Pathological Anatomy. Atlas of Macropreparations

Study guide
in 2 parts

Part 2

Pathology of Different Organs and Systems

Ministry of Education and Science of Ukraine
Ministry of Health of Ukraine
Sumy State University

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Pathology of Different Organs and Systems

Recommended by the Academic Council of Sumy State University

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Contents

Case 5

Pathology of pregnancy and childbirth
Malformations

Specimen for examination 1

Brain herniation

Fetus has a defect of the back skull bones, which protrude through the membranes of the brain substance. This pathology refers to embryopathy. Brain herniation of only the meninges and cerebrospinal fluid is called a meningocele, of the membranes and substance of the brain – meningoencephalocele, of the brain matter and ventricles – encephalocystocele. Lumbar hernia, associated with the splitting of the dorsal vertebrae departments, is called *spina bifida*.

Specimen for examination 2

An ovarian pregnancy

Ovum is localized in the ovary due to blockade of tubal patency. Morphologically: the ovum, areas of hemorrhage, chorionic villi, decidua reaction are determined in ovarian tissue. Causes: chronic inflammatory processes, congenital malformations, trauma, surgery. Consequences: ovarian rupture, the development of intra-abdominal bleeding, infertility, dishormonal disturbances.

Specimen for examination 3

Thymomegaly

The thymus gland is enlarged, it occupies 1/2 of the mediastinum. Thymomegalia is characterized by an increase in weight and volume of the thymus parenchyma above the age norm while maintaining its normal structure. It can be congenital or acquired. Congenital thymomegalia is often combined with malformations of the nervous, endocrine and cardiovascular systems, generalized hyperplasia of lymphoid tissue.

Specimen for examination 4

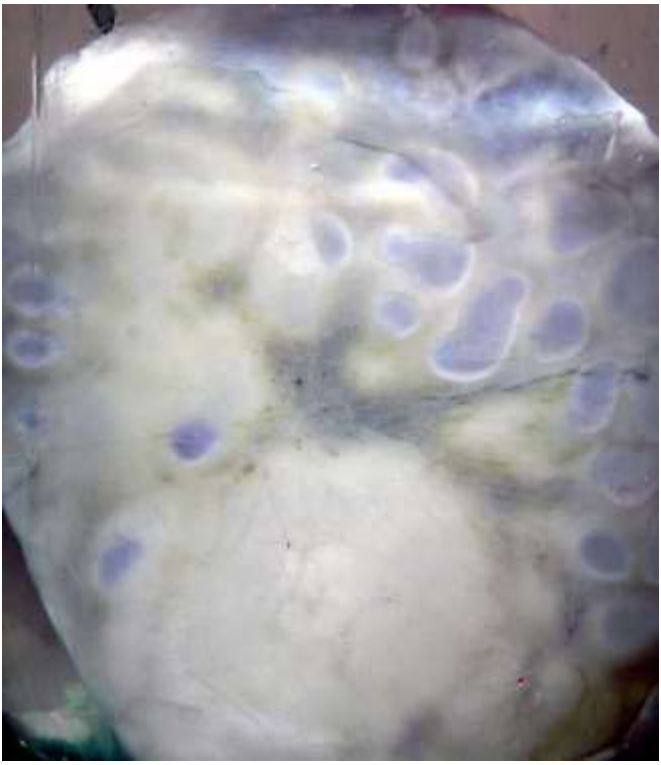
Intraventricular hemorrhage in a newborn

In the ventricles of the brain blood clots are determined. This can be caused by a birth trauma, a combination of asphyxia and birth trauma. This disease may develop with fluid overload in the case of excess fluid administration as a manifestation of iatrogenic pathology.

Specimen for examination 5

Pyloristenosis

Pyloric stenosis (refers to the early fetopathy) – congenital hypertrophy of the pyloric muscle of the stomach, with narrowing of its lumen; frequent congenital stomach development. Instead of the normal pyloric ring a narrow lumen tube with dense and thick walls, which is pressed into the duodenum, is visible on the specimen. Surgical treatment leads to complete recovery.



Specimen for examination 6

Atrophy of the skull bones of the fetus with hydrocephalus

The bones of the skull are thin due to the pressure of cerebrospinal fluid. Develops in circulation disturbance, formation and reabsorption of cerebrospinal fluid – hydrocephalus. The main cause is the disorder of cerebrospinal fluid outflow into the subarachnoid space, rarely – increased production of cerebrospinal fluid, or disorder of its resorption. Delay of the outflow of cerebrospinal fluid causes stenosis Monroe, Luschka and Magendie holes and the Sylvian aqueduct.

Specimen for examination 7

Spongy kidney

Kidney parenchyma with small cavities is a kind of polycystic of “infantile” type. Polycystic of “infantile” type is a significant bilateral increase in kidneys with formation of numerous small cysts in the cortical and medullary layers, that are in close contact with each other. The kidneys take the form of macroporous sponges. Microscopic examination shows that the entire renal tissue is replaced by cysts that are lined with cuboidal epithelium. Children are not viable.

Specimen for examination 8

Kidney with DIC–syndrome

The kidney is enlarged, there are small hemorrhages on the surface. The kidney on a cut is with a pale gray cortical layer and the stagnant layer of red medulla. Microscopically the parenchyma stasis, bleeding, blood clots microvasculature, degeneration and necrotic changes in the epithelium of kidney tubules are detected in the kidney. This pathology occurs in eclampsia. Consequences: acute renal insufficiency, uremia, and death.

Specimen for examination 9

Miscarriage

Fetus is small with signs of immaturity, born prematurely. The placenta with areas of hemorrhage is also represerted. According to the WHO definition, abortion, or miscarriage, is a termination of pregnancy during the first 28 weeks. The termination and removal of the fetus from the womb before 14 weeks of development is called an early abortion; within a period of 14 to 28 weeks – late abortion. During the histologic examination degenerative and necrotic changes in the tissues of the fetus and placenta are revealed.

Specimen for examination 10

Heart defect

At the gross specimen the heart of a newborn child is presented. There are holes in its septa interconnecting the chambers of the heart. Most often, this pathology occurs in the membranous part of the interventricular septum. The left-to-right shunt without the development of cyanosis and hypoxia (white type of heart disease) is noted. Complete absence of the interventricular septum leads to the formation of a three-chamber heart.

Specimen for examination 11

Hemorrhage in lateral ventricles

Lateral ventricles are filled with blood. In newborns it is a consequence of birth trauma in conjunction with asphyxia. It also develops in fluid overload in the case of excessive administration of fluids as a manifestation of iatrogenic disease. It occurs in women with the pathology of pregnancy – severe toxicosis, eclampsia, prior to parturition, and during the postpartum period. Consequences: cerebral edema, malfunction of vital centre, death.

Specimen for examination 12

Craniotomy in premature birth

There was no fetal head, there are signs of maceration of the skin – this indicates a fetal death. In this case, there was a congenital abnormality – hydrocephalus and pathology of the mother – contracted pelvis and poor uterine contraction strength. Such circumstances of parturition have an indication for craniotomy.

Specimen for examination 13

Postpartum endometritis

Uterus is enlarged, with a thickened wall, hypertrophied muscle fibers, the inner surface of the uterus is of brown-black colour as a result of the inflammatory process. The inflammatory process may spread over endometrium – then the metritis and perimetritis join in. In such cases, the uterus becomes septic focus of the widespread generalized infection. Consequences: dysplastic changes in the endometrium, sepsis, infertility.

Specimen for examination 14

Hydatidiform mole

The formation consisting of the racemiform villi cluster composed of numerous vesicles, filled with clear fluid, is represented on the gross stecimen. The vesicles can be freely positioned in the cavity of the uterus and to stand out from the vagina. When complete molar pregnancy, the fetus is not available; in case of partial – the fetus is alive, but it soon dies. Invasive hydatidiform mole may metastasize to the lungs, vagina.

Specimen for examination 15

Gemosalpinks

On the gross specimen the fragment of the fallopian tube is presented. It is expanded, filled with blood. This pathology occurs when there is ectopic pregnancy, corrosion of the chorionic villi of the tube wall, inflammations, traumas. Consequences: fallopian tube rupture, intra-abdominal bleeding.

Specimen for examination 16

Toxic liver dystrophy

This is an acute disease characterized by progressive massive necrosis of the liver and liver failure. Liver is enlarged, with soft texture, yellow. This is accompanied by hyperplasia of periportal lymph nodes and spleen, by multiple hemorrhages into the skin, mucous and serous membranes, lungs, by kidney epithelium necrosis, degenerative changes in the pancreas, myocardium and CNS. Patients die from acute hepatic or renal failure.

Specimen for examination 17

Horseshoe kidney

Congenital malformation of the urinary system. There are compounded kidneys as a horseshoe in the upper or lower their poles. This deficiency may not produce any functional disorders. It is discovered by chance during the examination or autopsy of the deceased from other pathologies. There are also other congenital kidney malformations: agenesia or areny, hypoplasia, dysplasia, polycystic kidney disease.

Specimen for examination 18

Hydatidiform mole

The bubble formation of the trophoblast are visible on the gross specimen. It occurs after an abortion or childbirth. As a malignant variant of this type of trophoblastic disease horionepitelioma develops. Macroscopically molar pregnancy is a racemose cluster composed of numerous vesicles filled with clear liquid. Bubbles can be freely positioned in the cavity of the uterus and stand out from the vagina. When complete molar pregnancy, the fetus is not available; in case of partial – the fetus is alive, but it soon dies.

Specimen for examination 19

Hypoplasia of the placenta

The placenta that does not match the child's age of gestation is presented on the gross specimen. Involuton of the placenta may occur as a malformation. Hypoplasia of the placenta is characterized by a decrease in its size and weight. It can lead to violations of fetal–placental circulation, the emergence of fetal–placental insufficiency and fetal death.

Specimen for examination 20

Congenital malformation of the hand

In this case, the phalanx rests on the skin fold, there is an increase in the number of fingers (polydactyly) and their fusion (syndactyly). There are also other malformations of limbs: amputation and aplasia (Amelia) of the extremities, phocomelia – hypoplasia of the proximal extremities, when the feet and hands begin directly from the trunk.

Specimen for examination 21

Congenital endocardial fibroelastosis

Thickening of the endocardium is visible in the heart. It is dull and with yellow–gray colour. Fibroelastic endocarditis is a congenital disease when sclerosis with a large number of elastic fibers in the endocardium and subendocardial layer of the myocardium are observed. Death occurs from congestive heart failure or heart failure with increasing intercurrent diseases (pneumonia).

Specimen for examination 22

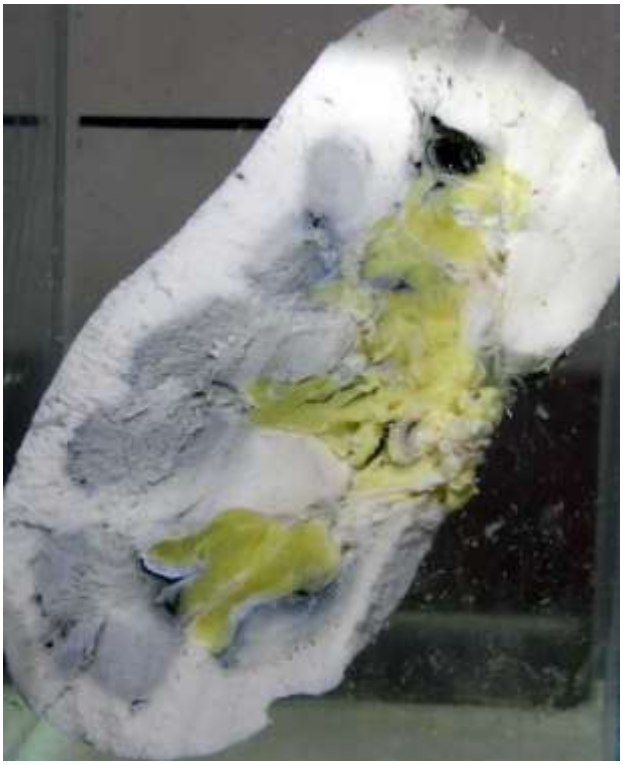
Spontaneous abortion

Premature birth of the fetus is caused by the mother's illness. At spontaneous abortion all the fertilized egg, that can be whole or broken, with shells and blood clots is thrown out of the uterus. Histological examination of fragments of fetal eggs revealed the fetal membranes, decidua and chorionic villi tissues. Abortion often occurs as a result of incomplete surface recess of the ovum in the uterine lining, insolvency of the mucosa, as well as hemorrhages, or tumours.

