

MORPHOLOGICAL AND CYTOLOGICAL SUBSTANTIATION OF METHODS OF DISINFECTION OF THE CAVITY OF THE FIBROUS CAPSULE IN RECURRENT LIVER ECHINOCOCCOSIS

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Abstract: in this research work, a clinical evaluation of the disinfecting effect of antiparasitic solutions used in the practice of treating the residual cavity of the fibrous capsule during echinococcectomy was carried out. The authors used morphological and cytological studies of the fibrous capsule and the contents of the echinococcal cyst, and it was found that a 0.02% solution of decanasse provides a complete disinfection of the embryonic elements of the echinococcal cyst. Studies have shown that with careful antiparasitic treatment, cysts based on the principles of aparasiticity and antiparasiticity in echinococcectomy reduce the risk of postoperative complications and relapse of the disease.

Keywords: echinococcosis, relapse, decassane, cyst, cytology.

МОРФОЛОГИЧЕСКОЕ И ЦИТОЛОГИЧЕСКОЕ ОБОСНОВАНИЕ МЕТОДОВ ОБЕЗЗАРАЖИВАНИЯ ПОЛОСТИ ФИБРОЗНОЙ КАПСУЛЫ ПРИ РЕЦИДИВНОМ ЭХИНОКОККОЗЕ ПЕЧЕНИ

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Аннотация: в данной научно-исследовательской работе проведена клиническая оценка обеззараживающего эффекта антипаразитарных растворов, используемых в практике при обработке остаточной полости фиброзной капсулы во время эхинококкэктомии. Авторами использованы морфологические и цитологические исследования фиброзной капсулы и содержимого эхинококковой кисты и при этом было установлено, что 0,02% раствор декасана обеспечивает полноценное обеззараживание зародышевых элементов эхинококковой кисты. Исследования показали, что при тщательной антипаразитарной обработке кисты, основанной на принципах апаразитарности и антипаразитарности, при эхинококкэктомии снижается риск послеоперационных осложнений и рецидивов заболевания.

Ключевые слова: эхинококкоз, рецидив, декасан, киста, цитология.

Introduction. Echinococcosis is a serious parasitic disease, which until now remains a serious medical problem. Despite significant advances in liver surgery, the introduction of new technical means in the course of the operation, the incidence of complications and relapses decreased slightly [1, 3]. Treatment of liver echinococcosis (EP) is mainly operational and one of the most important stage of surgical treatment is disinfection of the fertile elements of the parasite [11].

To date, a number of medications and physical factors have been suggested, but some are toxic, others have a weak antiparasitic effect [8, 10]. Researchers in the study of the effectiveness of agents determined the death of

scolexes in the contents of the cyst and the cavity of the fibrous capsule after its treatment, but they also have a contradictory character [4, 9].

The search for effective and safe methods of antiparasitic treatment in echinococectomy (EE) at the present time is an actual scientific and practical problem [1, 3]. In the authors' opinion, it is now necessary to search for such scolexocidal preparations that could achieve the maximum death of the fruit-bearing elements.

As scolex agents, various bactericidal, bacteriostatic and antiparasitic agents were tested: 3% sodium chloride solution, 0.04% chlorhexidine, 2-5% iodine tincture, furacilin solution (1: 5000), rivanol (1: 1000), 1- 15% aqueous and glycerol solutions of formalin, 1% dioxidine. However, most of them were not widely used because of low antiparasitic activity or toxicity. All this causes the urgency of the present problem, which was the reason for this study.

Objective: To find ways to optimize preventive and curative measures in patients with recurrent liver echinococcosis to reduce recurrence of the disease.

