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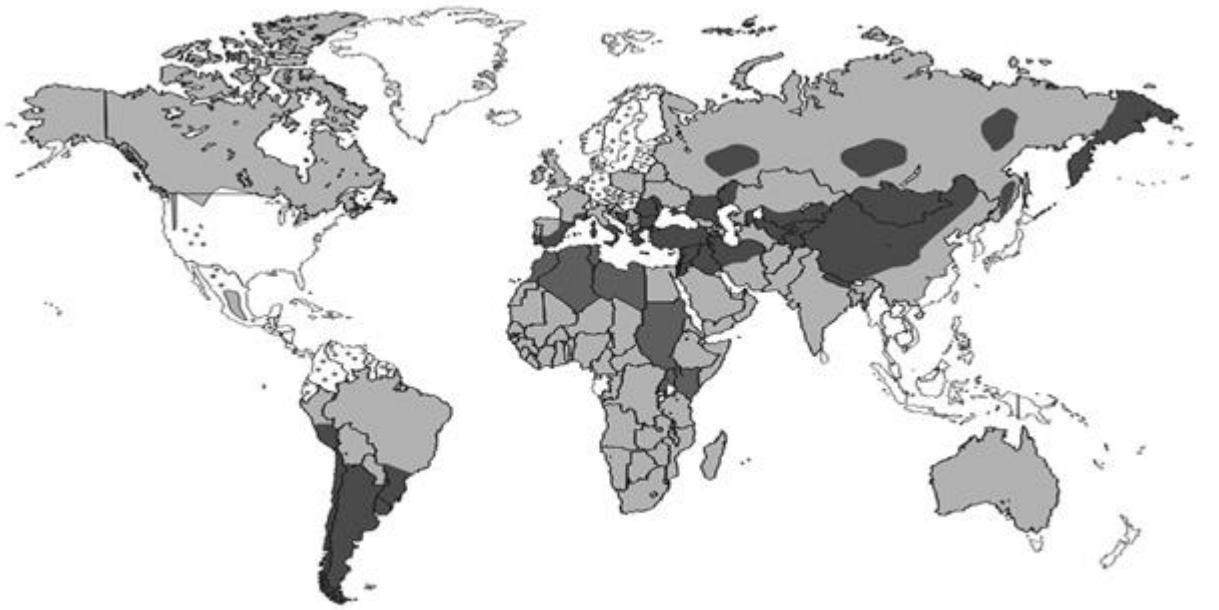

SURGICAL TREATMENT OF LIVER ECHINOCOCCOSIS

MONOGRAPH

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This monograph is intended for practicing physicians, young professionals, including masters and clinical residents in general surgery, paediatric surgery and emergency medicine.

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LIST OF ABBREVIATIONS

CT	Computed tomography
AKI	Acute liver failure
AKI	Residual liver cavity
OSHF	Acute cardiovascular insufficiency
Ultrasound	Ultrasound
EVR	Electrolysis aqueous solution
EC	Echinococcal cyst
EP	Echinococcus liver

INTRODUCTION

According to the World Health Organization, "Echinococcosis is distributed throughout the world and is found on all continents except Antarctica. In endemic areas, the human incidence of echinococcosis can exceed 50 per 100,000 people per year, and in parts of Central Asia and China, the prevalence can reach 5-10%."The WHO Foodborne Disease Burden Epidemiology Reference Group (FERG), established in 2015, estimates that "globally, echinococcosis is responsible for 19,300 deaths per year."[1]. Treatment of echinococcosis is often expensive and complex, and may require extensive surgery and/or long-term drug therapy. "Despite advances in diagnostic technology and surgical technique, approximately 7.3% of patients undergo re-operation for post-operative complications, with an average post-operative mortality rate of 2.2% and a recurrence rate of up to 20% of cases."[2]. “A special category of patients are those with complex and complicated course of hepatic echinococcosis, in whom surgery is performed on urgent indications, especially with compression of adjacent organs, main vascular structures, development of cysto-biliary connections, jaundice and cholangitis, which increases the rate of postoperative complications from 16% to 55% and mortality to 7%". All this leads to a further search for more significant measures of surgical treatment of hepatic echinococcosis, prevention of the development of specific complications and relapses, especially in cases of "complex" and complicated forms of the disease.