Specimen for examination 23

Tubal pregnancy

Fallopian tube is expanded with the wall thinning, there is blood with the elements of the ovum in the lumen. Chorionic villi that penetrate into the interior of the muscle membrane are determined histologically; in the lining of the uterus and tubes a decidua reaction occurs. Causes – inflammation with the development of a partial obstruction of the fallopian tubes, their blockade in tumours. Consequences: complete or incomplete tubal abortion, rupture of the fallopian tube, abdominal bleeding.



Specimen for examination 24

Shock kidney

Macroscopically cortex is increased in volume, pale, with edema. Pyramids are cyanotic–red due to the accumulation of gemoglobin pigments and acute plethora of juxtaglomerular areas affected buy shunting of blood. Microscopically ishemia, acute tubular necrosis of the epithelium to the basement membrane rupture and interstitial edema were detected. Consequences: acute renal failure, uremia, hypertension, dysproteinemia, death.

Specimen for examination 25

Miscarriage in the early stages of pregnancy

This defect refers to embriopathy of the central nervous system that is associated with the deformation of the ventricles of the brain in combination with hydrocephalus (increased intracranial pressure, increase in the volume of the cranium, atrophy of the brain substance).

Specimen for examination 26

Congenital lung cyst

The cavity which is covered by a thin layer of connective tissue and contains a transparent liquid is defined in the lung parenchyma. Cysts of lungs (refer to the early and late fetopathy) can be multiple (polycystic lung disease), located in the same lung, the same lobe or can be single. Cysts of lungs have different origins, often are formed at agenesis of one of the orders of bronchi branching.

Specimen for examination 27

Congenital lung cancer

On the gross specimen a lung of a newborn is represented. On the surface and in the depth of a lung multiple tumourous growths formations of gray colour are visible. During the histological examination the signs of tumour cell and tissue atypia of alveolar lung structures are revealed.

Specimen for examination 28

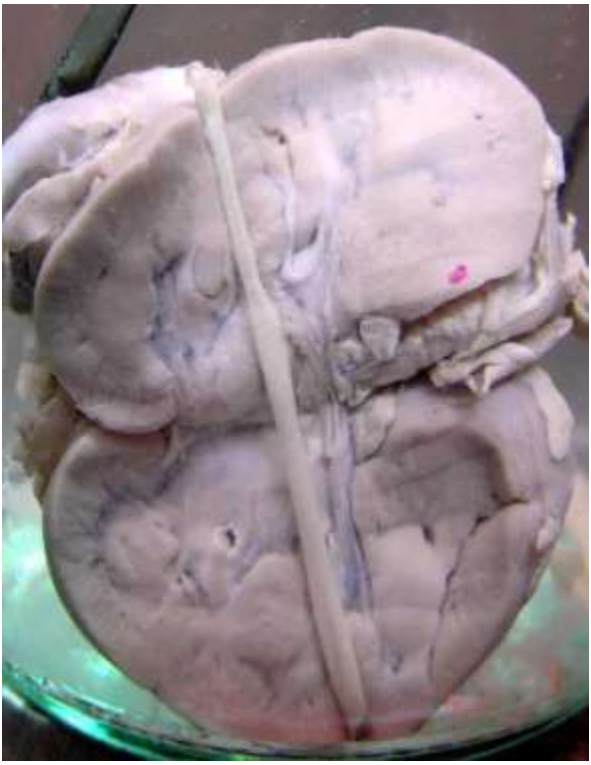
Congenital liver cancer

The node of the mottled tissue without clear contours with infiltrative growth can be seen in the parenchyma. Hepatoblastoma, or embryonic hepatoma is a malignant liver tumour that develops from embryonic pluripotent cells. The tumour in the form of multiple whitish–yellow nodes adheres to the liver tissue. The growth is fast, it metastasizes to the lymph nodes and hematogenically – to the lungs. Death occurs from bleeding into the abdominal cavity.

Specimen for examination 29

Ectopic pregnancy

The development of the ovum in the ovary, fallopian tube, abdominal cavity is called ectopic. Causes: inflammatory, neoplastic processes of the fallopian tube, innervation disorders of the fallopian tubes. Consequences: rapture of the fallopian tube or ovary, abdominal bleeding.



Specimen for examination 30

Renal hypoplasia

The kidney is reduced in size, the structural components are not broken. If there is a unilateral hypoplasia, then there is a compensatory increase in the other kidney size. At bilateral hypoplasia a chronic kidney failure develops, death occurs.

Specimen for examination 31

Congenital lung cancer

On the gross specimen the lungs of a newborn child are presented. On their surface gray components of different sizes are visible. Causes of the pathology: feto– and embryopathy, ionizing radiation, oncogenic viruses, physical and chemical factors.

Specimen for examination 32

Congenital heart defect

On the gross specimen the heart of a newborn child is presented. In its partitions there are holes interconnecting the chambers of the heart. Most often, this pathology occurs in the membranous part of the interventricular septum. The left–to–right shunt without the development of cyanosis and hypoxia (white type of heart disease) is noted. Complete absence of the interventricular septum leads to the formation of a three–chamber heart.

Specimen for examination 33

Ovary Cancer

On the gross specimen the ovary, significantly increased due to the proliferation of tissue, is represented. This tissue is yellow with gray areas of hemorrhage and necrosis, does not have clear borders of the growth. The secondary changes of the tumour are seen – foci of mucilagination, papilliform outgrowths. Microscopic examination showed cell irregularities (polymorphic and hyperchromatic nuclei, abnormal mitosis).

Specimen for examination 34

Multiple congenital malformations, fetal maceration

Maceration (from latin *maceratio*) – softening, soaking of tissues. In an antenatal died fetus maceration takes place under the influence of amniotic fluid. In a fetus swelling develops, liver and spleen moderately increase. Immature forms of erythrocyte series in the capillaries of the lungs can be found microscopically, because the lungs are less susceptible to autolysis and maceration.

Specimen for examination 35

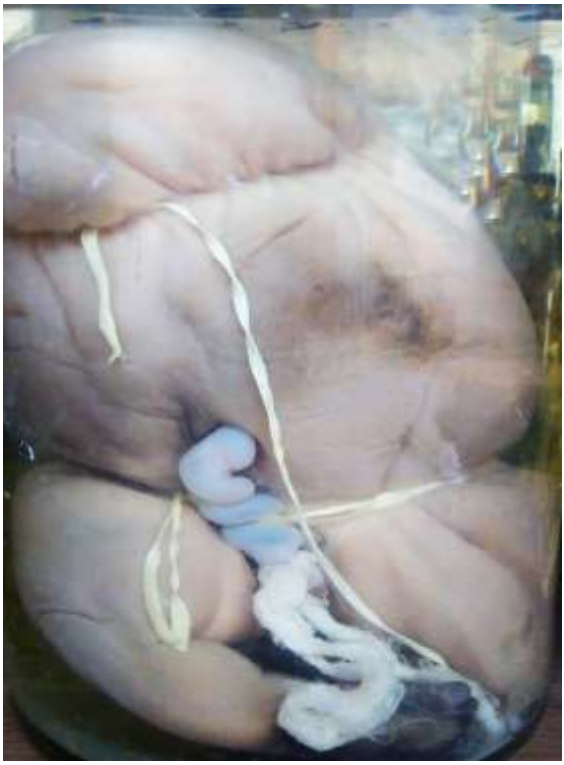
Splenunculus

On the gross specimen the child's spleen whith a small separate gray-brown knot is represented. This is an additional spleen. This pathology refers to embryopathy. Usually discovered by chance, it may not be manifested clinically.

Specimen for examination 36

Microgyria with congenital hydrocephalus

In the brain the increasing number of convolutions is observed, they are reduced in size. The lateral ventricles are expanded – it is a manifestation of intraventricular hydrocephalus. At this pathology the atrophy of brain substance develops, in most cases it is connected with the outflow of cerebrospinal fluid disorder due to stenosis, atresia or the bifurcation of the cerebral aqueduct, atresia of median and lateral apertures of the IV ventricle and interventricular holes.



Specimen for examination 37

Multiple malformations: agenesis of the skull, shoulder girdle and lower limb

On the gross specimen a fetus with multiple malformations is presented. Agenesis (or aplasia) – the congenital absence of an organ. In the presence of germ cells frequently formed with gate vessels, the term aplasia is used, in their absence, a malformation is termed agenesis. This pathology is not compatible with life, causing fetal death.

Specimen for examination 38

Subarachnoid hemorrhage in the brain

On the gross specimen the brain with hemorrhage (a plot of dark colour in its stem) is presented. This pathology occurs when high blood pressure may occur with late gestosis – eclampsia and pre-eclampsia. Microscopically the diffuse suffusion of the brain tissue with blood, necrosis of neurons is observed. The consequences: swelling of the brain, death, organization with the cysts formation.

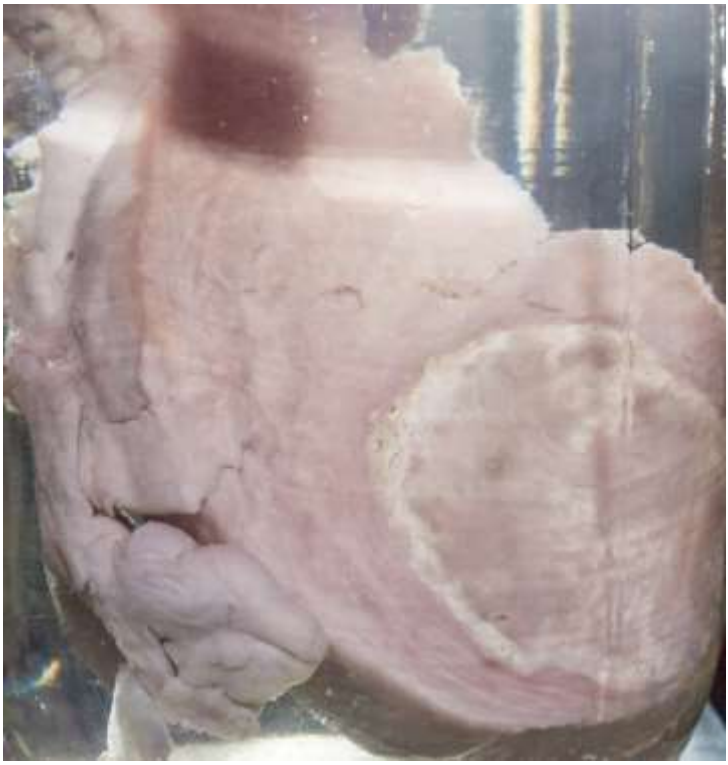
Case 6

Pathology of the female and male genital systems

Specimen for examination 1

Prostate adenoma

The prostate gland is enlarged in size, of thick consistency, with a bumpy surface. Adenoma refers to a group of specific benign epithelial tumours. Consequences: malignisation (transition into malignant tumour), acute urinary retention.



Specimen for examination 2

Calcification of the fibromatous node

On the gross specimen the uterus wall with the formation of 7 cm diameter, limited with capsule, is represented. It is determined by the area with calcination. Histological examination revealed the signs of tissue atypia, and calcium deposits were verified by the reaction of Von Kos. This process refers to secondary changes in the tumour.

Specimen for examination 3

Leiomyosarcoma of the uterus with secondary changes

In the uterus a tumour with soft consistency without a capsule, with no clear boundaries was observed. Secondary changes are marked in the form of necrosis, hemorrhage.

Specimen for examination 4

The papillary ovarian cyst with malignisation

The ovary is enlarged in size up to 10 cm due to the formation of the cyst. Histological examination of these expansions present the evidence of a constitution of adenomatous structures in which there are isolated abnormal mitoses and cell atypia.

Specimen for examination 5

Necrosis of the fibromatous node

On the gross specimen a fibromatous node up to 7 cm in diameter, bounded by a capsule, is presented. In its centre the gray focus of softening and decay without clear boundaries is determined. During the histological examination the signs of tissue atypia and areas of necrosis were revealed. This process refers to secondary changes in tumours.

Specimen for examination 6

Uterine fibromyoma

In the uterine wall expansion as a node of the diameter up to 12 cm is defined. On a section the node has a fibrous structure, dense texture. In some areas there are secondary changes. During the histological examination the signs of tissue atypia among smooth muscle and connective tissue structures were revealed.

Specimen for examination 7

Krukenberg ovary cancer

On the gross specimen the uterus with two fallopian tubes and ovaries is presented. The right ovary is enlarged up to 6 cm, the left – 7.5 cm, with thick consistency, a bumpy surface. During the histological examination glandular structures with signs of cell irregularities were revealed. This type of tumour lesions refers to lymphogenic metastases of gastric cancer.

Specimen for examination 8

Serous ovarian cyst

On the gross specimen an ovary enlarged in size is presented. It contains a formation in a diameter up to 10 cm, limited with a capsule. During the histological examination the signs of atrophy, sclerosis, dystrophy were revealed. During its growth it can lead to cancer.