Material and methods: The work is based on the results of examination and treatment of 47 patients with recurrent EP, operated on the basis of the general and GPH department of the AMMI and in the surgical clinics of the RRCEM of the Andijan branch for the period from 2012-2017. In the surgical treatment of recurrent EP, we adhered to the classification of FG. Nazyrova (2005) [5, 6, 7]. For objective evaluation of the results of surgical treatment of complicated EP, patients were conditionally divided into two groups. The first control group consisted of 22 (46.8%) patients treated in the period from 2012-2015 to the introduction of new technologies and to which a standard approach to diagnosis and treatment was applied. The second (main group) included 25 (53.2%) of those surveyed for the period from 2015-2017, patients with recurrent EP, when they began to take optimized methods of diagnosis and treatment. In our study, men were 19 (40.4%), and women 28 (59.6%) patients. The greatest number of patients was 23 (48.9%) at a young age (25-45 l), in the mature group (46-59 l) - 7 (14.9%) patients, in the youth group (18-24 l) - 14 (29.8%) and in the group elderly people (60-74 l) - 3 (6.4%) patients. With recurrences of EP, parasitic cysts with a diameter of up to 10 cm (63.3%) and, more rarely, cysts 20 cm in diameter and larger (28.1%) were more often detected. Of 47 patients with recurrent echinococcosis, 1 relapse of the disease was observed in 26 patients (53.3%), 2 relapses in 12 (25.5%) and more than 2 relapses in 9 (19.1%). All patients received a complex of clinical, laboratory, instrumental studies (chest x-ray, ultrasound, CT, MRI, etc.). Analyzing the data on the localization of echinococcal cysts with recurrent EP, we noted a more frequent lesion of the right lobe of the liver, which occurred in 27 (57.4%) patients, and in 17 (36.1%) patients the cysts were located in the subdiaphragmatic region. The most frequently diagnosed echinococcal lesion of the right lobe of the liver was 27 (57.4%), in the left lobe the parasite was found in 15 (31.9%) patients, the left and right throat of the liver - in 5 (10.7%) patients .

Of the 22 patients with recurrent EP of the control group, various variants of closed EE were used in 7, open EE in 8 patients, semi-closed in 7. 25 patients with recurrent EP of the main group, various variants of closed EE were used in 12, open EE in 6 patients, semi-closed in 7 patients .

After laparotomy and revision of the abdominal cavity organs, gauze napkins impregnated with a warm solution of decassan were placed around the cyst in the main group of patients, a puncture was performed, the contents of the cyst were aspirated, then the cavity was filled with a warm solution of 0.02% decanasin with an exposure of 5-8 min., Then, after evacuation of the germicide, capsule and the integrity of the chitin sheath was determined, followed by its removal. The cavity of the fibrous capsule was additionally treated with decanasin for 4-5 minutes. In the control group, we used as a decontamination of the fibrous capsule cavity a solution of furacilin, before and after disinfection of the cavity of the fibrous capsule during EE, we took the contents of the cyst to conduct a cytological study. Investigating the effects of decasan on fruit-bearing el

The method of cytological and morphological studies.

A special section of the research was the cytology of the contents of cysts for the presence of scolexes and the determination of the timing of death of embryonic elements under the influence of disinfectants. In addition, a morphological examination of the fibrous capsule was performed before and after disinfection.

The cavity of the fibrous capsule in the control group of patients was additionally treated with a solution of furacilin, and in the main group 0.02% with decanasin solution for 4-5 minutes. In both study groups, before and after treatment of the fibrous capsule cavity, the contents of the cyst were taken for cytological examination and the material was excised from the wall of pieces of a fibrous capsule measuring 1.0x1.0 cm for histological examination.

The preparations were fixed in a 10% formalin solution. In addition, morphological studies of the fibrous capsule were performed in these groups. The preparations were stained with hematoxylin with eosin.

For carrying out cytological studies, native preparations were prepared and stained with gemotoxylin with eosin by the method of the papanikolaou. Microscopic studies were performed on a Belgium CYAN microscope.

In view of this circumstance, one of the main tasks was to perform cytological and morphological studies to determine the effectiveness of decontamination of the fruit bearing elements of echinococcus under the influence of antiseptic solutions of furacilin and decanasin. Summarizing the above in the complex of diagnostic methods of investigation at the preoperative stage of examination using ultrasound, x-ray, CT, MRI, cytological and

morphological studies, it allows to diagnose relapsing EP, to establish localization, to find out the number, size of cysts, the state of vital activity of the parasite and to choose rational tactics of surgical treatment [5, 6, 8]. At the time of the operation, in patients with recurrent EP in the control group, the cyst was strictly pointed by the observance of strictly aparasitic and antiparasitic principles, its contents were taken before and after the treatment of the cavity with an antiseptic solution of furacilin, and cytological studies were carried out to determine the viability of scolexes and their staining to brown with a 1% aqueous solution of eosin .

Cytological studies were performed using the Pap test.

This technique is more reliable and allows you to judge the effectiveness of the method of decontamination. The results obtained are given in table 1.