At present, the most relevant research in the world practice is still the study of pathogenetic aspects of the development of complicated and recurrent forms of echinococcosis of various organs, the determination of criteria for assessing the true severity of the course of the pathological process using mathematical approaches that allow minimising subjective assessment and the risk of surgical intervention. The physical and biomechanical characteristics, histological and

[1] Lake RJ, Devleesschauwer B, Nasinyama G, Havelaar AH, et al. National Studies as a Component of the World Health Organization Initiative to Estimate the Global and Regional Burden of Foodborne Disease. PLoS One. 2015 Dec 3;10(12):e0140319. doi: 10.1371/journal.pone.0140319. PMID: 26633010; PMCID: PMC4668835.
[2] Abuoğlu HH, Günay E, Akyuz C, et al. Surgical approach to giant hepatic hydatid cysts: a single-center experience from Istanbul. Int J Clin Exp Med 2019;12:915–22.

macroscopic results of the use of different chemical agents for the treatment of the residual cavity after echinococcectomy of the liver will continue to be studied under experimental conditions. Also of interest is the scientific search for the development of new minimally invasive surgical technologies for the removal of hydatid cysts of the liver, especially with regard to the prevention of recurrent forms of the disease associated with both dissemination and tactical aspects of the complex treatment of echinococcosis.

Currently, large-scale work on social protection of the population and improvement of the health care system is underway. In this direction, in particular, in improving the results of surgical treatment of patients with liver echinococcosis, positive results have been achieved. At the same time, to improve the care provided, evidence-based results are required to improve the tactical and technical aspects of treatment and prevent the development of postoperative complications.

The implementation of these tasks, including the improvement of the results of surgical treatment of liver echinococcosis by improving tactical and technical approaches and developing a differentiated approach to surgical treatment, is one of the topical areas.

In modern surgical practice in the Central Asian region, in particular, in Uzbekistan, operations for echinococcosis of the liver and abdominal cavity are one of the most frequent interventions. However, over the past 20 years, the spread of prevention programs in endemic areas, along with the use of chemotherapy, has led to effective disease control[3]. However, surgery still plays an important role in cases where non-operative treatment has failed or is not considered feasible, as well as in complex and/or complicated echinococcal cysts. According to Greco S. et al. (2019) "chemotherapy followed by ultrasonography can only be considered in selected patients with small, asymptomatic cysts containing solid calcifications, the latter being signs of cyst death and inactivation"[4]. In addition, advances in minimally invasive treatments such as PAIR (puncture-aspiration-injection-

[3] Bhutani N, Kajal P. Hepatic echinococcosis: a review. Ann Med Surg (Lond) 2018;36:99–105.
[4] Greco S, Cannella R, Giambelluca D, et al. Complications of hepatic echinococcosis: multimodality imaging approach. Insights Imaging 2019;10:113

reaspiration) have further reduced the need for surgery[5]. In the surgical treatment of liver echinococcosis in various clinical situations, more complex treatment than usual may be required, but there is no single generally accepted definition of "complex" echinococcosis. Fancellu A. et al. (2020) suggested that "cysts larger than 15 cm or compressing major vascular structures or located in both lobes of the liver should be considered as a category of complex echinococcal cysts"[6].

Benkabbou A. et al. (2016) state that "depending on the size and location of the cysts, patients may be asymptomatic or present with jaundice, cholangitis, liver abscess, and sepsis." According to the authors, in 19% of patients with liver echinococcosis, cysto-biliary communication is detected in recurrent cholangitis, in 9.5% of cases cysts are found that destroy the diaphragm or chest wall, or communicate with the bronchial tree, 31% are cysts in contact with the main vascular structures, 11.9% - multiple cysts of the liver, 14.3% - giant cysts with displacement of the organ and 14.3% have a combination of the above types.