Specimen for examination 9

Serous ovarian cyst malignisation

In the ovary there is a cavernous formation filled with clear, colourless liquid – a cyst. On the inner wall it forms visible proliferative papillae. During the histological examination the signs of tissue and cell irregularities, invasive growth were revealed.

Specimen for examination 10

The uterus with fallopian tubes and ovaries (age hypotrophy)

The uterus is small, tubes are thinned, ovaries are small, dense, fibrous. This is a manifestation of hypotrphy in women of postmenopausal age.

Specimen for examination 11

Pseudomucinous ovarian cyst

This is a benign tumour of the ovary, which has a form of a cavity filled with mucous content. Consequences: malignisation and can lead to cancer.

Specimen for examination 12

Diffuse endometrial fibromatosis

There is thickening, induration of the uterus. In the muscular layer the fibrous tissue layers of gray colour are found. This is pathological process of benign nature.

Specimen for examination 13

Ovary cystadenoma

An enlarged ovary has a cyst formation up to 7 cm in diameter, filled with clear liquid. The formation is limited with a capsule, has a smooth surface. During the histological examination the diagnosis of ovary cystadenoma was confirmed. There are two types of this disease: simple and serous papillary cystadenoma.

Specimen for examination 14

Serous ovarian cyst

Another name for this tumour – cystadenoma. This is a benign tumour, which is presented in the form of a cavity filled with colourless liquid. The wall of the cyst is smooth. Consequences: proliferation, the formation of papillary structures, malignisation.

Specimen for examination 15

Thecoma

On the gross specimen an ovary increased up to 10 cm is represented. The surface is uneven, gray, with thick consistency. During the histological examination of the ovary, tissue atypia signs of a stromal component were detected.

Specimen for examination 16

Ovary thecoma

A benign tumour that grows as a yellow node is presented. It refers to benign tumours. Its characteristic is tissue atypia.

Specimen for examination 17

Fibromatous node

This is a benign tumour of the connective tissue, often occurs in the wall of the uterus. It has a dense, fibrous structure, the cut is gray. During the histological examination the tissue atypia was detected.

Specimen for examination 18

Uterine fibromyoma with malignancy

The uterus has a node of dense consistency, of gray colour, fibrous structure, without clear borders with the uterine tissue. At the microscopic level, there are signs of cell irregularities.

Specimen for examination 19

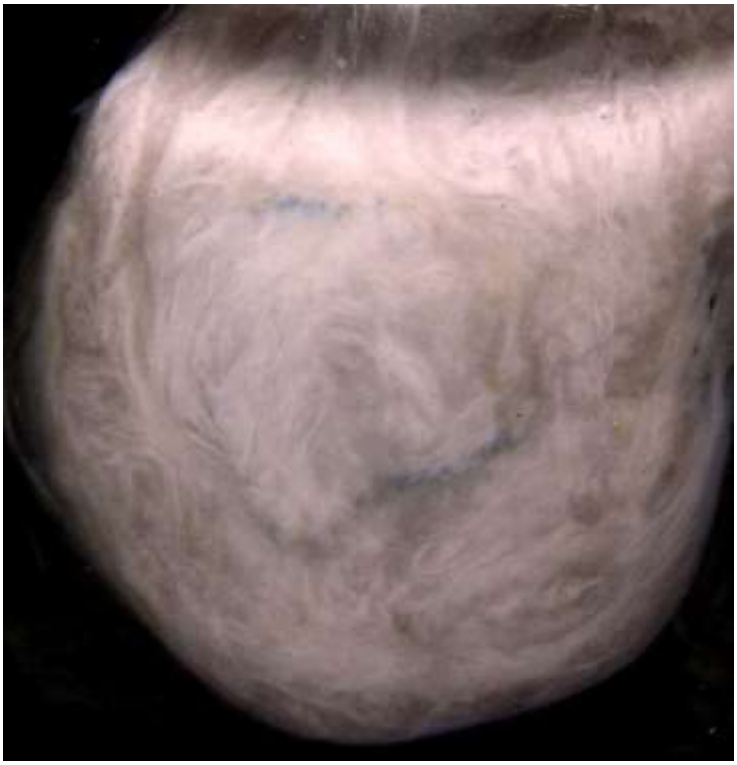
Fibrosarcoma

This tumour refers to a group of mesenchymal tumours of the connective tissue. It is without capsule, like "fish meat" on a section. Its characteristic is cellular atypia, infiltrative growth.

Specimen for examination 20

Simple ovarian cyst

On the gross specimen there is an enlarged ovary with a formation of up to 4 cm in diameter. On a section the formation is filled with transparent liquid, it has a thin and smooth capsule. During the histological examination the signs of tissue atypism were revealed.



Specimen for examination 21

Fibroma with necrosis

On the gross specimen fibroma – a tumour of solid consistency with tissue necrosis is presented. The histological examination shows that the tumour is composed of connective tissue with signs of tissue atypia.

Specimen for examination 22

Ovary cancer

The ovary has a tumour that is presented of papilliform excrescences. Microscopically: severe manifestations of cell irregularities (polymorpic and hyperchromatic nuclei, abnormal mitosis).

Specimen for examination 23

Uterine fibromyoma with secondary changes

The uterus has a node proliferation up to 15 cm in diameter in its wall. On a section the node has a fibrous structure, dense texture. In some areas of the node there are dark bleedings. Histological examination of the node shows the signs of tissue atypia among smooth muscle and connective tissue structures.

Specimen for examination 24

Ovary thecoma

On the gross specimen there is an enlarged ovary. Its surface is bumpy, of gray colour and thick consistency. During the histological examination of the ovarian tumour the signs of tissue atypism of the stromal component were revealed.

Specimen for examination 25

Paget's disease

On the gross specimen the mammary gland with signs of deformation around the areola and nipple retraction is presented. During the histological examination the proliferation of light Paget cells with infiltrative growth of tumour cells along the ducts was revealed in the breast tumour.

Specimen for examination 26

Metastasis of breast cancer into the skin

On the gross specimen the skin fragment with proliferation of tumour nodules with a diameter of 2 to 5 cm, of thick consistency without clear boundaries with areas of hemorrhage and necrosis on the surface is presented. During the histological examination the signs of tumours in cell and tissue atypism of breast glandular structures were revealed.

Case 7

Pathology of the cardiovascular system
Diffuse diseases of connective tissue
Pathology of the respiratory system

Specimen for examination 1

Atherosclerotic cardiosclerosis

The cut of the heart muscle with the presence of gray stripes of diffuse nature. These are cardiac muscle substitution sites with the connective tissue. The presence of atherosclerotic coronary artery eccentric stenosis indicates the origin of these atherosclerotic changes.

Specimen for examination 2

Left ventricular hypertrophy with cardiosclerosis

On the gross specimen a section of the heart muscle with the signs of left ventricular hypertrophy up to 2 cm with simultaneous papillary muscle hypertrophy can be seen. The visible areas of the myocardium are of gray colour and diffuse origin, resulting from the heart muscle disorder in hypertension.

Specimen for examination 3

Polypous – ulcerative endocarditis in sepsis

On the gross specimen the lesions of the aortic valve leaflets are visible. Valves are thickened with signs of destructive changes that result from septic lesions of staphylococcus. Growths and ulcers are visible on the valve – it is polypous–ulcerative endocarditis. Complications: the development of septic (bacterial) emboli into the systemic circulation.

Specimen for examination 4

Extensive myocardial infarction

On the gross specimen the sections of the left ventricular chamber with a local wall lesion of a dark colour, which mainly captures its inner and middle layers, can be seen. Such a massive damage of the heart muscle after myocardial infarction leads to formation of acute heart aneurysm.

Specimen for examination 5

Concentric myocardial hypertrophy
(compensatory, tonogenuous)

A cross section of the heart chambers of the right and left ventricles can be seen. Left ventricular wall is hypertrophied up to 2 cm. Hypertrophy develops in the heart in hypertension, with heart defects (aortic valve stenosis in septic endocarditis). Hypertrophy of the muscle fibers is due to organelles hyperplasia.

Specimen for examination 6

Perforated ulcers in polypous-ulcerative endocarditis

On the gross specimen the lesion of aortic valve is visible. Valves are thickened with signs of destructive changes that result from septic staphylococcus lesions. Growths and ulcers on the valve are visible too. Complications: the development of septic (bacterial) emboli into the systemic circulation. Microscopically the prevalence of destructive changes in the valve wall, which is typical for bacterial endocarditis, is determined.

Specimen for examination 7

Postinfarction cardiosclerosis

On the gross specimen the sections of the left ventricular chamber can be seen. It is dilated, with presence of large gray areas in the interventricular septum at the focus of myocardial infarction.

Specimen for examination 8

The back–verrucous endocarditis

On the gross specimen a thickened by proliferation of connective tissue mitral valve is represented. At the ends of the valve a thickening is seen. There is a combination of sclerotic changes with fresh destructive valve changes. In this case, acquired deficiency and thromboembolic complications of venous circulation often develops.

Specimen for examination 9

Concentric myocardial hypertrophy

On the gross specimen a cut of the left ventricle is represented. It is hypertrophied up to 2 cm. Hypertrophy develops in the heart in hypertension, heart diseases (aortic valve stenosis in septic endocarditis). In the initial stages of the disease it is characterized by not only compensatory hypertrophy of muscle fibers, but also by stromal components (vessels, nerve fibers, connective tissue).

Specimen for examination 10

Leriche syndrome

Blood clots at the aortic bifurcation occluding its lumen are visible. These changes develop at the stage of atherosclerosis complications. The consequence of thrombosis of the iliac arteries may be ischemia of the lower limbs with the development of gangrene.

Specimen for examination 11

Hematencephalon

On the brain tissue slice a small hemorrhage is seen in the gray matter. Such complications can develop in hypertension. There is a third stage in its flow (the stage of organ changes) or at any other stages in the case of hypertensive crisis. The result is the formation of hemosiderin, which damages the brain parenchyma, and this leads to a proliferation of connective tissue and gliosis.

Specimen for examination 12

Obliterating atherosclerosis of the coronary arteries of the heart

On the gross specimen the thickened tortuous coronary arteries of the heart are visible. At the top of the hearth macrofocal myocardial infarction is seen. The thickening is caused by the deposition of atherosclerotic plaques. As a result, narrowing of the lumen of arteries by 25–75 %, which leads to deterioration of myocardial perfusion. The result – myocardial ischemia, degenerative changes, ischemic necrosis (infarction). The consequence may be cardiosclerosis – replacement of the connective tissue of the myocardium.

Specimen for examination 13

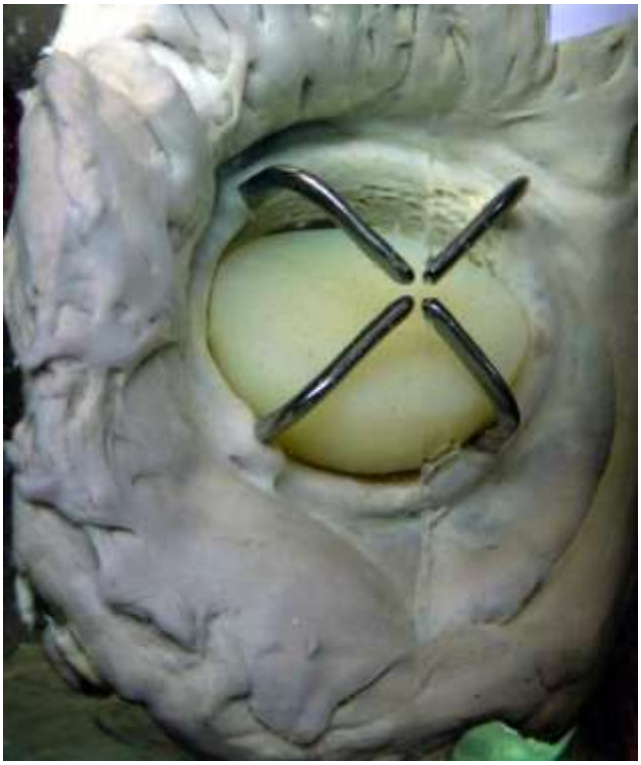
Hemorrhagic cerebral infarction

On the gross specimen the bleeding in the brain that develops during the third stage of hypertension is presented. This is characterized by the destruction of the brain tissue. The consequences: death, cyst formation in connection with the development of liquefactive necrosis. Cyst walls are of rusty colour due to the deposition of hemosiderin.

Specimen for examination 14

Verrucous endocarditis
with myocardial hypertrophy

The rheumatic mitral valve lesion example. On the valve we can see verrucous layers of thrombotic masses, resulting from damage of the endocardium in a mucoid or fibrinoid swelling with the following destructive changes. Such changes in the wall of the valve lead to the formation of defect with myocardial hypertrophy or thromboembolic complications.