Table 1. The results of the influence of the antiseptic solution of furacilin on the viability of the fruit bearing elements of echinococcus in the control group

| Method of disinfection | Number of patients | Exposure (in minutes)% of killed scolexes | | |
|----------------------------------|--------------------|---|------|------|
| | | 3 | 5 | 10 |
| Antiseptic solution of furacilin | 22 | 70,0 | 80,0 | 90,0 |

The use of an antiseptic solution of furacilin up to 5 minutes did not exert a destructive effect on scolexes and after 10 minutes of exposure 90% of the killed scolexes were detected, hooks were absent and the internal structure was thickened.

The results of the cytological examination are presented in Fig. 1-4.

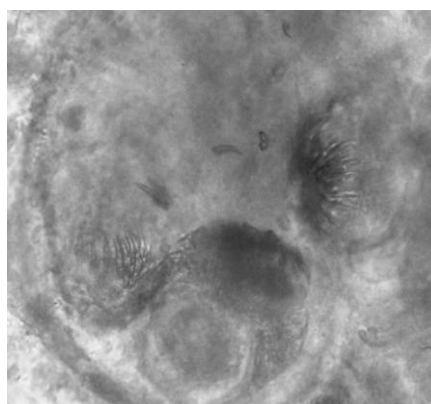


Fig.1. Live scolex before furatsilin treatment

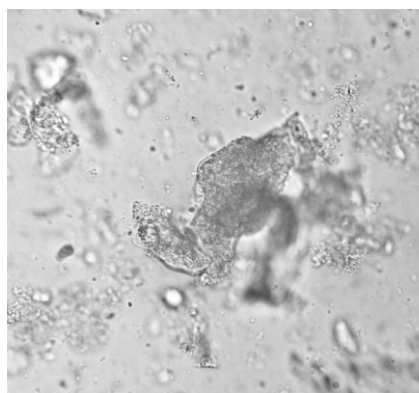


Fig. 2. 3 minutes after exposure to furacilin

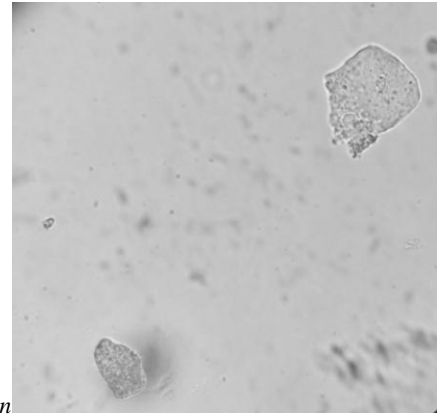


Fig. 3. The condition of scolex 5 minutes after exposure to furacilin

Fig. 4. After 10 minutes after exposure to furacilin

At the third minute of exposure, when the changes in the shape of the scolex toward the stretching and the swelling of the cell membrane have already been determined (Fig. 2). At 5-minute exposure, the germinal sheath is destroyed, with a thickening of the cell structure and partial coloring in brown color (Fig. 3).

Thus, our cytological studies indicate that the antiseptic solution of furacilin is an effective disinfectant in the treatment of the cavity of the fibrous capsule during echinococectomy, but after 10 minutes% of the killed scolexes was 90%.

Particular attention was paid to the morphological state of the fibrous capsule before disinfection and after treatment with a solution of furacilin. These studies were performed in 12 patients, for histological examination, the material was taken by excising the pieces of the fibrous capsule wall with 1.0 x 1.0 cm sections. Morphological studies of the fibrous capsule before the treatment of the cavity, showed productive inflammation and infiltration of the fibrous capsule with signs of hemodynamic disturbances (Fig. 5).

Collagen fibers that make up the connective tissue base of the fibrous capsule are loosened, sometimes forming gaps. In an excised fibrous capsule, productive inflammation is noted with the development of productive vasculitis.

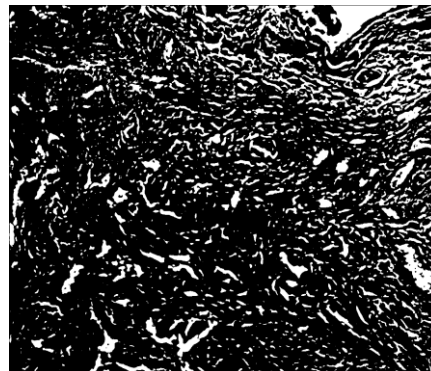


Fig. 5. Fibrous capsule before furatsilin treatment, staining with hemotoxylin-eosin, increased X64



Fig. 6. Fibrous capsule after (after 3 minutes) treatment with furacilin, stained with hemotoxylin-eosin, increased in x64 After treatment of the cavity of the fibrous capsule with an antiseptic solution of furacilin in the wall of the capsule, a hemodynamic disturbance at the level of the vessels of the microcirculatory bed has been noted as a type of congestive embolism with foci of perivascular hemorrhage. There was a moderate increase in the process of loosening the collagen base of the fibrous capsule with the formation of cracks (Fig. 6).