According to Ramia J.M. et al. cysto-biliary communications are considered an important prognostic factor for postoperative complications, rupture of a cyst in the biliary tract increases postoperative morbidity from 16% to 55% and mortality from 1.25% to 7%[7]. In cases of multiple cysts, there is a high risk of intrabiliary rupture, and as shown in the study by Akcan O. et al. (2017), in such situations, radical or partial pericystectomy should be considered; due to the risk of functional insufficiency of the liver remnant, anatomical or non-anatomical liver resections, according to the authors, are not required[8]. In a recent meta-analysis by Pang Q. et al. (2018) demonstrated that radical procedures reduce the incidence of postoperative complications and recurrence of liver echinococcosis compared with

[5] Kahriman G, Ozcan N, Dogan S, et al. Percutaneous treatment of liver hydatid cysts in 190 patients: a retrospective study. Acta Radiol 2017;58:676–84

[6] Fancellu A, Perra T, Vergari D, Vargiu I, Feo CF, Cossu ML, Deiana G, Porcu A. Management of complex liver cystic hydatidosis: challenging benign diseases for the hepatic surgeon: A case series report from an endemic area. Medicine (Baltimore). 2020 Nov 25;99(48):e23435.

[7] Ramia JM, Figueras J, De la Plaza R, et al. Cysto-biliary communication in liver hydatidosis. Langenbeck's Arch Surg 2012;397:881-7.

[8] Akhan O, Salik AE, Ciftci T, et al. Comparison of long-term results of percutaneous treatment techniques for hepatic cystic echinococcosis types 2 and 3b. AJR Am J Roentgenol 2017;208:878-84.

conservative surgery[9]. Although there have been no prospective studies comparing conservative and radical approaches, it should be noted that the recurrence rate after surgical treatment ranges from 1% to 20%. Among the minimally invasive operations, according to the literature, laparoscopy is considered in cases of small and uncomplicated cysts located close to the surface of the liver. Most of the studies described in the literature have some limitations, the main ones being retrospective design and small sample size. The search for an ideal surgical technique for the treatment of echinococcal cysts of the liver remains a subject of discussion.

The analysis of the literature indicates that the main reasons for poor results in the surgical treatment of liver echinococcosis are various tactical and technical factors that affect the incidence of relapses and specific postoperative complications. Against this background, an open question remains the development of a differentiated approach to the treatment of complex forms of the disease, the improvement of preventive measures for relapse and the development of postoperative complications, including the optimization of the method of intraoperative treatment of residual cavities and the technical aspects of performing surgical interventions in complicated forms of liver echinococcosis. All of the above dictates the need to continue research in this direction.

[9] Pang Q, Jin H, Man Z, et al. Radical versus conservative surgical treatment of liver hydatid cysts: a meta-analysis. Front Med 2018;12:350-9.

CHAPTER I. CURRENT STATUS OF LIVER ECHINOCOCCOSIS TREATMENT: PROBLEMS AND PROSPECTS

1.1. Modern approaches in the treatment of liver echinococcosis

Echinococcosis is a chronic widespread disease, the frequency of which in endemic regions does not tend to decrease. This is one of the most dangerous and widespread helminthiasis, which is characterized by the development of cystic formation in the liver, lungs and other parenchymal organs, which occurs when larvae (oncospheres) are introduced into the target organs [103; pp. 78-83, 117; pp. 555-558, 131; pp. 15-20, 145; pp. 128–137, 148; pp. 1985–1999, 151; pp. 1516, 177; p. 784]. Infection occurs orally.

In the life cycle of the parasite, the final host pollutes the environment with eggs and segments, which, getting into the body of the intermediate host, contribute to the development of echinococcosis, while the person is a biological dead end [109; pp. 155-166, 116; pp. 247–259, 122; pp. 761–773, 143; pp. 89-116, 146; pp. 435–444, 165; pp. 83–87]. One of the most frequent organs that affects echinococcus is the liver and lungs [25; pp. 111-117, 51; pp. 111-112, 71; pp. 38-41, 130; pp. 337-343, 165; pp. 83–87]. However, the parasite can affect any human organ and system [13; pp. 27-31, 26; pp. 196-201, 87; pp. 64-67, 117; pp. 555-558, 126; pp. 1797, 133; pp. 631, 160; pp. 64-65].