Specimen for examination 15

Artificial heart valve

At the mitral valve site an artificial valve is installed in connection with the emergence of acquired defects of the mitral valve, which developed after its rheumatic desease.

Specimen for examination 16

Concentric myocardial hypertrophy
(compensatory, tonogenuous)

On the gross specimen a cut of the left ventricle is represented. It is hypertrophied up to 2 cm. Hypertrophy develops in the heart in hypertension, heart diseases (aortic valve stenosis in septic endocarditis). In the initial stages of the disease it is characterized by not only compensatory hypertrophy of muscle fibers, but also by stromal components (vessels, nerve fibers, connective tissue).

Specimen for examination 17

Gon focus

The healing of the primary complex foci is presented. With the localization of primary tuberculosis in the lungs perifocal inflammation dissipates first of all. Exudative tissue reaction is replaced by productive one: around the focus of caseous pneumonia the shaft of epithelioid and lymphoid cells is formed, separating the centre from the surrounding lung tissue. Cheesy mass gradually dehydrates, becomes dense and calcifies (petrification). Eventually, bone rods are formed in interjoist by means of metaplasia.

Specimen for examination 18

Fatty liver in lobar pneumonia

Fatty liver shows an acute increase in fat content and its changes in hepatocytes. In liver cells lipid granules appear initially, and then small droplets (atomizing obesity), which subsequently coalesce into large drops (globular obesity) or one adipoid vacuole, that fills cytoplasm and pushes the entire core to the periphery. Macroscopically the liver is enlarged, anemic, yellow, with loose texture.

Specimen for examination 19

Fibrous–cavernous tuberculosis

The chronic form of tuberculosis is presented. It occurs in those cases when at the healed primary affect the inflammatory specific process takes a progressive course with alternating exacerbations and remissions. In this case the body sensitizes and paraspecific changes appear, which are understood as various mesenchymal cell responses in a diffuse or nodular lymphocyte proliferation and macrophage, hyperplastic processes in hematopoietic tissue, fibrinoid of the connective tissue changes in arteriolar walls and in the organs, amyloidosis.

Specimen for examination 20

Lobular pneumonia (bronchopneumonia)

Bronchopneumonia is characterized by the presence of multiple lesions of the lung tissue located around the inflammation of the bronchi or bronchioles proliferation process surrounding the alveoli. This type of pneumonia is most common in children, the elderly and those with weakened resistance (for example, in patients with malignancies, heart failure, chronic renal failure, etc.). Bronchopneumonia may also develop as a complication of acute bronchitis, cystic fibrosis and other diseases.

Specimen for examination 21

Juxtahilar bronchopneumonia

The most common pathogens are Staphylococcus, Streptococcus, Haemophilus influenzae, Escherichia coli and fungi. The development of pneumonia is associated with acute bronchitis or bronchiolitis, the inflammation often spreads to the lung tissue through bronchi (top-down way, usually with catarrhal bronchitis or bronchiolitis), less peribronchial (usually destructive bronchitis or bronchiolitis).

Specimen for examination 22

Lobar pneumonia

On the gross specimen a lobe of the lung is gray, airless, of dense consistency (lobar pneumonia). Lobar pneumonia is an acute infectious and allergic disease, which affects one or more lobes of the lung (lobar pneumonia), fibrinous exudation appears in the alveoli (fibrinous or lobar pneumonia), and on the pleura – fibrinous deposits (pleuropneumonia).

Specimen for examination 23

Bronchopneumonia

Bronchopneumonia is pneumonia that develops due to bronchitis or bronchiolitis (bronhoalveolitis). It has a focal character, it can be morphologic manifestation of both primary (for example, respiratory viral infections) and secondary (as a complication of certain diseases) acute pneumonia. Most often it affects the basal parts of the lungs on both sides, which at the autopsy have gray or gray–red colour. Histological examination shows the typical acute inflammation with exudation.

Specimen for examination 24

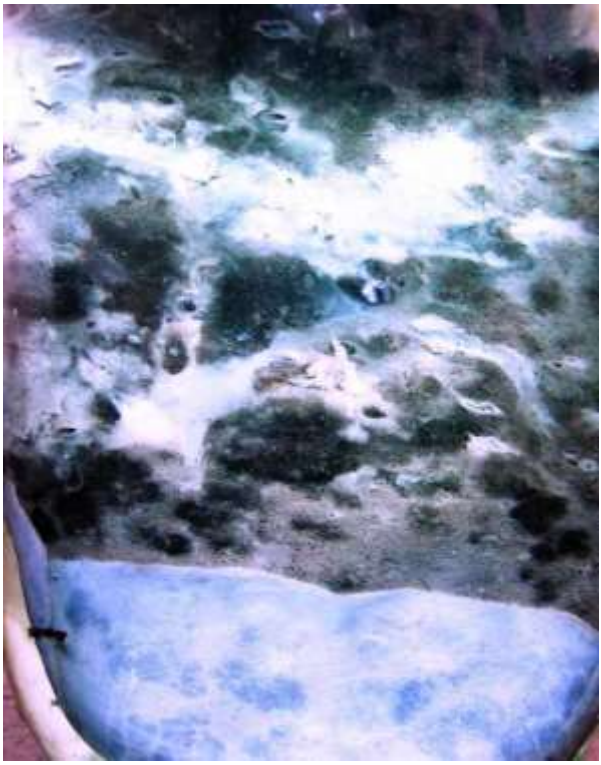
Primary contracted kidney

The kidney is contracted. The surface is of fine–grained and dense consistency. Such changes in the kidney develop in hypertension when renal glomerular arterioles arise phenomena of hyalinosis and sclerosis, worsening blood supply to the kidney parenchyma and cause its sclerotic changes. Macroscopically it appears by retraction on the kidney surface adjacent protrusions formed as a result of compensatory hypertrophy processes in the remaining glomeruli.

Specimen for examination 25

Carcinomatosis of the lung

The lung parenchyma has small foci of gray colour. It is characteristic of metastatic origin of the lung cancer. First lymphogenous metastases arise in peribronchial and bifurcation lymph nodes, then – in neck, retroperitoneal ones. Among hematogenous metastases of lung cancer the metastases of the liver, brain, bone (vertebrae in particular) and adrenals are characteristic.



Specimen for examination 26

Hemorrhagic pneumonia

Multiple foci of hemorrhage are detected macroscopically in the lung. Histologically interstitial inflammation, lymphocytes, macrophages and plasma cells in exudate were determined. In the lumen of the alveoli and bronchioles there is a large amount of hyaline membrane formed from a fibrinous exudate. Acute fulminant hemorrhagic pneumonia can be fatal.

Specimen for examination 27

Chronical bronchitis

Chronic bronchitis is a chronic inflammation of the bronchial tubes, resulting from the prolonged acute bronchitis or prolonged exposure of bacteria or viruses, physical and chemical factors to the mucous membrane of the bronchi. Chronic inflammation may be accompanied by metaplasia of the epithelium, thereby reducing the number of cells having cilia. Consequences: pulmonary atelectasis, obstructive emphysema, chronic pneumonia, pulmonary fibrosis.

Specimen for examination 28

Bullous emphysema of the upper lobe of the lung

Pulmonary emphysema is a disease characterized by excessive air content in the lungs and increase in their sizes. Bullous emphysema is not a separate type of emphysema. This is a term that indicates the bull presence. Its diameter is more than 10 mm. Bulls may occur in all four major types of emphysema. They often are broken, which leads to the development of spontaneous pneumothorax. Most of bulls are located on the top of the lung.

Specimen for examination 29

Central lung cancer

On the gross specimen a node of gray colour without clear boundaries is observed. According to the classification of lung cancer there are: root (central), from the stem or the initial part of the segmental bronchus and peripheral. By the nature of growth there are: exophytic (endobronchial) and endophytic (exo- and peribronchial). According to macroscopic picture there are: massive, or nodular, polypoid, Penkosta's cancer. On this preparation the nodular form of lung cancer is presented.

Specimen for examination 30

Tuberculoma

Tuberculoma is a form of the secondary tuberculosis, a kind of stage in the evolution of infiltrative tuberculosis when perifocal inflammation resolves and the focus of cheesy necrosis remains, surrounded by a capsule. Tuberculoma reaches 2–5 cm in diameter, located in segment I or II, more often to the right. Often, at the X–ray examination it is mistaken for peripheral lung cancer as a result of its fairly well–delineated borders.

Specimen for examination 31

Lung cancer

The focus of gray colour without clear borders and with infiltrative growth is visible. In the etiology of lung cancer the carcinogens, smoking cigarettes are of maximum concern. Precancerous conditions include chronic bronchitis, chronic pneumonia, accompanied by hyperplasia. Cancer may occur in the centres of fibrosis after suffering tuberculosis, pulmonary infarction, around foreign bodies, the so-called “scarred cancer”.

Specimen for examination 32

Bronchiectasis

Bronchiectasis is characterized by stable expansion of the bronchus or bronchioles. They can be congenital or acquired. Congenital bronchiectasis is relatively rare and is developed in connection with the bronchial tree dismorphology. Histological evidence of congenital bronchiectasis is the disarray in their wall structural elements of the bronchus.

Specimen for examination 33

Hematogenous tuberculosis

In acute miliary tuberculosis the lungs are inflated, loose, have small bumps like grains of sand, which are especially numerous at the top of their segments. Often this form of tuberculosis ends with meningitis. At chronic miliary tuberculosis scarring and bumps resistant pulmonary emphysema may develop, and therefore increases the load on the heart and the right ventricular hypertrophy (cor pulmonale) develops.

Specimen for examination 34

Cancer metastasis to the lung

A plurality of nodes is determined in the lungs. These are metastases of a malignant tumour. These nodes have different shape, fuzzy border growth, the surface of nodular is of gray and pink colour. According to the spreading metastases are hematogenous (tumour cells migrate in blood vessels), lymphogenous (distribution takes place through the lymphatic vessels) and the implant (the spread within the serous cavities).

Specimen for examination 35

Macrofocal bronchopneumonia

On the gross specimen foci of inflammation different in size are visible. They are dense, the cut is of gray and red colour. Depending on the size of foci there are miliary (alveolitis), acinar, lobular, segmental and polysegmental bronchopneumonia. In the alveoli clusters with mucus exudate, neutrophils, macrophages, erythrocytes, exfoliated alveolar epithelium are revealed; sometimes they are determined by a small amount of fibrin. The fluid is distributed unevenly.

Specimen for examination 36

Hemorrhagic tracheobronchitis

On the gross specimen changes in the mucosa of the trachea and bronchial tubes with multiple hemorrhages are visible, mucous is hyperemic and dim. In acute bronchitis, bronchial mucosa becomes hyperemic and swollen, there may be small hemorrhages, ulcers. In the lumen of the bronchi in most cases there is a lot of mucus. Various forms of catarrh with accumulation of serous, mucous, pus or mixed exudate develop in the bronchial mucosa.

Specimen for examination 37

Cor pulmonale

On the gross specimen a heart with right ventricular hypertrophy, thickening of its wall up to 1.0 cm is visible (normal right ventricular wall thickness is of 3 mm). Pulmonary heart develops in chronic lung disease (chronic pneumonia, chronic obstructive bronchitis, bronchial asthma and others). There is hypertension of pulmonary circulation, leading to right heart hypertrophy (cor pulmonale).

Specimen for examination 38

Miliary tuberculosis of lung

In acute miliary tuberculosis the lungs are inflated, loose, with small bumps, like grains of sand, which are especially numerous ar the top of their segments. Often this form of tuberculosis ends with meningitis. At chronic miliary tuberculosis scarring and bumps resistant pulmonary emphysema may develop, and therefore increases the load on the heart and the right ventricular hypertrophy (cor pulmonale) develops.

Specimen for examination 39

Tuberculosis of the kidney

Tuberculosis of the kidney is usually unilateral, most often occurs in young people during puberty and in old age. Early lesions occur in the cortex. With the progression of the process they arise in the pyramids, where the destructive process of cavities formation begins. Outwardly from the cavity interstitial renal tissue is infiltrated by lymphocytes, histiocytes with epithelioid cells. Gradually specific inflammatory process proceeds to the urinary tract, bladder, prostate.

Specimen for examination 40

Carcinomatosis of the pleura

On the gross specimen a lung tumour is represented. On the pleura small knots of gray colour, of various shapes, with a diameter up to 2.0 cm, with no clear borders can be seen. This is the kind of metastasis of lung cancer by implanting.

