icteric period occurs after germination or compression of the common bile duct by the tumor. It is characterized by persistent and intense obstructive jaundice, pruritus, discolored feces and dark brown urine, enlargement of the liver and gallbladder caused by bile congestion. The closer the tumor is to the duct, the earlier jaundice occurs and the greater the possibility of radical treatment. Along with jaundice, patients are worried about pain in the hypochondrium or epigastric region, weight loss, weakness increase,

appetite disappears. With the germination of the duodenum or its compression by a tumor, there is a feeling of overflow of the stomach, vomiting of eaten food. Liver failure occurs and progresses. Symptoms of cancer of the body and tail of the pancreas Jaundice is uncharacteristic, occurs only when the tumor spreads to the head of the gland or when the bile ducts are compressed by metastases. The clinical picture is determined by two symptoms: severe persistent or paroxysmal pain in the epigastric region and rapid progressive weight loss. Palpation of the epigastric region is painful, but the tumor is rarely palpable. In the presence of jaundice, the required minimum of examination includes clinical and biochemical blood tests, urine and feces examination for bile pigments, ultrasound examination of the abdominal organs, endoscopic examination of the stomach and duodenum. In case of reasonable suspicion of the presence of a pancreatic tumor, computed tomography of organs in the upper floor of the abdominal cavity is advisable .

Diagnosis of Duodenal Cancer:

Diagnosis of pancreatic cancer is based on instrumental studies: duodenoscopy with tumor biopsy and duodenal radiography. Ultrasound examination (ultrasound) allows before the operation to reveal the growth of the tumor in the pancreas and mesenteric vessels, metastases in the lymph nodes and liver, ascites (accumulation of fluid in the abdomen). Angiographic examination of the vessels makes it possible to detect the state of the vessels, options for their location, which must be taken into account when performing the operation, to detect small metastases in the liver that are not detected by ultrasound. Among the laboratory parameters, biologically active substances and their metabolites (gastrin, serotonin) determined in blood and urine have relatively high specificity .

Duodenal Cancer Treatment:

For pancreatic cancer, three surgeries can be performed, depending on the level at which the tumor is located. 1. With a small tumor in the upper horizontal part of the duodenum, circular resection of the affected part of

the intestine can be performed with subsequent restoration of patency by means of a direct gastroduodenal anastomosis, or the operation can be completed according to the Billroth 2 principle, as in low duodenal ulcers. 2. In infrapapillary cancers, circular resection of the lower horizontal part of the duodenum with end-to-end reconnection of the intestine is also possible. 3. The most difficult are operations for peripapillary cancers. When the tumor is located in the area of the large duodenal nipple and excretory duct of the pancreas, it is necessary to remove the affected part of the intestine, the final part of the common bile and Wirsung ducts and the head of the pancreas.

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