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PATHOANATOMIC AND HISTOLOGICAL CHANGES IN ECHINOCOCCOSIS OF THE HEART OF ANIMALS AND HUMANS

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INTRODUCTION

The problem of echinococcosis of the heart is relevant among the medical community due to the rarity and complexity of the diagnosis of this disease. Despite the improvement of diagnostic methods, echinococcosis of the heart remains insufficiently studied and is often diagnosed at late stages. In light of these facts, the purpose of this study is to review clinical cases of echinococcosis of the heart in order to identify the clinical features, diagnostic methods and effective treatment strategies that contribute to improving the diagnosis and treatment of this disease.

Key words

echinococcosis, heart, pathology, histology, pericardium, myocardium.

The purpose of the work. The study of clinical cases of echinococcosis of the heart in order to systematize and analyze data, evaluate the effectiveness of methods of diagnosis, treatment and prevention of the disease in order to develop optimal strategies for managing this pathological condition.

Materials and methods of the study: a retrospective analysis of the literature data was carried out. In the course of the research, the following methods were used: analytical and descriptive assessment, as well as materials from his own dissertation work on echinococcosis.

Results. Echinococcosis of the heart is a rare disease, to which about 300 scientific publications are devoted. Of these, about 170 works by I.J. Deineko (1968) studied and analyzed in detail the localization of the parasite in the pericardium

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and myocardium of the heart. Some studies, such as the works of V.M. Sadykov (1973) and N.M. Matchanov et al. (1977), provide information about heart parasites in different intermediate hosts.

Echinococcosis of the heart spreads through the body with blood flow, and blood passes through the heart. Usually, helminths, bypassing the liver filter, settle in the lungs. The first contact of the parasite with the heart occurs in the venous collectors before reaching the lungs. However, myocardial damage in this way rarely occurs, since the helminth freely penetrates into the lung tissue, which is a secondary organ in terms of frequency of damage in echinococcus.

If the scolexes do not settle either in the liver or in the lungs, and remain viable, they enter the arteries and can affect any structure with blood supply in the body. However, echinococcal heart lesions are very rare, even among rare localizations. Perhaps this is due to the peculiarities of the blood supply to the myocardium. Unlike most organs in which blood supply is carried out using branched vascular networks, the blood supply to the myocardium consists of a poorly developed vascular network.

Perhaps such a structure protects the heart to a certain extent from the parasite settling in its tissues. Some cases of echinococcosis describe damage to the heart valves, which are characterized by very poor blood supply. Therefore, echinococcal heart disease is an unusual situation caused by the specific features of the parasite's interaction with the main human host. Cysts in the heart, despite their "goodness", are a malignant process, since most complications (more than 75% of cases) lead either to death or to severe disability. Therefore, echinococcosis of the heart is of priority importance, even in cases where the lesion of helminth is multiple. In patients with echinococcosis of the heart, recorded in the world literature, of various ages from 5 years to 82 years. However, mostly young people aged 20 to 40 years get sick (70-75% of all patients). While with the usual localization of echinococcus (in the liver and lungs), women get sick more often (in a ratio of 2.3:1), echinococcosis of the heart affects mainly men (3:1). From our observation, out of 11 patients with echinococcosis of the heart, 8 were men.

Solitary hydatid cysts of the heart are most often observed, affecting the ventricular myocardium in 70-80% of cases. The left ventricle is affected 2-3 times more often than the right one, accounting for about 55-60% of all observations. The atria are affected approximately equally often (5-7%). An isolated lesion of the interventricular septum is very rare. Damage to the pericardium is more often combined with echinococcosis of the lungs or with damage to the atria and ventricles. Isolated primary pericardial lesion is rare.

Studying 160 patients with echinococcosis of the heart, it was found that 101 of them (63.1%) were men, and 59 (36.9%) were women. The age of the patients

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ranged from 3 to 70 years [Deineka I.Ya., 1969]. In 101 cases, the localization of cysts was accurately indicated. The wall of the left ventricle was most often affected in 42 cases (41%), followed by the interventricular septum in 20 cases (19.6%), and less often the wall of the right ventricle in 11 (10.8%). The occurrence of cysts was noted in all parts of the heart – 9 (8.8%), the wall of the left ventricle and left atrium – 6 (5.9%), the wall of the left atrium –3 (2.9%), the apex of the heart – 2 (2%), the atrial septum – 2 (2%), the wall of the right ventricle and the right atria – 2 (2%), the wall of the right atrium – 2 (2%), the right auricle – 1 (1%), the left auricle –1 (1%) and the base of the heart –1 case (1%).