Specimen for examination 41

Acute lung abscess

Lung abscess has pneumonic origin. Pneumonic abscess occurs as a complication of pneumonia of any etiology, usually with staphylococcal and streptococcal. Suppuration pneumonia outbreak is usually preceded by necrosis of the inflamed lung tissue, after which there is chamber of purulent fusion. Purulent necrotic masses are released through the bronchial phlegm, an abscess cavity is formed.

Case 8

Pathology of the urinary system

Specimen for examination 1

Nephrolithiasis

On the gross specimen disturbances of the kidney parenchyma structure are visible. This is caused by the presence of multiple stones in the kidneys, breaking the flow of urine, which causes atrophy, sclerotic changes in the renal parenchyma. The main pathogenesis of kidney stones is the increase of salts concentration in the urine, changes in pH and colloid urine balance, formation of colloidal (protein) stone foundations.

Specimen for examination 2

Kidney adenocarcinoma

On the gross specimen a tumour of gray colour without clear borders, which infiltrates the surrounding tissue, is revealed. Microscopically atypical cancer cells form tumour glands of various forms and sizes, which spread to the surrounding tissues. According to the degree of differentiation there are high- and low-grade adenocarcinomas, by structure – tubular, acinar and papillary.

Specimen for examination 3

Abscessive pyelonephritis on the background of polycystosis

On the surface of the kidney cysts in the form of blisters filled with clear liquid are seen. Along with them foci of yellow colour up to 0.2 cm in diameter, well separated from surrounding tissues are revealed. Microscopically these areas are defined by atrophic changes, and infiltration of segmented neutrophils.

Specimen for examination 4

Grainy kidney dystrophy

The kidney is enlarged, swollen, of dull colours. Microscopic examination determines the accumulation of large protein grains of bright pink colour in the nephrocytes cytoplasm. This is accompanied by the destruction of the mitochondria, the endoplasmic reticulum, the brush border. This type of degeneration is common in nephrotic syndrome, and is an evidence of failure of tubules. This syndrome is one of the many manifestations of kidney diseases, which initially hit the glomerular filter.

Specimen for examination 5

The kidney in hypertension

Kidneys are dense, with uneven surface affected by significant scarring. There is a restructuring of the organ. There is a phenomenon of a primary contracted kidney. Microscopically there is diffuse proliferation of connective tissue and replacement of organ parenchyma, hypertrophy of subcapsular glomeruli in the surviving nephrons.

Specimen for examination 6

Kidney cyst

Polycystic kidney disease is a hereditary kidney disease with bilateral cyst development in kidney parenchyma from the different origins – tubules and collecting ducts. Polycystic kidneys resemble a grape. Kidney tissue is composed of many cysts of various sizes and shapes, filled with serous liquid, semi–liquid colloidal masses of chocolate colour.

Specimen for examination 7

Secondary contracted kidney

Kidney is dense, with uneven surface due to the presence of developed scars. There is a restructuring of the kidney. This leads to the development of chronic renal failure – a syndrome with morphological basis of nephrosclerosis (contracted kidneys), and the most prominent clinical manifestation – uremia.

Specimen for examination 8

Adenoma of the renal pelvis

In the upper renal lobe there is a field with the tumour focus of yellowish–gray colour with a diameter up to 4.0 cm, in the section of lobular structure. The presence of a capsule, slow growth, lack of infiltrative growth shows the benign nature of the tumour. According to morphological structure there are tubular, trabecular, acinar, and cystic papillary adenoma.

Specimen for examination 9

Hydrocalycosis

On the gross specimen there is a kidney. A stone, which is in the kidney, causes the urine outflow failure and causes it to expand only this calix – hydrocalycosis; as a result – atrophied kidney parenchyma. Attaching of infection leads to the development of complications – calculous hydronephrosis (hydroureteronephrosis) that may develop in pyonephrosis.

Specimen for examination 10

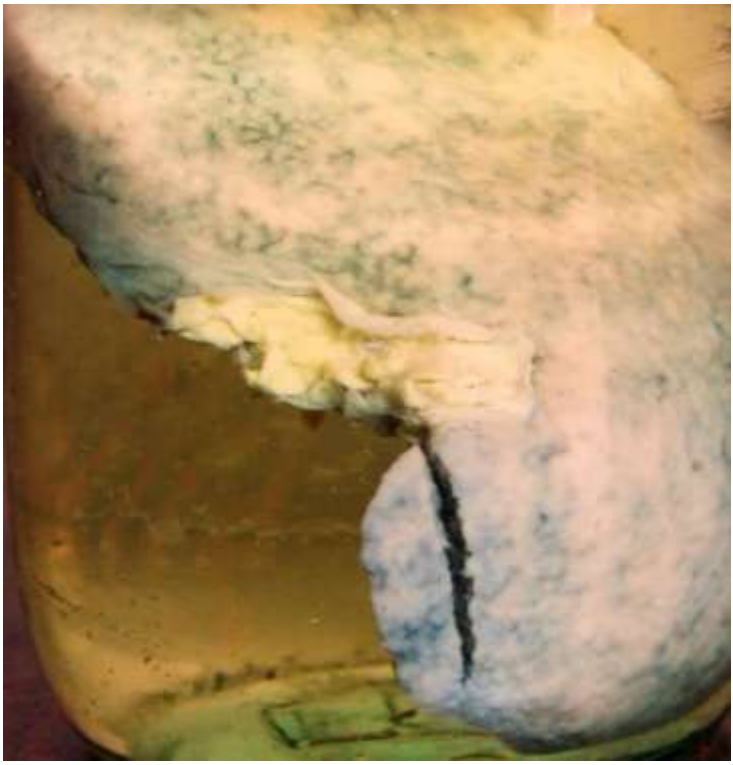
Big sebaceous kidney

At proteinuric stage of renal amyloidosis protein deposits appear not only in pyramids, but in the glomeruli in the form of minor deposits in the mesangium and individual capillary loops, and in arteriolar wall. Sclerosis and amyloidosis of pyramids and significant layers that promote exclusion and atrophy of many deep–seated nephrons. The outer surface of a kidney is smooth and white; the surface of the cut has a characteristic “sebaceous” shine.

Specimen for examination 11

Kidney with large cystis

Microscopically cysts wall is covered by cubic, flattened epithelium. Sometimes there are wrinkled vascular glomerulus. Renal tissue between cysts is atrophied. Quite often polycystic kidney is combined with polycystic liver, ovarian, lung and pancreas.



Specimen for examination 12

Subacute glomerulonephritis

Macroscopically kidney is enlarged, flabby, cortex layer is wide, of yellowish–brown colour with red specks. Pyramides are full–blooded, of red colour (large mottled kidney), sometimes with acute hyperaemia of cortex. A kidney is called the “big red kidney”. Consequences: acute and chronic renal failure.

Specimen for examination 13

Fine–cystic kidney

Polycystic kidney disease in children is inherited in an autosomal recessive manner; adult polycystic kidney disease – in an autosomal dominant manner. Cysts compress renal parenchyma and there develop atrophic, sclerotic and inflammatory processes. Sometimes the cyst wall breaks, which favours inflammation in the kidney parenchyma. It should be noted that the earlier manifestations polycystic arise, especially malignant disease occurs; The duration of disease are asymptomatic.

Specimen for examination 14

Pyelonephritic contracted kidney

Nephrosclerosis and renal contracting occurs not only at the primary hypertension, but secondary as a result of inflammation in the glomeruli, tubules and stroma. Secondary renal contracting in most cases is the result of chronic glomerulonephritis (secondary nephrotic kidney contracting), less often – pyelonephritis, amyloid nephrosis, kidney stones, renal tuberculosis and others.

Specimen for examination 15

Hydronephrosis

On the gross specimen the kidney is transformed into a thin-walled bag filled with urine. The ureter occlusive stone, causing the expansion of not only renal pelvis, ureter and the cavity above the obstruction is hydroureteronephrosis. This gives rise to inflammation of the ureter wall – ureteritis that ends with decubitus; bedsore is formed with perforation of the ureter.

Specimen for examination 16

Kidney adenoma

The formation of the correct shape, clearly separated from the surrounding tissue with a diameter up to 2.0 cm is determined at a lower pole of the kidney. On the cut this formation is yellow. Microscopically the expansive growth of formation, tissue atypia, formation of tubular structures were determined. All these signs indicate that the formation is a tubular adenoma of the kidney.

Specimen for examination 17

Cancer metastasis into the kidney

On the gross specimen there is a kidney. In its lower pole the formation up to 3.0 cm in diameter and without clear borders, of yellow–gray colour, with areas of hemorrhages and necrosis is observed. Microscopic examination showed a tissue and cell atypia, absence of capsule, invasive growth of abnormal cells.

Specimen for examination 18

Shock kidney

Shock is a clinical condition associated with a decrease of effective cardiac output and leading to destructive changes of the internals. When kidneys are damaged, acute renal failure develops – a syndrome, which is characterized by necrosis of tubule epithelium and deep disturbances of blood and lymph flow. In this case the kidney is of white–gray colour, pyramids are congested and stagnant red. Microscopically necrobiotic and necrotic changes in the epithelium of the tubules were observed.

Specimen for examination 19

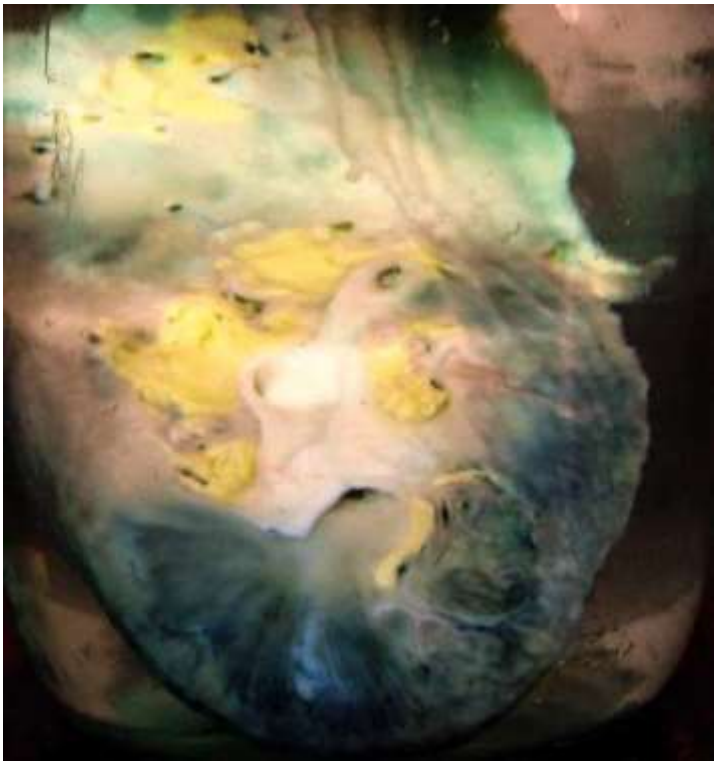
Chronic glomerulonephritis

This pathology is characterized by the duration of the disease for more than 12 months, latent or recurrent course, a variety of clinical forms. Some authors believe that 60 % of cases are associated with the transition of acute to chronic glomerulonephritis. The main mechanism of chronic glomerulonephritis is an immune complex, and less frequent – antibody.

Specimen for examination 20

Hypernefroid kidney cancer

On the gross specimen a tumour in diameter up to 2.5 cm, with yellowish–gray colour, without clear borders, that infiltrates surrounding tissue is observed. Microscopically tissue and cell atypia, the tendency to infiltrative growth and areas of hemorrhage in the tumour were detected.



Specimen for examination 21

Kidney fibroma

Fibroma is a tumour of connective (fibrous) tissue origin. It has the form of nodes of different sizes. Microscopic examination: tumour consists of differentiated connective tissue; fiber bundles and blood vessels are located in different directions.

Specimen for examination 22

Cyanotic induration of the kidney

Its appearance is due to chronic venous plethora. A kidney in venous plethora increases in size, is bluish due to the reduced hemoglobin increase. It is dense through concomitant failure of lymph flow and edema, and later – the proliferation of connective tissue.

Specimen for examination 23

Nephrolithiasis

On the gross specimen a kidney with its parenchyma structural damage is presented. The reason for this is the presence of the urine outflow failure, leading to atrophy and the development of sclerotic changes in the organ. Among the common factors that contribute to the development of the kidney disease, there is the importance of becoming hereditary and acquired disturbances of mineral metabolism and acid–base status, the nature of power, the mineral content of drinking water, as well as vitamin deficiency. Inflammations in the urinary tract and the urinary stasis have the important role.

Specimen for examination 24

Hydronephrosis

On the gross specimen the kidney is transformed into a thin–walled bag filled with urine. The ureter occlusive stone, causing the expansion of not only renal pelvis, ureter and the cavity above the obstruction is hydroureteronephrosis. This gives rise to inflammation of the ureter wall – ureteritis that ends with decubitus; bedsore is formed with perforation of the ureter.