Thus, morphological studies of the fibrous capsule have shown that the antiseptic solution of furacilin leads to a moderate loosening of collagen fibers, the formation of "slots", and more effective disinfection of the capsule of perivascular tissue of the liver. In the main group of patients, we strictly adhered to the principles of aparasiticity during the operative intervention, which consisted in carrying out a number of measures aimed at preventing contact of the contents of the cyst with the operated organ, cavities and operating wound in order to prevent intraoperative dissemination of the embryonic elements of the cyst being removed. To ensure aparasiticity, great importance was attached to operational access, the rules of isolation of the operating field and the aparasitic ways of evacuating the contents of the cysts being removed. Along with this, in this particular group of patients, we also adhered to the strict principles of antiparasiticity, consisting in the disinfection of the germinal elements of the parasitic cyst. To this end, in the study group, we paid special attention to effective methods of antiparasitic treatment of the contents of the removed cysts with a 0.02% solution of decassane. In the main group of patients during EE, the cavity of the fibrous capsule was additionally treated with decanasin for 3-5 minutes. Before and after decontaminating the cavity of the fibrous capsule with a 0.02% solution of decanas, the contents of the cyst were taken for cytological examination. The aim of the cytological study was also aimed at determining the viability of scolexes and their staining to brown with a 1% aqueous solution of eosin. This method allowed us to judge the effectiveness of the decontamination method, which are presented in Table 2.

Table 2. Results of the effect of a disinfectant, antiseptic, antimicrobial, antifungal preparation of a 0.02% solution of decanas on the viability of the fruit bearing elements of echinococcus in the main group of patients

| Method of disinfection | Number of patients | Exposure (in minutes)% of killed scolexes | | |
|------------------------|--------------------|---|-------|-------|
| | | 3 | 5 | 10 |
| Dekasan 0.02% | 25 | 90,0 | 100,0 | 100,0 |

The use of a 0.02% decassan solution already in 3 minutes had a disastrous effect on scolexes, and 90% of the killed scolexes were detected. This was manifested in the fact that the secondary elements of the echinococcus were immobile, intensely colored brown, their internal structure hardly differentiated. Studies conducted at exposures from 5 to 10 minutes did not reveal any significant differences, all scolexes were lost. It was found that the optimal exposure time is 4-5 minutes. The results of the cytological examination are presented in Fig. 7-10. Living scolex with a whole germinative shell with integral internal cellular contents (Fig. 7).