Echinococcosis is a common disease in countries with developed pastoralism and a temperate warm climate. The geography of the prevalence of echinococcus in the world can be grouped into 5 foci: South America, Australia and New Zealand, North Africa, some European countries and a number of CIS countries [112; pp. 322-327, 152; p. 2249]. The Republic of Uzbekistan is an endemic focus of echinococcosis. The incidence rate is from 6 to 9 people per 1000 population □51□.

In recent years, there has been an increase in the absolute number of patients with echinococcosis, which is primarily due to the widespread introduction of highly informative research methods into clinical practice, in particular ultrasound

[2; pp. 20-22, 12; pp. 49-53, 38; pp. 14-19, 46; pp. 75-77, 68; pp. 67-73, 83; 32 p., 130; pp. 337-343, 166; p. 1880], CT [3; pp. 58-63, 37; p. 35-37, 47; 33 p., 130; S. 337-343, 166; p. 1880], MRI [16; p. 55-58, 73; p. 50-51, 166; p. 1880].

Before the introduction of ultrasound into practice, the correct preoperative diagnosis was made only in 30% of patients [28; pp. 106, 130; pp. 337-343, 166; p. 1880]. The widespread introduction into clinical practice of modern research methods that reproduce the image of the liver contributed to an increase in the frequency of recognition of cystic changes [12; p. 49-53, 47; 33 p., 73; p. 50-51, 171; p. 191-202]. Modern diagnosis of liver cysts is based on a comprehensive study, including analysis with an assessment of the characteristics of the clinical course, generally accepted methods of functional liver tests, serological and immunological tests and special research methods (X-ray, ultrasound, MRI, CT, radioisotope and angiographic, etc.) [3; pp. 58-63, 25; pp. 111-117, 38; pp. 14-19, 46; pp. 75-77, 73; pp. 50-51, 130; pp. 337-343, 156; pp. 189-199, 166; p. 1880].

The main method of treatment of EP is a surgical operation, which allows you to radically recover from the disease [20; pp. 149-153, 54; pp. 34-36, 83; 32 p., 127; p. 54-60]. At the same time, in practical medicine, the "Watch and Wait" approach can be followed with inactive small echinococcal cysts, since 18-20% of them can remain stable for a long time without any treatment [157; pp. 3057, 159; p. 492].

However, with small, hard-to-reach, intraparenchymal ECs, with a high operational risk, it is possible to use a conservative method of treatment for which albendazole or its analogues are widely used. In addition, albendozole in the form of antiparasitic chemotherapy is also an adjunct to surgical treatment, especially with intraoperative contamination of the abdominal cavity [72; p. 19-24, 110; p. 112-116, 128; p. 205-212, 144; p. 750-753, 154; p. 797-803, 155; p. 727-734, 164; p. 1073-1083]. Based on the study of the functional state of the liver and immune system, conservative therapy is often supplemented with hepatoprotectors and immunostimulants [113; p. 63-68, 114; p. 211-216, 124; p. 300-304, 138; p. 467-474, 141; p. 166-171, 150; p. 1176-1189, 163; p. 16-23, 178; p. 6679-6685].

One of the most controversial issues in echinococcosis surgery is the choice of classification of the disease and surgical interventions.

In the monograph "Surgery of echinococcosis", Shevchenko Y.L. and Nazyrov F.G., having studied all the available classifications, proposed to classify EC as follows: by origin (primary; recurrent); by the nature of damage to the liver and other organs (isolated, multiple, combined); by the size of the EC (small cysts (up to 5 cm); medium (from 5 to 10 cm); large (more than 10 cm)); by the number of cysts (solitary, multiple); according to the viability of the cyst: (live parasite; cyst with signs of "aging"; dead cyst (cyst fibrosis, pseudotumor, calcification)); complications of echinococcosis (breakthrough of a cyst into the abdominal cavity; breakthrough of echinococcus into the pleural cavity, lung; breakthrough of a cyst into the bile ducts; suppuration of an echinococcal cyst) [106; 288 p.].

In 2003, based on the classification of Gharbi H.A., WHO proposed an ultrasonic classification of EP, according to which there are 6 types:

- CL - (cystic lesion) cystic formation (single-chamber cystic formation, usually spherical or ovoid in shape, with unclear homogeneous anechoic contents, limited to a hyperechoic rim; the cyst wall is not visualized).