The parasitization of echinococcus in the heart always leads to an increase in this organ. The infected heart reaches very large sizes and squeezes the mediastinal organs, and sometimes even the lungs. The growth of the parasite affects tissues and causes clinical manifestations of the disease. Growing larvae exert pressure on the myocardial muscles, which leads to ischemia [Deineka I.Ya., 1968]. With multiple echinococcosis, several ischemic foci occur, which affects the work of the heart. The deterioration of cardiac activity is caused by the pressure of larvae on nerve nodes, as well as toxic and allergic reactions of the body. Localization of larvae in the interventricular septum leads to impaired conduction of the Gis bundle, as well as to sclerosis and dystrophy of its left leg [Deineka I.Ya., 1968].

Growing larvae, protruding into the heart cavity, can disrupt blood circulation mechanically. In the presence of large parasites, blood flow to the atrium from the hollow and pulmonary veins is hampered, and it is also possible to close the atrioventricular openings. Echinococci can penetrate and compress the coronary arteries and their branches. In this case, blood clots often form in the vessels compressed by the cyst. Larvae, especially penetrating into the left half of the heart, cause embolism and thrombosis of the coronary vessels, primarily the left coronary artery [Deineka I.Ya., 1968].

I.J.Deineka notes that one of the most frequent and dangerous complications of echinococcosis of the heart is a larval breakthrough, which can lead to sudden death of the patient. A breakthrough is observed in the presence of large larvae, when they significantly protrude into the ventricular cavity, most often into the right one, and their rupture occurs [Deineka I.Ya., 1968]. Almost always, the larvae in the heart contain daughter bladders, and when the maternal bladder ruptures, embolisms often occur. Then there is a blockage of the pulmonary artery or its branches by daughter echinococcal vesicles and their membranes.

In addition to the mechanical blockage caused by daughter bladders and their shells, the penetration of infected, toxic and allergenic echinococcal fluid is important. Blockage of the pulmonary artery or aorta can lead to death. Larvae in

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the wall of the right atrium and auricle penetrate into the cavity of the right atrium, and then the contents of the parasites enter the ventricle of the heart, which also leads to blockage of the pulmonary artery. Several cases have been described when all branches of the pulmonary artery were blocked by a multitude of larvae of different sizes [Deineka I.Ya., 1968].

However, surgical treatment of echinococcosis of the heart still presents certain difficulties and risks. The operation requires high qualification and experience of the surgeon, since echinococcal heart damage can be complex and diverse. The main diagnostic methods for echinococcosis of the heart are echocardiography and computed tomography. These methods make it possible to determine the location and nature of the heart lesion, as well as to estimate the size and number of echinococcal cysts.

During heart surgery, the surgeon removes echinococcal cysts, restores damaged tissues and structures of the heart, and, if necessary, can perform coronary bypass surgery or valve replacement. An important aspect of a successful operation is effective anesthetic support. Under endotracheal anesthesia, the surgeon's work is facilitated and the risk of complications is reduced. Surgical interventions on the heart in cases of echinococcosis can significantly improve the prognosis and survival of patients. However, the decision to perform surgery should be balanced and based on the individual characteristics of each patient, the degree of heart damage and the general state of his health.

Thus, modern surgical practice provides an opportunity to diagnose and treat echinococcosis of the heart, which helps to increase patients' chances of recovery and prevent possible complications.

After opening the cyst and removing the contents, the cavity is treated and drained. If the myocardium is thinned, additional cavities using heparinized collagen or other plasticizing materials may be required to strengthen the walls of the cyst. In case of detection of parasites in the myocardium or other complications, appropriate measures must be taken. After the operation, a control check of the tightness and absence of fluid leakage from the cyst is performed. After that, the suturing procedure is completed and the wound is closed.