Specimen for examination 25

Purulent pyelonephritis

Kidneys are enlarged, swollen, full–blooded. The cavity of pelvis is widened, filled with nebulous urine or pus; mucosa is dull, with hemorrhages. On a cut the kidney is mottled – gray and yellow areas are surrounded by a full–blooded areas, there are small abscesses. There often develop miliary abscesses and hemorrhages. There is a dystrophy of the epithelium of the tubules; in their lumen there are cylinders of desquamated epithelium and leukocytes.

Specimen for examination 26

Kidney amyloidosis

Nephropathic amyloidosis is quite common in AA amyloidosis – the secondary, which is a complication of arthritis, tuberculosis, bronchiectasis, and hereditary, which occurs in the periodic disease. This indicates that renal amyloidosis is often secondary disease.

Specimen for examination 27

Bladder cancer

In the lumen of the bladder a tumour with exophytic growth, without clear borders, that infiltrates surrounding tissue, is determined. Complications: hydronephrosis, pyelonephritis, bleeding.

Specimen for examination 28

Kidney infarctions

On the gross specimen white infarct with hemorrhagic rim – a clearly separated area of light–gray colour and triangular shape, is determined. Its cause is associated with impaired blood supply in the basin of the renal artery. White infarction colour is caused by the development of necrosis, and hemorrhagic corolla is enlarged collateral vessels.

Specimen for examination 29

Chronic pyelonephritis

Kidney surface is uneven, the cut has visible areas of scar tissue, which alternate with relatively stable kidney parenchyma; pelves are dilated, their walls are thickened, white. Changes of renal tissue in chronic pyelonephritis are often of focal nature: foci of interstitial inflammation, atrophy and sclerosis of renal tissue are surrounded by unchanged one, where you can find signs of regenerative hypertrophy. A consequence of chronic pyelonephritis is contraction of the kidney.

Specimen for examination 30

Infantile type cystic disease

The development of polycystic kidney disease is associated with the violation of embryogenesis in the first weeks, accompanied by the formation of glomerular, tubular excretory cysts. Glomerular cysts have no connection with the renal tubules, are responsible for the early development of kidney failure. Tubular cysts that are formed from the tubules and excretory that arise from collecting tubules, increasing slowly due to the difficulty of emptying and thus reach a considerable size.

Specimen for examination 31

Kidney in atherosclerosis

Kidneys are with dense surface as a result of scarring presence. The kidney nephrosclerosis and renal scarring occur not only at the primary hypertension, but secondary too. The consequence of renal scarring of any cause is the development of chronic renal failure.

Specimen for examination 32

Apostematous pielonefritis

The kidney is enlarged, flabby, of gray colour, mottled. Under the capsule pockets of pale gray colour in deameter up to 0.2–0.8 cm are visible. These are ulcers under the capsule. There is microbial embolism when hematogenically germs spread through the body – often is seen in sepsis.

Specimen for examination 33

Primary contracted kidney

In hypertensive disease and symptomatic hypertension nephrosclerosis or primary renal scarring (primary contracted kidney) develops as a result of vascular changes. Macroscopically: the kidney is dense, with fine–grained surface due to the presence of developed scarring, restructuring of the kidneys is observed.

Specimen for examination 34

Pyonephrosis

In acute pyelonephritis the progress of purulent process leads to the abscesses merger and the formation of kidney carbuncle, a compound of purulent cavity with pelvis (pyonephrosis), the transition process in the fibrous capsule (perinefritis) and perirenal fat (paranephritis).

Specimen for examination 35

Hemorrhagic glomerulonephritis

Macroscopically the kidney is enlarged, loose, the cortex layer is expanded, full–blooded, red specks can be seen there and beneath the capsule (mottled kidney). In morphological examination a sharp hyperemia, infiltration of polymorphonuclear leukocytes in response to immune complexes were revealed in renal glomerular capillaries.

Specimen for examination 36

Kidney cancer

On the gross specimen the kidney cancer of epithelial origin is represented. There are following variants of malignant kidney epithelial tumours: renal cell or gipernefroid cancer (clear cell, granular cell, glandular, sarcomatoid, mixed variants), and Wilms' tumour or nephroblastoma. Gipernefroid cancer is 90 % of all tumours in adult kidney and nephroblastoma is 20 % of all malignancies in children.

Specimen for examination 37

Urolithiasis complicated by hydronephrosis

On the gross specimen kidney parenchyma structure damage is observed. This is caused by the presence of stones, urinary outflow disorder, which leads to occurrence of atrophic and sclerotic changes in kidney tissues. Kidney disease (nephrolithiasis) is a disease with a chronic course, where in the calix, pelvis, ureter of one or both kidneys stones of different size, structure and chemical composition (phosphates, urates, oxalates, etc.) are formed.

Specimen for examination 38

Kidney cancer

According to histological structure renal pelvis cancer can be transitional cell, squamous and glandular (adenocarcinoma). The most common is transitional cell carcinoma. It is of papyllary structure, accompanied by the development of inflammation. Tumour invades pelvic wall, extends into the surrounding tissue, ureter and bladder.

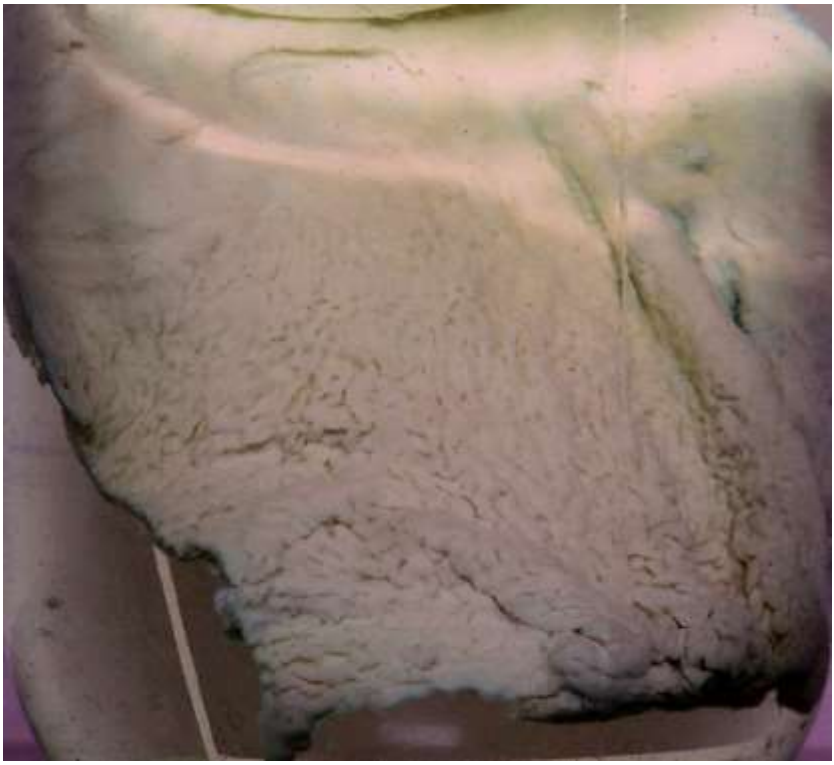
Case 9

Pathology of the digestive system

Specimen for examination 1

Chronic gastric ulcer with malignisation and bleeding

On the gross specimen the stomach is represented. Its mucous membrane has defect up to 1.5 cm in diameter. There is a complication of the combined flow of peptic ulcer disease: bleeding from the ulcer and malignisation (signs of cell atypia).



Specimen for examination 2

Acute gastric ulcer

On the wall of the stomach the defect that comes to serosa is visible. The disease can be caused by various factors that lead to stress. Ulcers result from mucosal ischemia, resulting in decreased resistance to acid. In the development of peptic ulcer disease the erosions, especially on the lesser curvature, do not heal. Under the influence of gastric layers of the stomach wall necrotize deeper and erosion turns into acute peptic ulcer (ulcus acutum pepticum) of the round or oval form.

Specimen for examination 3

Corrosive gastritis

Necrotic (corrosive) gastritis (gastritis necrotica s. corrosiva) is the result of action on the stomach mucous membrane of the acids and alkalis, which coagulate and destroy it. The pathogenesis of this process is the reduction of prostaglandin synthesis. In the affected area they distinguish acute diffuse gastritis; focal acute gastritis. In turn, the focal acute gastritis can be advantageously fundic, antral, piloroantralnym and pyloroduodenal.

Specimen for examination 4

Patellate stomach cancer

On the preparation a malignant epithelial tumour of the stomach is presented. Macroscopically gastric cancer is divided into exophytic (plaque, polypoid, mushroom), exophytic with a central ulcer (saucer, exophytic–endophytic), infiltrative (endophytic, intramural) and linitis plastica.

Specimen for examination 5

Lipomatosis of the pancreas

In the parenchyma of the pancreas proliferation of connective tissue, adipose tissue lesions, atrophy of the parenchyma of the gland are seen. Gland is thinned, reduced in size.

Specimen for examination 6

Necrosis of the stomach wall

Most often, this pathology develops after exposure of different chemical substances (alcohol, poor–quality food products) or certain drugs (especially non-steroidal anti-inflammatory agents, aspirin). These substances cause rapid exfoliation of epithelial cells, and decrease of mucus secretion is accompanied by a decrease in the function of a protective barrier against the action of acid. Necrotisis can lead to the development of phlegmon, and even perforation.

Specimen for examination 7

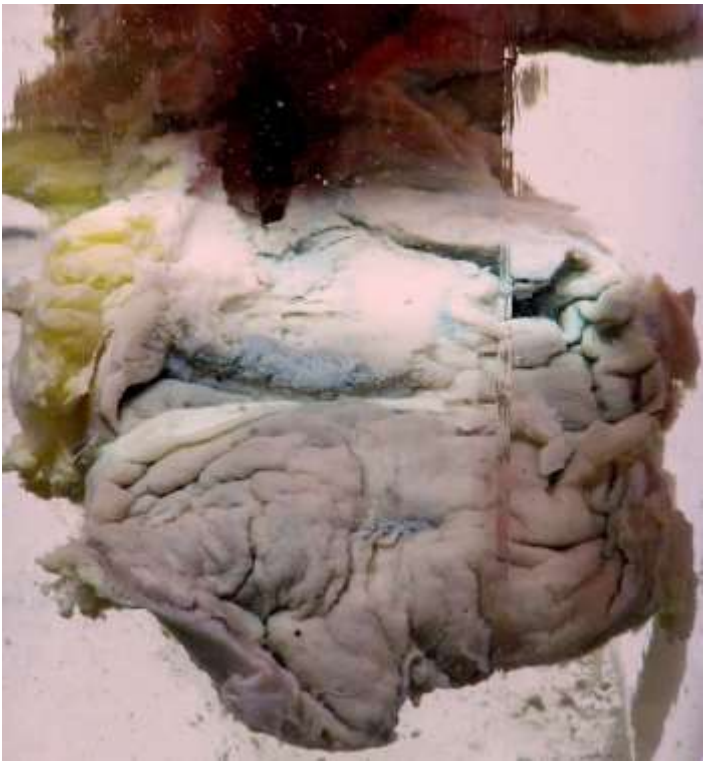
Cancer, stomach ulcer

Lymphogenous cancer metastasis may be in the pleura, lung, peritoneum, although lately they are more often implant during tumour germination of the serous membrane of the stomach wall. Hematogenous metastases may be as multiple nodes and are detected in the liver, lungs, bones. Implantation metastases occur in multiple tumour nodules of different sizes in the peritoneum.

Specimen for examination 8

Gangrenous gastritis

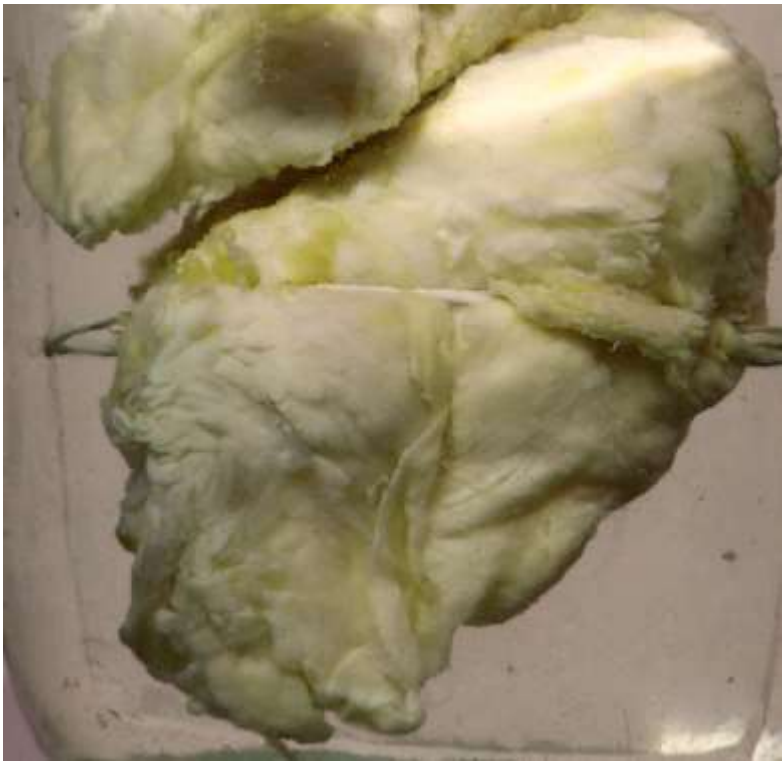
Occurs in the stomach traumas, peptic ulcers, ulcerative gastric cancers. Mucous is thickened, coarse folds with hemorrhages and fibrinopurulent stratifications are observed. Leukocyte infiltration permeates all layers of the stomach and the surrounding peritoneum, leading to peritonitis and development of perigastritis.