- CE1 (cystic echinococcosis) - active, live parasite (single-chamber cystic formation of a spherical or ovoid shape with homogeneous anechoic contents; single hyperechoic inclusions can be determined; the cyst wall is clearly visualized.

- CE2– active, living parasite (multivesicular, multiseptal cysts, spherical or ovoid, in which daughter cysts can partially or completely fill the maternal cyst; visualization of partitions in the cyst is possible; the cyst wall is clearly defined; usually the cyst grows, can form new daughter cysts).

- CE3 (transitional) - parasite in the transitional, intermediate phase. Along with the dead maternal and daughter cysts, viable protoscolexes may be in the fluid (a single-chamber cyst may contain daughter cysts; anechoic contents simultaneously with the exfoliated inner membrane of the cyst; echogenic areas indicate a destroyed membrane of daughter cysts.

- CE4 (inactive) - inactive, the parasite is dead, it usually does not contain viable protoscolexes (heterogeneous hypoechoic or dyshomogeneous degenerative contents; daughter cysts are absent; it may look like a "ball of wool", which indicates the destruction of the shells).

- CE5 - The parasite is dead, it usually does not contain viable scolexes, the cyst in most cases does not develop, it usually does not contain viable protoscolexes (thick, calcified capsule, the degree of calcification of the capsule varies from partial to complete).

Currently, the most radical way to treat EP is surgical. Existing surgical interventions by Milonov O.B. (1976) are classified into closed and open echinococcectomy [69; p. 75]. Closed echinococcectomy meant surgical interventions without opening its membranes by performing an ideal echinococcectomy (removal of a cyst along with a fibrous capsule) or resection of an organ without opening a cyst. Open echinococcectomy meant the removal of a parasitic cyst after dissection of their membranes.

In the classification of Askerkhanov R.P. depending on the volume of surgical intervention (1976), there are three main methods of surgical treatment: echinococcectomy (removal of EC without a fibrous membrane); pericystectomy (removal of EC with a fibrous capsule); organ resection (removal of EC with liver tissues within the affected tissue).

Each of the above methods is divided into: ideal (complete removal of EC with the entire fibrous capsule); closed (complete suturing of the residual cavity of the fibrous capsule); semi-closed (partial suturing of the residual cavity of the fibrous capsule); open echinococcectomy (fibrous capsule is not sutured); omentoplasty (tamponing of the residual cavity with a part of the large omentum) [11; 372 p.].

Vafin A.Z. (2000) improved the proposed classification of surgical interventions, according to which all operations for EP are divided according to the methods of echinococcectomy (closed, open, combined) and methods of elimination of the residual cavity (complete elimination, incomplete elimination,

external drainage of the residual cavity, internal drainage of the residual cavity by the ruth of cystodigestive anastomoses) [22; pp. 19-20].

An analysis of modern literature shows that no focal liver disease has been proposed as many different types of operations as in EP. However, the choice of indications, the nature and scope of the operation, the method of treating the cyst and eliminating the AKI remain the subject of discussion [45; pp. 53, 77; pp. 11-16, 108; pp. 46-49, 115; pp. 537-555].

Despite the presence of many operational methods, the results and their technical complexity are not equivalent [98; p. 97-99, 118; p. 801-805, 125; p. 48-51, 148; p. 1985-1999, 177; p. 784]. The choice of the most optimal surgical intervention in each case, of course, should be determined by the presence of experience based on large clinical material. Undoubtedly, new technologies related to scientific and technological progress play an important role in this. One of the important points of surgical intervention is the complete removal of parasitic cysts, treatment of the residual cavity and intraoperative prevention of recurrence of the disease [92; pp. 34-39, 122; pp. 761-773, 134; p. 331].

To achieve aparasiticism during surgery, much attention is paid to intraoperative treatment of the residual cavity [49; pp. 29-31, 67; pp. 63-67, 149; pp. 99-105, 161; pp. 323-326]. The widely used method of treating the fibrous capsule with a formalin solution, which completely suppresses the vital activity of the germinative elements of echinococcus, has begun to lose ground in recent years due to high toxicity, the risk of developing various complications and the appearance of other drugs [45; pp. 53, 129; pp. 1059-1061].