It is important to note that this procedure requires a highly qualified surgeon and must be performed in strict accordance with aseptic rules. In addition, each case of pericardectomy has its own characteristics, so the choice of autopsy method and subsequent manipulations may differ in each case and are determined by the surgeon based on the clinical situation and preferences. If the closure of the cyst is difficult, and the thinned bottom threatens to rupture or cause an aneurysm of the heart, you can strengthen this area with a flap from the diaphragm using the Petrovsky method [Deineka I.Ya., 1968].

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According to the results of the literature analysis, I.J. Deineka noted that the most effective operation is considered to be echinococcal ectectomy, which consists in removing the most protruding part of the fibrous capsule. Removal of large fossilized cysts is accompanied by a risk of damage to the heart cavity.

Instead of completely removing all cysts, methods are sometimes used to reduce the risk of developing dangerous complications. For example, the use of antiparasitic drugs to reduce the size of cysts and prevent their growth. Methods of drainage of cysts and removal of their contents under the control of an ultrasound or computed tomograph can also be used. These methods can be quite effective and minimize the risks of surgery to completely remove all cysts. However, in some cases, complete removal of cysts may be necessary. Sometimes cysts are located on important anatomical formations that affect heart function, and can also cause chronic infection or recurrent exacerbations. In such situations, complete removal of cysts can be crucial to improve the patient's condition and prevent serious complications.

In general, the approach to the treatment of multiple echinococcosis of the heart should be individual and based on an assessment of the risk and benefit of each specific case. The decision to completely remove cysts depends on many factors, such as the location of cysts, their size, the patient's symptoms and the presence of other diseases. The rational use of all available diagnostic and treatment methods allows you to choose the most effective tactics for each patient. More common postoperative complications are pneumonia, embolism and vascular thrombosis. According to Deinecke (1968), "the prognosis for echinococcosis of the heart remains threatening, since cysts can burst and lead to sudden death of the patient. Surgery can also cause life-threatening complications." Echinococcal damage to the heart can lead to serious consequences such as embolism, thrombosis, anaphylactic shock, pneumonia, atelectasis and pulmonary edema, as well as cardiac disorders, including atrial fibrillation, cardiovascular insufficiency and tachycardia.

We found up to 48 echinococcal cysts in the heart of cattle, and up to 21 cysts in sheep. In addition to large cysts, small cysts are also found on histological sections of the heart. This was also noted in the experimental infection of sheep. The heart affected by echinococci increases significantly in size and can reach a weight of up to 4.8 kg in cattle, 1.1 kg in sheep and 1.6 kg in pigs. Echinococcosis of the heart can lead to sudden death of an animal. We observed such a case in a Karakul sheep, whose heart was affected by echinococcus, although there were no visible signs of poisoning during the pathoanatomical autopsy.

We conducted an experiment on 12 guinea pigs, during which we injected a liquid containing echinococcal larvae into the heart in doses of 3-2-1 ml to study its

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effect on the animal body. The guinea pig, which was injected with 1 ml of liquid with echinococcal larvae, had rapid breathing, lay down and became passive. After 5 minutes, she started twitching her hind limbs, then tried to get up, but lay down again. This behavior lasted for 40 minutes, then the guinea pig gradually recovered, began to move, drink water and eat grass. A day later, the animal fully recovered.

A guinea pig injected with 2 ml of liquid with echinococcal larvae had the same behavior as an animal injected with 1 ml of liquid. However, the recovery took longer, and the guinea pig's condition was worse. She was lying on her side more and sucking in air with her mouth. After 1.5 days, the animal died. During the autopsy, a sharp blood filling of the lungs was found, the heart seemed flabby and devoid of blood. The kidneys turned gray and swollen, the boundary between the cortical and cerebral layers softened. The spleen was enlarged, but the structure of its pulp showed no obvious signs.