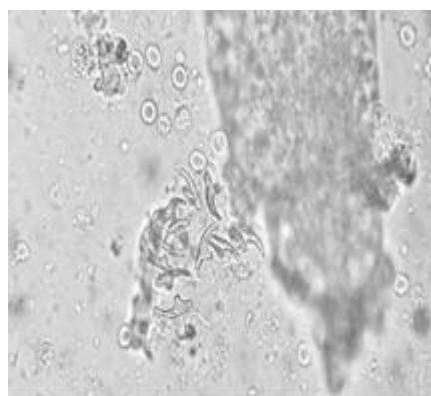


Fig. 7. Live scolex before processing with 0.02% decassan

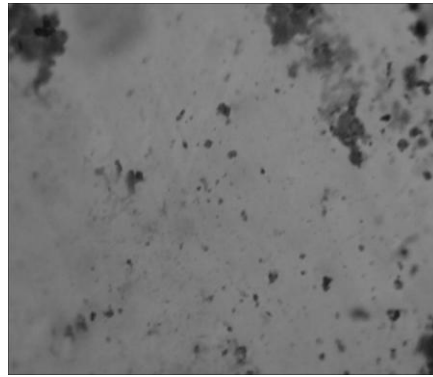


Fig. 8. After 3 minutes after exposure, 0.02% decassane

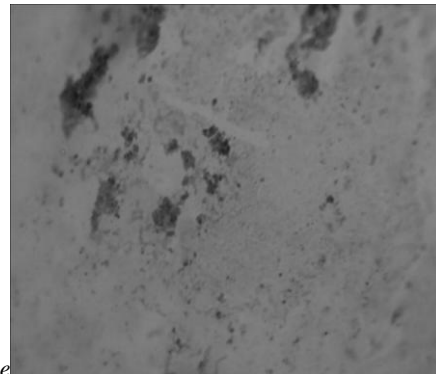


Fig. 9. After 5 minutes after exposure, 0.02% decassane

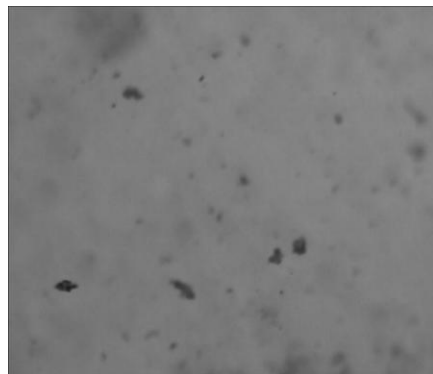


Fig. 10. Ten minutes after exposure, 0.02% decane

At the third minute of exposure, the shape of scolex was determined in the direction of stretching and swelling of the cell membrane (Fig. 8). At the 5 minute exposure, the germinal sheath was destroyed, with a thickening of the cell structure and partial coloration in brown color (Fig. 9, 10).

Summing up the results of cytological studies in the main group of patients, it can be assumed that 0.02% decanas in its scolexic effect is not inferior to the antiseptic solution of furacilin, which was the reason for us to use 0.02% decassan solution in the clinic as an effective disinfectant of the fibrous cavity capsules. And in this group of patients, we attached importance to the morphological studies of the fibrous capsule before decontamination and after treatment with a 0.02% solution of decanasine. Studies were performed in 10 patients, for histological analysis, the material was taken by excision of pieces of the wall of a fibrous capsule with dimensions 1.0x1.0 cm before and after cavity treatment. The condition of the fibrous capsule before processing is shown in Fig. Morphological studies showed that, after exposure to a 0.02% solution of decanasine, a moderate inflammatory infiltration with signs of hemodynamic disturbances, vascular hyperemia, and hemorrhages around the vessels was observed after exposure of the fibrous capsule to the solution of fibrous capsule (Fig. 12). Collagen fibers constituting the connective tissue base of the fibrous capsule, They were slightly loosened, sometimes forming cracks. Around the vessels there was productive inflammation, productive vasculitis.

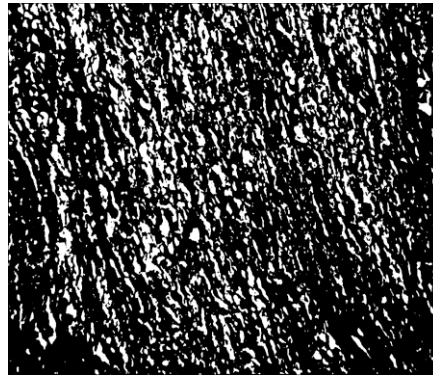


Fig. 11. Fibroznaya capsule before treatment with decassane staining with haemotoxylin-eosin, Enlarged x64

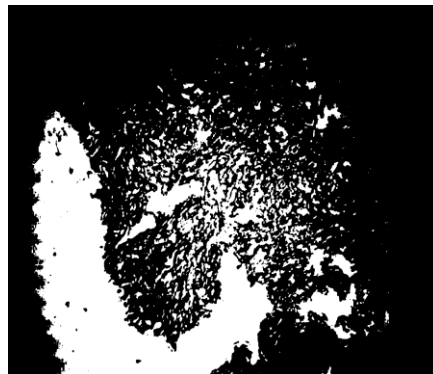


Fig. 12. Fibroznaya capsule after 3 minutes after treatment with decassane, coloration of hemotoxylin - eosin, Increased x64

After an exposure of 3-5 minutes in the wall of the capsule, there was a violation of hemodynamics with pronounced hyperemia of the vessels of the microcirculatory bed by the type of congestive embolism, with foci of perivascular hemorrhage. The growth of the process of loosening the collagenous base of the fibrous capsule with the formation of cracks is seen (Fig. 12).

Thus, morphological studies of the fibrous capsule showed that a 0.02% solution of decassane leads to loosening of collagen fibers, the formation of cracks. This facilitates the penetration of the decasan solution into the perivascular tissue of the liver, which contributes to the maximum disinfection of the capsule.

In the early postoperative period, the greatest number of specific postoperative complications was observed in 9 patients of the control group (31.7%), whereas in the main complication 2 (8%) occurred.

Long-term results were studied in 23 patients of the main and 19 control groups. Excellent results were established in 18 patients of the main and 10 patients of the control group. Good results were found in 4 patients, in 2 patients with control, in unsatisfactory in 1 primary and in 7 controls. Relapses were noted in 4 (16%) patients of the control group, in the main group, a relapse was diagnosed in (1) the patient. So, relapse has decreased from 16% to 4%.