Many researchers, taking into account the above shortcomings of formalin, have proposed various methods of treatment (treatment with 70% ethyl alcohol solution, 2-5% iodine solution, calcium chloride, hypertonic solution) [11; 372 p., 137; p. 1046-1411, 155; p. 727-734, 174; p. 1670-1679]. Combined methods for treating AKI with a mixture of glycerol and a 1-2% solution of albendazole in dimexide are proposed [9]. Additional use of ultrasonic cavitator, plasma argon

coagulator, cryodestruction can increase the efficiency of antiparasitic treatment [23; p. 56-59, 27; 203 p., 57; p. 23-27, 89; p. 20-24, 136; p. 752-757].

In recent years, 100% medical glycerin has been widely used for the treatment of AKI, which has high antiparasitic activity [9; pp. 96-101, 60; pp. 18-22]. However, the analysis of the long-term results of the use of glycerol shows that the proportion of recurrence of EP has not changed much [24; p. 217].

The volume of surgical intervention depends on the characteristics of the location of the EC.

With the marginal location of the EC, it is possible to perform marginal resection. This type of surgical intervention has a low frequency of postoperative complications and mortality and is characterized by radicality [55; pp. 56-60, 81; pp. 31-35, 127; pp. 54-60, 168; pp. 1772-1774].

With large ECs, it is necessary to perform a hemihepatectomy to remove the cyst within healthy tissues. However, this intervention was not widespread due to its complexity and trauma, as well as relatively high mortality [28; pp. 106, 64; pp. 29-33]. With hanging cysts on a narrow base along the edge of the liver, echinococcectomy can be performed without opening the fibrous capsule.

This technique is called the "ideal" echinococcectomy. However, when performing an ideal echinococcectomy, damage and rupture of the EC are possible with the risk of contamination of the abdominal cavity [7; pp. 65-67, 11; 372 p., 64; pp. 29-33].

With the marginal location of echinococcus and total calcification of its fibrous capsule, the operation should be completed by pericystectomy [17; pp. 49-54, 48; 42 p.]. Pericystectomy is a complex and traumatic operation, as a rule, it is accompanied by bleeding and biliary activity. Despite the invasiveness, with the correct determination of the indications for this method, the results of this operation are favorable [76; pp. 29-35].

The main stage of surgical intervention for EP is the elimination of AKI. Depending on the method of treatment of AKI, open, semi-closed and closed

methods of echinococcectomy are distinguished [11; 372 p., 34; p. 26-29, 81; p. 31-35, 127; p. 54-60, 149; p. 99-105, 168; p. 1772-1774].

With small cysts and the absence of biliary fistulas, it is possible to leave the cavity of the fibrous capsule open into the abdominal cavity (open Vishnevsky method). This method can be used when performing laparoscopic echinococcectomy [22; pp. 19-20, 31; 7-11]. Open methods include marsupilization - suturing the edges of the fibrous capsule to the edges of the wound of the abdominal wall. However, this technique has not been widely used in recent years [11; 372 p.].

Often, semi-closed methods of processing OPP are performed. The most commonly used method of Gilevich, which consists in the imposition of screwing seams. The semi-closed method includes Askerkhanov's technique, which is carried out by tamponing the OPP with a part of a large omentum on the leg with an additional drainage tube [55; pp. 56-60, 106; 288 p.].

Semi-closed treatment methods are indicated in the presence of complicated forms of EP - suppuration of AKI, the presence of biliary fistulas, large deep-seated cysts, especially in the area of the liver gate. In addition, these methods are used for large sizes of AKI, close proximity of the main vessels and bile ducts, when there is a high risk of their deformations during suturing of the cavity [66; p. 14-17, 123; p. 376-378, 162; p. 699-704].

When performing closed methods, the OPP is completely eliminated by suturing or tamponing (capitonage according to Bobrov, Delbe, tamponing with an omentum) [42; pp. 13-15, 95; pp. 94-96, 106; 288 p.]. There are also methods for filling the residual cavity with a variety of fillings, emulsions, antiseptics, muscles, and a round ligament. However, these methods are not widely used [11; 372 p., 79; p. 66-69, 84; p. 55-56].