Based on the described symptoms and pathological changes, it can be assumed that the cause of death of the guinea pig was an allergic reaction to the injected echinococcal fluid. The first signs of suppression and anxiety of the mumps may be associated with the initial reaction of the body to an allergen and a violation of respiratory function. Later, seizures and breathing problems developed, which may be the result of an allergic reaction and anaphylaxis. Upon autopsy, the guinea pig revealed a bloody mucus-like plaque under the skin, an enlarged heart filled with blood, pale lungs, foci of hemorrhages and atrophy on the liver and kidneys, an enlarged spleen and cerebral edema. All these signs indicate the development of a systemic allergic reaction caused by echinococcal fluid. This description can serve as an assumption, but the final diagnosis and the exact cause of death can only be established by a veterinary pathologist after conducting a detailed pathological examination.

The animals, which were injected with 3 ml of isotonic sodium chloride solution in the heart, at first felt bad and lay down, but then gradually began to move and ate well.

Histological examination of the organs of guinea pigs, which were injected with 3 and 2 ml of echinococcal fluid, revealed the following changes: loosening of the fiber of the heart, swelling of the tissue around the vessels and focal lymphoid infiltrates, round-cell infiltration of the endocardium of the right ventricle and partially of the left ventricle (Figure 1). Minor hemorrhages and filling of blood vessels were observed in the lungs, and fullness and small hemorrhages were found in the liver, kidneys and spleen.

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Figure 1. Round-cell infiltration of the endocardium of the right ventricle and partially of the left ventricle. Hematoxylin-eosin

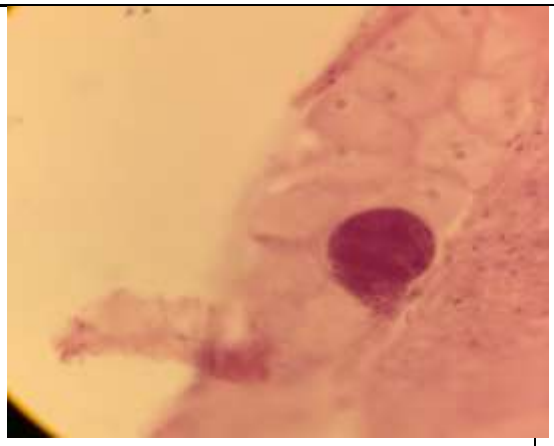

Figure 2. The heart muscle. Hematoxylin-eosin

With an increase in the volume of injected echinococcal fluid in animals, significant changes occur in their organs, which leads to anaphylactic shock and, as a result, to the death of animals due to the high sensitivity of their body.

In this study, histological changes were found in the heart of Karakul sheep affected by echinococcosis. The pericardium, the fatty tissue around the heart, contained small large-cell infiltrates. The heart muscle was uniformly colored, but contained round blue formations. Large-cell inflammatory infiltrates have been observed around the vessels, consisting of epithelioid cells and individual leukocytes. Transverse striation was not observed in all areas of the muscle. Van Gieson coloration revealed a moderate amount of pink collagen fibers in the interstitial tissue, as well as gray-green parasitic formations. The muscle was anemic and contained small round-cell infiltrates. Granular formations of various sizes, rounded and oval shapes, separated from the surrounding tissue, were also found. As a result of experiments, it was proved that E. hominis can be detected in humans, which is an important model for the development of echinococcosis of the heart in humans.

Patient T.M., 49 years old, turned to the neurosurgical department of the Samarkand Medical Institute, complaining of pain in the lower back and right leg. During one of the operations, she had parasites containing 11 scolexes removed. Infection occurred in 2 puppies (Nos. 91 and 94), which were infected 58 days after contact with the segments. 6 Karakul lambs of 2 months of age were infected with segments, while 3 Karakul lambs that were not infected served as controls. 125 days after infection, the experimental and control lambs were killed and examined. Three lambs were infected with T.ovis (larvae) on a heart between 0.5 and 6 mm in size. Each cysticercus contained scolexes with 4 suckers and a proboscis consisting

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of large and small hooks. In addition, 5 lambs were infected with echinococcosis. The samples were fixed, stained with hematoxylin and eosin, and also stained with Van Gieson.

The results of histological studies showed the presence of oval formations ranging in size from 10 microns to a visible size in the interstitial tissue of the heart, which were unevenly scattered along the capillaries. These formations could be found both singly and in clusters (2-3 each). Fig.3.