Thus, the choice of therapeutic and diagnostic tactics for relapse EP in most cases depends on the nature of the lesion, the number and size of EC, and also in the choice of the most optimal access and methods of isolation of the operating field, antiparasitic treatment of the cyst and rational drainage of residual cavities, based on the principles of aparasitism and the antiparasitic nature of echinococectomy, increase the radicality of operations and sharply reduce the likelihood of recurrence of the disease.

Conclusions: 1. Application of a 0.02% solution of Dexasan has a 100% detrimental effect on the fruit-bearing elements of echinococcus in an exposure of 3 minutes, which was confirmed by cytological and morphological studies.

2. Based on the morphological study of the fibrous capsule, it was found that a 0.02% Dekasan solution leads to loosening of collagen fibers and the formation of cracks, which facilitates the penetration of decassan solution into the perivascular tissue of the liver, while ensuring maximum disinfection of the capsule.

3. Optimized pre and postoperative management of patients using effective methods of echinococectomy and treatment of the residual cavity by Dekasan allowed to reduce postoperative complications by 23.7%, and relapse of echinococcosis by 12%.

References / Список литературы

1. *Abdakov A.D.* Clinical evaluation of the principles of aparasiticity and antiparasiticity in the surgery of liver echinococcosis: Avt. diss. ... cand. honey. sciences. Stavropol, 2012. 21 p.

2. *Akilov Kh.A., Baybekov I.M., Khayitov A.K.* Efficiency of treatment of the residual cavity with potassium permanganate after a liver echinococectomy in a comparative aspect // *Surgery of Uzbekistan*, 2008. №1. P. 6-8.
3. *Aliev M.A., Baimakhanov B.B., Fedotovskikh G.V.* Morphological identification of embryonic elements of echinococcus in the fibrous capsule of the liver and evaluation of the efficiency of treatment of the residual liver cavity in a combined way. // *Surgery of Uzbekistan* 2006. № 3. SP.
4. *Aliev M.Zh.* Efficiency of methods of disinfection of a cavity of a fibrous capsule at an echinococcosis of a liver // Author's abstract. diss. ... cand. honey. sciences. Bishkek, 2015. P. 24.
5. *Artikov Zh.B.* Choice and optimization of surgical tactics for echinococcosis of the spleen with the use of modern diagnostic technologies: Abstract. diss. ... cand. honey. sciences. Tashkent, 2011. 24 p.
6. *Askerkhanov G.R., Khalilov A.Kh., Magamedov S.Z. et al.* Surgical treatment of lung echinococcosis. Topical issues of modern surgery. Astrakhan, 2016; 12.
7. *Waffle A.3. Aydemirov A.N., Popov A.V., Malanka M.I., Abdokov A.D., Khushvaktov U.S. Sh.* Features of repeated operations on the liver with relapse of echinococcosis // Materials of the XVIII International Congress of Surgeons-Hepatologists of CIS countries "Actual problems of surgical hepatology" (Almanac of the AV Vishnevsky Institute of Surgery). M., 2011. Volume 6. № 2.
8. *Shevchenko Yu.L., Nazirov F.G.* Surgery of echinococcosis // Monograph. M., 2016. C. 287.
9. *Shevchenko Yu.L.* Echinococcosis of the heart. Surgical treatment of infective endocarditis and the basis of purulent-septic cardiac surgery. M.: Dynasty, 2015 392-409.
10. *Aslan M., Yiiksel P., Polat E., Cakan H., Ergin S., Oner Y.A., Zengin K., Ankan S., Saribas S., Torun M.M., Kocazeybek B.* The Western blot method in patients with cystic echinococcosis // *New Microbiol.*, 2011. Vol. 34. № 2. P. 173-177.
11. *Nazirov F.G., Devyatov A.V., Makhmudov U.M.* Critical situations in repeated operations in patients with recurrent echinococcosis of the abdominal cavity. Materials of the XVIII International Congress of Surgeons - Hepatologists of CIS countries "Actual problems of surgical hepatology" (Almanac of the AV Vishnevsky Institute of Surgery), 2011. Volume 6. № 2. P. 108.
12. *Nazirov F.G., Ilkhamov F.A.* Classification of liver echinococcosis and methods of its surgical treatment // *Annals of surgical hepatology*, 2005. T. Yu. № 1. C. 8.