Specimen for examination 9

Colon cancer

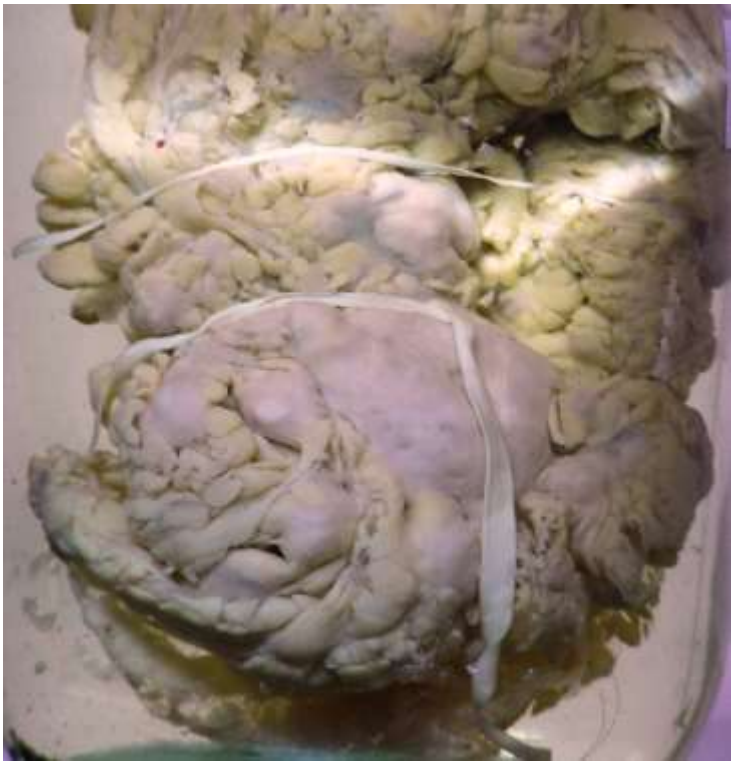
Cancer is most common in the rectum, less – in sigmoid, hepatic and splenic angles of transverse colon. Macroscopically there are ulcerative, ulcerative–infiltrative form, but cancers can be in the form of a node (polypoid). There is also anal area cancer – squamous cell carcinoma with keratinization and without keratinization. Complications: bleeding, perforation of the intestine with peritonitis, abscess, development of intestinal obstruction, fistula formation.



Specimen for examination 10

The pancreas in diabetes mellitus

The pancreas has a reduced size, dense texture as a result of the development of connective tissue, the yellow colour is affected by the deposition of fat. Microscopic examination revealed the phenomenon of atrophy, multiple sclerosis and lipidosis.



Specimen for examination 11

Colon cancer

Colon cancer is more common today than ever before, mortality increases every year. There are different precancerous lesions: hyperplastic polyps, adenomatous polyps, villous polyps, intestinal polyposis, chronic ulcerative colitis, chronic fistulas of the rectum, etc.

Specimen for examination 12

Acute gastric ulcer with penetration in lesser omentum

In the wall of the stomach there is an oval–shaped ulcer. Its edges are represented by mucosa, submucosa and muscle layers. At its bottom a perforated hole in the omentum can be seen. Penetration ulcer (penetratio) is its penetration beyond the stomach, when tissues of adjacent organs – the pancreas, gall bladder, liver become the bottom of the ulcer.

Specimen for examination 13

Metastases of gastric cancer in the diaphragm

The process of metastasis has 5 stages: 1) penetration of tumour cells into the lumen of a blood or lymph vessel; 2) the transfer of tumour cells through the blood stream or lymphatic system; 3) stopping the tumour cells in the new location; 4) tumour cells emerge into the perivascular tissue; 5) growth of metastasis.

Specimen for examination 14

Chronic duodenal peptic ulcer

Chronic duodenum ulcer has a round or oval shape. Size is usually less than 2 cm in diameter, but there were described cases, when the sizes reached 10 cm in diameter and greater. The depth of the ulcer is different, and sometimes it reaches a serous membrane. The edges of the sores are clear, dense and rise above the mucosal surface.

Specimen for examination 15

Chronic gastric ulcer with bleeding

Bleeding occurs in acute stage of the disease affected by fibrinoid necrosis of the vascular wall. At the bottom of the ulcer thrombosed vessels are seen. Patient has “coffee–ground vomiting”, its colour is due to hydrochloric acid hematin. Fecal matters acquire the colour and consistency of tar. This stool is called melena.

Specimen for examination 16

Colon cancer

On the preparation there is the fragment of circularly placed colon tumour, narrowing the lumen. Most often there is a tumour of the colon, small intestine primary tumours are rare. Microscopically the tumour is built of atypical glandular structures, with apparent tissue and cell atypia – low differentiated adenocarcinoma.

Specimen for examination 17

Stomach cancer

There are the following macroscopic types of tumour: junctive; infiltrative; ulcerous. Metastases occur most often at the focus of the primary capillary network that is formed of vessels that carry blood away from the primary tumour localization. The reason for stopping tumour embolus may be purely mechanical.

Specimen for examination 18

Nonspecific ulcerative colitis

Ulcers are uneven and sometimes merge, they spread horizontally on the not yet damaged areas, forming significant damage. Of course, ulcers are superficial, they capture mucosa and submucosa, but in severe cases all layers of gut can be damaged up to the perforation.

Specimen for examination 19

Cancer of the small intestine with metastases to the lymph nodes

On the gross specimen the small intestine section is represented. In its wall exophytic growth up to 5 cm in diameter, tapering organ lumen, is defined. During the histological examination the signs of tissue and cell atypia and polymorphism of nuclei were revealed.

Specimen for examination 20

Peritoneal carcinomatosis

The preparation is a portion of the small intestine. Multiple growths up to 2 cm in diameter are found in its mesentery. These formations are of dense consistency, without capsule, tightly connected to the surrounding tissues. This is implantation metastasis. During the histological examination atypical glandular structures were revealed – it is the metastasis of adenocarcinoma.

Specimen for examination 21

Multiple metastases of gastric cancer in the liver

Metastasis of gastric cancer is lymphogenous, hematogenous and via implantation (contact). The nodal metastases in regional lymph nodes located along the small and large curvature of the stomach, lymph nodes in the large and small omentum are of particular importance.

Specimen for examination 22

Stenosing cancer of pylorus

In the pyloric part of the stomach there is a formation, circularly arranged. It narrows the lumen and completely covers it. Complications can be bleeding, metastasis, cachexia.

Specimen for examination 23

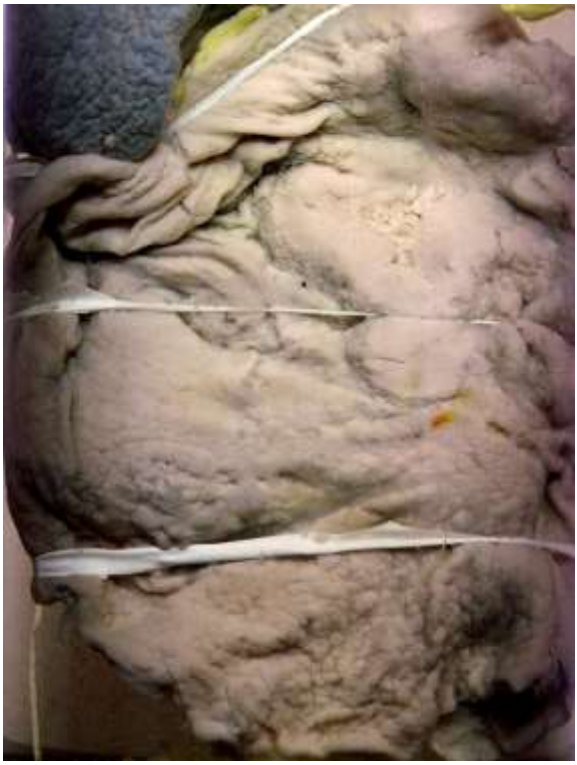
Metastasis of gastric cancer to the liver

The cut of the liver with multiple nodules in the parenchyma with a diameter up to 1 cm is presented on the gross specimen. Histologically: in the nodules atypical glandular structures corresponding to the gastric mucosa were detected. In this case there is hematogenous metastasis of gastric adenocarcinoma in the liver.

Specimen for examination 24

Stomach cancer (scirrhoma)

Malignant tumours of the stomach in which the stroma dominates parenchyma. On a section the cancer tissue is represented in white and gray woody density. A frequent histological type of gastric cancer is adenocarcinoma. Among undifferentiated cancers solid and mucinous cancers are found.



Specimen for examination 25

Cancer with metastases in the spleen

On the gross specimen the stomach with endophytic tumour of 5 cm in diameter and a spleen are presented. Formations of the light yellow colour, without clear borders are revealed in the spleen. During the histological examination this structures were indicated like gastric adenocarcinoma.

Specimen for examination 26

Chronic gastric ulcer with malignisation

In the wall of the stomach a deep crater with a chronic ulcer edges can be seen. Microscopic examination of the chronic ulcer edges detected signs of cell atypia.

Specimen for examination 27

Chronic hypertrophic gastritis

A special form of chronic gastritis is Menetries disease in which the mucous membrane is thickened and has a semblance of brain convolutions. The morphological basis of the disease is proliferation of glandular epithelium cells, hyperplasia of mucous glands and infiltration by lymphocytes, plasmocytes, epithelioid and giant cells with the formation of cysts. Exacerbation of chronic gastritis manifests stromal edema, hyperemia, considerable cell infiltration with increasing percentage of neutrophils, sometimes – the formation of erosions and microabscesses.

Specimen for examination 28

Chronic gastric ulcer

It is a chronic ulcer. It has dense edges (callous ulcer), bottom is rough. Edge sores facing the esophagus, are undermined, and the mucous membrane hangs over the defect. Recess is formed which accumulates gastric contents. The edge facing the duodenum is slighty sloping.

Specimen for examination 29

Fungoid stomach cancer

The tumour is exophytic growth and has the form of a mushroom: a cap on a wide leg like a polyp. Its surface may be smooth, bumpy or papillary and resemble cauliflower. Localization: cancer occurs most often in the pylorus and then on a small curvature in the cardiac department at the greater curvature, rare – in the front and rear wall, very seldom – in the bottom area.

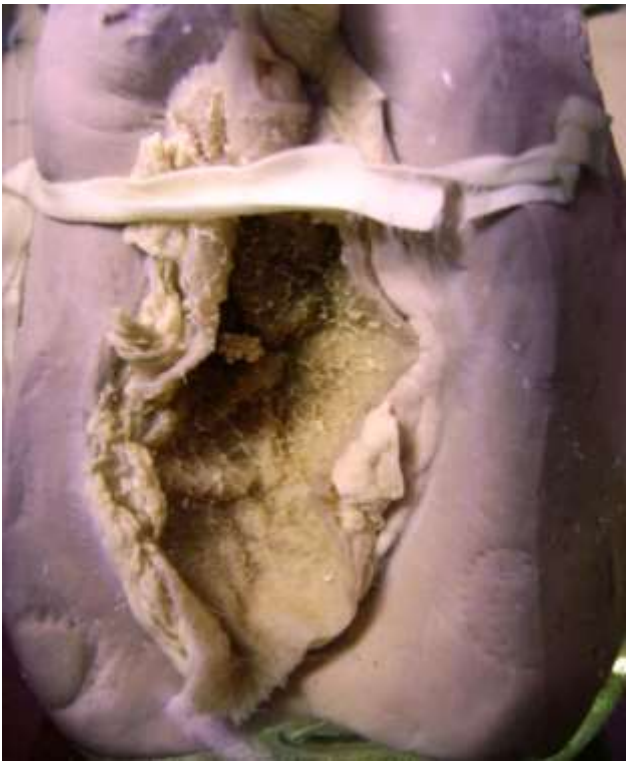
Case 10

Pathology of the hepatobiliary system

Specimen for examination 1

Fatty liver

The liver is enlarged, with dense texture, and on a cut and surface fine yellowish granularity is indicated. Most hepatocytes are substituted by fatty inclusions with atrophy of the nuclei, destructive changes in hepatocytes, mesenchymal cell inflammatory response, growth of connective tissue. Consequences: the formation of cirrhosis and liver failure.