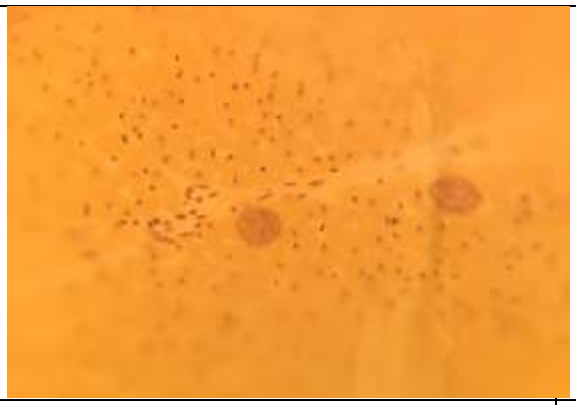

Fig.3 Interstitial heart tissue. Hematoxylin-eosin staining. An increase of 15x40

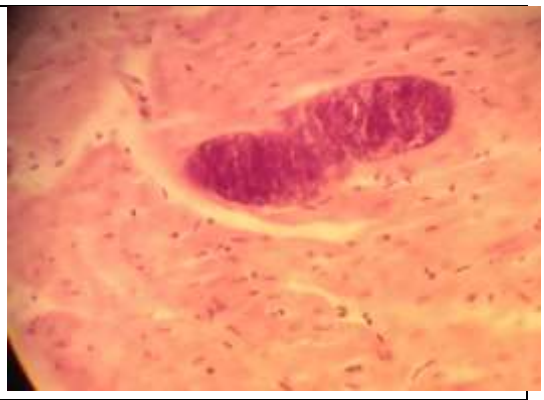

Fig.4. Myocardium with echinococcus larvae. Hematoxylin-eosin staining. An increase of 7x8

When magnification was performed 600 (eyepiece 15, lens 40), a thin, homogeneous capsule, eosin-colored pink, capable of refracting light well, was discovered. It was filled mainly with a pink mass with incredibly small dust-like grains stained blue with hematoxylin. The largest formations were found not only in the intermediate tissue, but also in the muscular environment. There was no reaction from the intermediate tissue near the smallest parasites, however, leukocytes (neutrophilic) and lymphoid cells were observed around parasites with a diameter of 100 microns or more, located either next to the parasite or distributed in the surrounding intermediate tissue. Small infiltrates, similar in type, could be seen near the capillaries of the intermediate tissue, their presence did not depend on the presence of the parasite. Parasites that did not initiate reactions from the interstitial were identified.

In places, the capillaries were dilated and filled with blood. The largest parasite did not fully fit into the field of view of the microscope at low magnification (eyepiece 7, lens 8). It retained its oval shape, but there were hollowed-out depressions at the poles, inside which the surrounding tissue reacted most actively (see Figure 4).

The granular mass of the parasite had no shell, but was surrounded by a massive capsule consisting of several layers. First there was a layer directly adjacent to the granular mass, which included fibrous structures; it was followed

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by a layer of a similar structure, but with cellular elements similar to fibroblasts. Next was a layer of granulation tissue, including eosinophils, lymphoid and epithelioid cells. They are concentrated mainly at the poles of the parasite, where the structure of the layers has been disrupted. At one of the poles, a lymphatic follicle with a light reactive center is visible, creating a granulation protrusion that penetrates the granular mass. At the boundary with this mass and perpendicular to its surface, endothelium and epithelioid cells spread, forming resorption cells arranged in the form of a palisade. Inside the pale pink mass of the parasite's contents, large light red grains and larger linear formations could be found that strongly refract light and resemble crystals. In places, the initial signs of precipitation of calcium salts in the form of blue specks were visible, and sometimes the formation of vacuoles. Thickening and coarsening of collagen fibers were observed around the largest parasites.

When staining preparations using the Van Gieson method, a fibrous capsule was detected in individual large parasites. The integrity of the capsule was violated at the poles in the places where the granulation tissue was located. There were also cases when the granular contents of the parasite came into contact with inflammatory infiltrates containing giant cells. Above these cells were elements of more mature connective tissue rich in collagen fibers. In such cases, collagen bundles are formed both inside the granular mass and outside it along the connective tissue.

From the available data on the morphogenesis of the heart, it can be concluded that during experimental infection with E.granulosis eggs of Karakul lambs, parasites develop in interstitial tissue. Similar morphological changes are observed in the hearts of goats infected with echinococcosis.

We conducted anatomical and morphological studies of the hearts of Karakul lambs subjected to experimental infection with echinococcosis. We used 85 Karakul lambs of different ages in our experiments. Of particular interest were 10 Karakul lambs of 2 months of age: 5 of them were in the control group, and 5 received 5,000 oncospheres of multiceps from donor dogs inside. One lamb died on the 22nd day after infection, one on the 134th day, another lamb was slaughtered on the same day; one lamb died on the 293rd day after infection, and the other on the 507th day. The lamb, which died on the 22nd day after infection, had a heart in a state of systole. Small white foci were found on the epicardium, the myocardium was flabby, had a gray-reddish color on the incision, and the muscle pattern was blurred.

The heart muscle was uniformly stained with hematoxylin and eosin, most of the bundles were cut across and obliquely. Focal infiltrates from lymphoid cells are present in the pericardium and interstitial tissue. Vessels with weak blood filling.

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Only in some places the capillaries contained red blood cells. There were large unchanged vessels, but the perivascular tissue in places contained inflammatory infiltrates from lymphoid cells and polyblasts. Everywhere – in muscle, interstitial tissue and Purkinje cells – there were oval formations stained blue with hematoxylin, granular in appearance, containing cuticles. The location of such parasites is diverse. They are absent in the pericardium, although there are foci of inflammatory infiltration. The muscle on the longitudinal section has longitudinal and transverse striation. Inflammatory infiltration occurs both in the heart muscle and in the interstitial tissue, regardless of the location of the parasite. In addition, streptococcal chains colored in dark blue are found in the preparations.

When stained using the Van Gieson method: the epicardium was colored pink, areas of infiltration with a concentration of cells were revealed, the nuclei of which acquired a brown hue. The interstitial connective tissue was edematous, loosened, and contained inflammatory infiltrates around the vessels due to the spread of inflammatory processes along the outer wall of the vessels. The muscle was uniformly colored yellow, had longitudinal stripes and transverse markings. Oval and round formations with brown grain on a pink background were found inside the muscle fibers and Purkinje cells, as well as in the interstitial tissue. They were surrounded by a well-defined shell. There were no such formations in the pericardium.

The lamb, which was injected with 5,000 oncospheres of multiceps and died on the 134th day after infection, had the "final" stage of echinococcosis. According to our data, the "final" stage of echinococcosis is also accompanied by a violation of the cardiovascular system. At autopsy, this lamb's heart was in a state of systole, there was a small amount of blood in the right ventricle, right atrium and left ventricle, and spotty-striped hemorrhages were observed under the endocardium of the right ventricle.

When stained with hematoxylin and eosin, the heart was a layer of fiber on the surface of the epicardium. The muscles were evenly colored, and the smallest capillaries were filled with blood. A formalin pigment was detected. Blue colored, well-defined oval and round formations were present in various areas. According to the Van Gieson method, the same thing was revealed.

Changes in the biochemistry of the heart muscle of lambs affected by larval teniidosis include changes in the concentration of nucleic acids and free amino acids. In the case of echinococcosis in lambs, a significant decrease in most free amino acids was observed, with the exception of lysine, aspartic acid, serine and glutamic acid, which are approximately at the same level in both healthy and

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echinococcal-affected animals. The appearance of tyrosine in small amounts was noted in lambs with echinococcosis, which was absent in healthy individuals.

Scientific research in the field of microbiology, biochemistry and helminthology confirms that the change in the level of free amino acids in the heart muscle of Karakul lambs suffering from cenurosis and other helminthiasis is caused by the process of autolysis and impaired function of protein synthesis in tissue. This is due to toxicosis, the presence of pathogenic microorganisms in helminths and the allergic state of the body.

Internet links on echinococcosis include 705 sources, of which 35 relate to echinococcosis of the heart. This indicates significant information and research devoted to this problem.