Specimen for examination 2

Chronic calculous cholecystitis

The presence of gallstones leads to inflammation in the wall of the gallbladder. Direct stone formation mechanism consists of two processes: the formation of the organic matrix and crystallization of salts, each of these processes can be primary in certain cases.

Specimen for examination 3

Calculous cholecystitis

In the lumen of the gallbladder stones of different sizes are visible. Parasecretion, as well as stagnation of secretion, leads to an increase in the concentration of substances from which the stones are being built, and their precipitation from solution, aided by the strengthening of reabsorption and secretion thickening.

Specimen for examination 4

Steatosis of liver

On the gross specimen an enlargement of the liver is represented. On a section it is yellow, which indicates the increased content of fat. During the histological examination the signs of fatty degeneration of hepatocytes were revealed. Causes: intoxication, hypoxia. Consequences: liver failure.

Specimen for examination 5

Gallstones

Stones or calculi (from latin concrementum) are dense formations, formed from the secretions or excretions and freely lie in the gallbladder or excretory ducts. Causes are varied and are determined by both general and local factors. General causes are metabolic disorders. For example, the relationship of gallstone disease with general obesity and atherosclerosis is well known, and kidney stones – with gout, oxaluria.

Specimen for examination 6

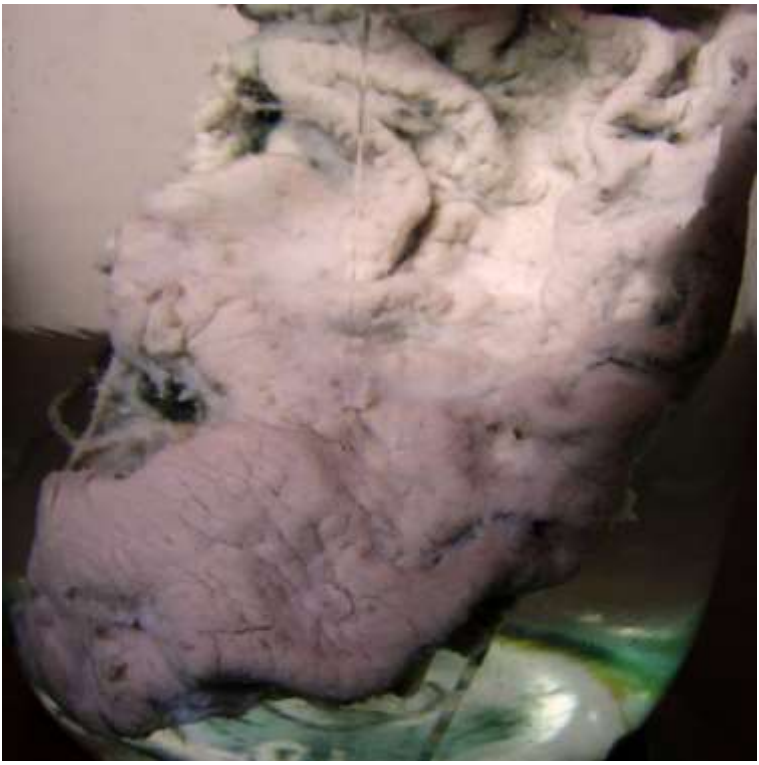
Empyema of the gallbladder on the background of cholelithiasis

On the gross specimen the gallbladder is increased, in the lumen the bile contains a purulent eksudate. As a result of pressure on the stone wall of the gallbladder its mortification may occur – bedsore, which may be accompanied by the development of perforations, adhesions, fistula formation, empyema. The stones are often the cause of inflammation, because they injure the tissue, creating gates of infection, cause stagnation and are the basis of cholelithiasis.

Specimen for examination 7

Toxic liver degeneration
(red degeneration stage)

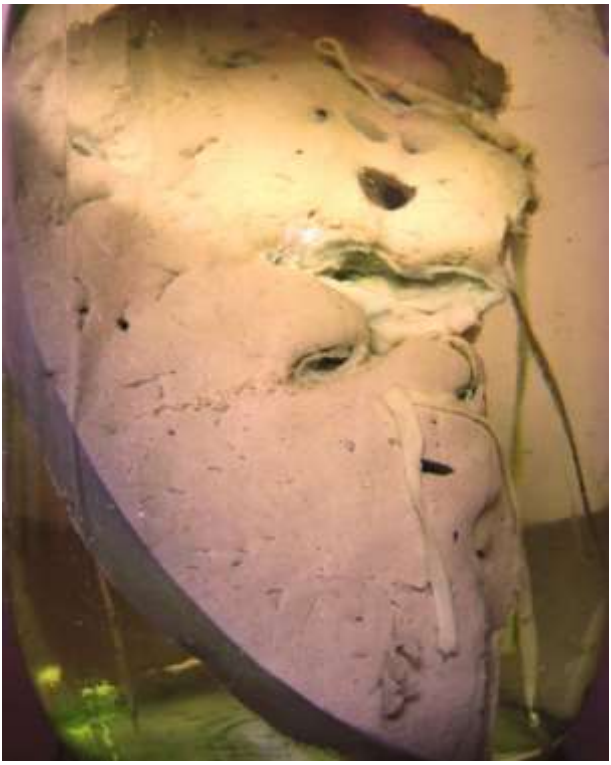
This is an acute disease characterized by progressive massive necrosis of the liver and hepatic insufficiency. During the third week of disease the liver progressively diminishes and turns red – a red stage of dystrophy.



Specimen for examination 8

Pancreatic cancer with metastases in the spleen

Pancreatic cancer develops from a ductal epithelium (adenocarcinoma) and acini with parenchymal epithelium (alveolar or acinar carcinoma). On the gross specimen we can see a tumour in the pancreas of the light–gray colour with no clear borders, absence of capsule, with infiltrative growth. In the spleen we see glands – it is a metastatic node of pancreatic cancer.



Specimen for examination 9

The liver with obstructive jaundice

On the gross specimen the liver is increased, of yellow colour and of the clay type. The cause of its occurrence – violation of the outflow of bile (the presence of stones, the proliferation of the tumour).

Specimen for examination 10

Chronic pancreatitis

On the gross specimen we can see changes: parenchyma is reduced to the extent, proliferation of connective and fatty tissue is seen, on the cut uneven lobular structure can be seen. Chronic illness leads to sclerosis. Exocrine glands are replaced by fibrous tissue, so there may be sites that at palpation can be perceived as a tumour. The endocrine part is usually not damaged.

Specimen for examination 11

Nodular liver cancer

The liver is determined by a gray node without clear boundaries, absence of capsule and with infiltrative growth. Most often it is hepatocellular carcinoma by histostructure.

Specimen for examination 12

Metastasis of gastric cancer to the liver

The liver has gray–pink components of different sizes. They differ from the macroscopic structure of the liver parenchyma, microscopically tissue lesions of varying degrees of differentiation are detected, glandular structures with signs of cell irregularities are presented.

Specimen for examination 13

Mixed cirrhosis of liver

Macroscopically the liver is reduced in size, dense, with large foci separated by wide and deep grooves. It is characterized by early hepatargia (liver failure) and late portal hypertension. It develops as a result of massive necrosis of liver parenchyma. Necrotic patches are replaced by dense scar tissue.

Specimen for examination 14

Multiple cavernous hemangiomas of the liver

On the gross specimen a slice of the liver is represented. In its thickness there are numerous blood lakes of different sizes from 1 to 8 cm, which almost completely replace organ parenchyma. Histologically it is the structure of the vascular tumour with cavernous transformation.

Specimen for examination 15

Adenoma of the pancreas

In the pancreas gray islets with clear contours, expansive growth are visible. We can see a benign tumour – an adenoma of the pancreas. Tumours of the pancreas islet apparatus refers to APUD system tumours. Adenomas of the islet cells are called insuloma; they are hormonally active. Malignant variants of insulin are called malignant insuloma that can save hormonal activity.

Specimen for examination 16

Cancer of the pancreas

It can occur in any part of the gland, but usually in a head. On the gross specimen we see a tumour in the pancreas of a light gray colour without clear borders, absence of capsule, with infiltrative growth. Cancer invades the node ducts of the pancreas, then the bile duct. This increase causes the disorder of the pancreas and liver (cholangitis, jaundice).

Specimen for examination 17

Biliary cirrhosis

On the gross specimen we can see morphological signs of cirrhosis: dismorphology of the lobular structure of the liver. Microscopically degeneration of hepatocytes (hydropic, balloon, fat), necrosis of hepatocytes; availability of regenerate components – false lobules (strengthening the recovery, the presence of hepatocyte mitosis), diffuse fibrosis (growth of connective tissue) were determined.

Specimen for examination 18

Splenomegaly

The spleen is increased by 3–4 times, of dark cherry colour, thick. These changes occur in diseases of the blood: anemia, leukemia, hemoblastoses. Enlargement of the spleen is a result of compensatory hypertrophic changes. The consequences: increased function, becomes blood forming organ, sometimes a break can occur with little traumatizing.

Specimen for examination 19

Micronodular cirrhosis of the liver

Portal cirrhosis is characterized by the homogeneity of the microscopic picture – connective mesh and a small quantity of false lobules. This cirrhosis microscopically often reveals signs of chronic inflammation and fatty degeneration of hepatocytes. Macroscopically the liver is small, dense, granular or hummocky. Portal cirrhosis develops slowly (over many years), most often in chronic alcoholism.

Specimen for examination 20

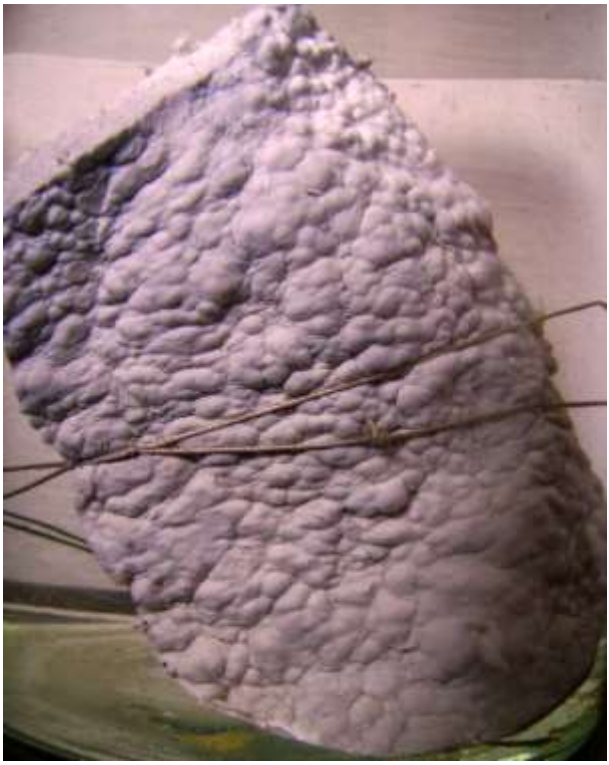
Liver cancer on the background of calculous cholecystitis

On the gross specimen we can see an enlarged gall bladder filled with stones. Next in the liver parenchyma there is a gray node without clear borders with infiltrative growth. According to the microscopic structure most often it is hepatocellular cancer. It develops as one large node which covers almost the entire lobe of the liver (nodular form) or small nodules that are scattered in the liver tissue (diffuse form).

Specimen for examination 21

Biliary cirrhosis of the liver

On the gross specimen we can see morphological signs of cirrhosis: dismorphology of the lobular structure of the liver. Microscopically determined: degeneration of hepatocytes (hydropic, balloon, fat), necrosis of hepatocytes; availability of regenerate components – false lobules (strengthening the recovery, the presence of hepatocyte mitosis), diffuse fibrosis (growth of the connective tissue).



Specimen for examination 22

Alcoholic hepatic fibrosis

We can see on the gross specimen dismorphology of the liver architecture in the form of fibrosis and nodular regeneration. Liver cirrhosis is a non-specific disease. It is the final stage of the disease, leading to chronic damage of the liver cells. The amount of connective tissue increases sharply and liver cells do not form acini and lobules, but recovered in the form of nodules, without correct structure of a lobule.

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Частина 2

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