I.F.Aupertit and B.Ritz in 1997 described a case of an echinococcal cyst found in the interventricular septum. I.Sabah and F.Yalcin in 1998 reported a case of rupture of an echinococcal cyst in the interventricular septum of the heart, detected by echocardiography. O.K.Salih et al. in 1998, three cases of localization of echinococcal cysts under the epicardium were described: in two patients, cysts were found after operations for echinococcosis of the lungs, and in the third patient, 10 years before hospitalization in the department of thoracic and cardiovascular surgery, 4 cysts in the pericardium were removed, after which a cyst was found in the myocardium, successfully deleted.

Cases of echinococcosis heart disease have also been described by F.Kardaras et al., A.Usal, A.Birand, Achouh P. et al., Alfonso F., et al., Siwach S.B. et al., Bashour T.T. et al., Von Sinner W.N., Hasim Ustunsoy, Di Bello R. and co-author, Sirinelli A. and co-authors, Ravikumar E and co-authors, Julian E., Ufuk Yetkin and others. Among the countries with the largest number of patients who underwent surgery or died from echinococcosis of the heart, Turkey occupies a leading position. The works of I.J.Deineka (1963, 1968) are considered one of the most authoritative in this field, they cover many aspects of surgery, diagnosis and pathoanatomical picture of this disease.

In the context of these studies, the patient Sh., 44 years old, who was operated on due to an echinococcal cyst of the left ventricular myocardium in the Department of thoracic Surgery of the Scientific Center of the Russian Academy of Medical Sciences, is mentioned. The first case described in the text describes in detail the surgical intervention to remove an echinococcal cyst from the myocardium of the left ventricle of the heart. The procedure included a lateral thoracotomy, dissection of the pericardium and removal of the cyst, followed by curettage of its walls and treatment with a glycerin solution. Histological examination confirmed the presence of the parasite and characterized fibrous tissue with elements of the parasite's chitin shell.

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The second case describes the detection of echinococcal heart disease in a patient E.A., 17 years old. The patient was found to have an unusual heart shape containing calcinates, and was diagnosed with echinococcosis of the heart in the calcification stage. Surgery was not performed for medical reasons.

Both cases indicate different stages of echinococcal heart disease and the need for an individual approach to treatment, depending on the patient's condition and the stage of the disease.

This is a description of a case of echinococcosis of the heart in a patient A.V., 65 years old, who complained of pain in the heart and headaches, as well as loss of consciousness. He had binge drinking. Tomography and magnetic resonance imaging revealed tumors in the myocardium of the left ventricle of the heart measuring 1 x 1.5 cm and 1.5 x 2 cm, as well as three tumors in the brain of 1 cm in diameter each. The results of various tests (SPR, LAR, IHR) indicated the presence of a parasite with a titer of 1 :16000. The patient underwent three courses of treatment, as a result of which his general condition improved: headaches and loss of consciousness stopped, and chest pain subsided.

However, the patient refused further studies because he considered himself healthy, although an ECG showed a blockage of the left leg of the Gis bundle. As a result, the patient died of binge drinking. This case highlights the importance of undergoing full treatment and follow-up even after general improvement, especially in the presence of serious diseases such as echinococcosis of the heart.

Conclusions: It is clear from the text that echinococcosis of the heart is a rare but serious disease that can cause various complications and requires careful medical supervision. The text describes various cases of heart damage by this disease, including cases of detection of myocardial cysts and their treatment, as well as cases of deceased patients diagnosed with echinococcosis of the heart.

Treatment of patients with echinococcosis of the heart is often complicated, especially with concomitant diseases or the patient's unwillingness to undergo full treatment and supervision. Some patients refused to continue the examination, despite the detected pathologies. In the future, for a deeper understanding of echinococcosis of the heart, a systematic study of this disease is required. This includes an analysis of clinical cases, their treatment results, and the effectiveness of various diagnostic and therapeutic methods. Such studies will help determine the optimal strategies for the treatment and prevention of echinococcosis of the heart, increase the effectiveness of medical care for patients with this disease and reduce its impact on health. In addition, it is important to pay attention to educating the public about preventive measures related to preventing infection with this parasite in order to reduce the risk of disease. Educating and informing people about

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hygiene measures, lifestyle and disease control measures will help reduce the spread of this disease.

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