In cases where the fibrous cavity is technically difficult to eliminate by other means, the method of tamponade of the residual cavity with an omentum on the feeding leg can be used. The pronounced reparative properties of the omentum

contribute to the rapid obliteration of the residual cavity [60; pp. 18-22, 107; pp. 49-55].

Certain difficulties in the elimination of AKI arise in cases where the cyst reaches a very large size. At the same time, excision of the fibrous capsule presents certain difficulties due to the numerous adhesions formed between the cyst and the surrounding organs. In these cases, in addition to screwing sutures, it is advisable to fill the residual cavity with an omentum on the feeding leg if there is a condition for tamponade with an omentum (a sufficiently large volume of the omentum to completely fill the OPP, its mobility) [106; 288 p.].

With a large volume of AKI and insufficient volume of the omentum, the cavity can be drained [5; pp. 116-121, 33; pp. 27-32, 75; pp. 53-54].

With the introduction of ultrasound and CT into clinical practice, the possibility of percutaneous drainage of EC became possible [29; p. 39-46, 49; p. 29-31, 57; p. 23-27, 125; p. 48-51, 135; p. 881-887, 142; p. 688-689, 147; p. 1600-1606]. However, due to the danger of contamination of the abdominal cavity with live echinococcus and the difficulty of removing the chitinous membrane through a drainage tube, the method must have strict indications for its implementation [50; pp. 87-88]. This method can be successfully used in patients with a high risk of surgery.

The choice of surgical tactics for complicated forms varies depending on the nature of the complications. Their main feature is that in most of these patients the clinical picture of the disease is characterized by the phenomena of intoxication, sepsis, cholangitis, liver failure. All this greatly complicates the planning of effective surgical tactics [1; pp. 38-42, 101; pp. 71-72, 164; pp. 1073-1083].

Suppuration of EC is most often noted. Unfortunately, in 35-78% of cases, this complication is diagnosed intraoperatively [10; p. 62-70, 30; p. 16-19, 49; p. 29-31, 123; p. 376-378]. In this category of patients, the operation of choice is semi-closed echinococcectomy [18; pp. 29-30, 49; pp. 29-31]. With preoperative diagnosis of complications and high operational risk, it is advisable to perform percutaneous transhepatic drainage of suppurating cavities [49; pp. 29-31].

One of the frequent complications of EP is the development of biliary hypertension and cholangitis as a result of the breakthrough of EC into the bile ducts, the postoperative mortality rate of which reaches up to 10-15% [55; p. 56-60, 137; p. 1406-1411]. Surgical treatment is quite difficult, since patients are often operated on in the presence of severe complications: septic cholangitis, obstructive jaundice, severe intoxication, liver failure [36; pp. 55-58].

A number of authors believe that echinococcectomy should be combined with choledochotomy, sanitation and cholangiostomy [35; pp. 24-29]. Currently, surgical tactics depend on the severity of obstructive jaundice and the degree of liver failure. In case of unexpressed jaundice and mild hepatic insufficiency, retrograde cholangiography is first performed to clarify the diagnosis, followed by papillosphincterotomy, which allows to resolve jaundice and evacuate daughter cysts from the biliary tract [121; p. 15253-15261]. With severe obstructive jaundice, in order to decompress the biliary system, it is possible to perform percutaneous transhepatic cholangiostomy [36; pp. 55-58, 69; 107.].

One of the most formidable complications is the breakthrough of the cyst into the subphrenic space and pleural cavity during the localization of EC on the diaphragmatic surface of the liver [73; pp. 50-51]. With an isolated breakthrough into the subphrenic space with the development of a subphrenic abscess, it is preferable to perform echinococcectomy from extrapleural access [11; 372 p., 26; p. 196-201, 136; p. 752-757] or percutaneous transhepatic drainage of the purulent cavity [29; p. 39-46, 49; p. 29-31, 57; p. 23-27]. With a breakthrough into the pleural cavity and the development of pleural empyema, a two-stage surgical treatment is used. At the first stage, drainage of the right pleural cavity is performed, and after sanitation of the pleural cavity, at the second stage, pleurectomy, transpleural diaphragtomy, thorough sanitation and antiparasitic treatment of AKI are performed by thoracotomy [136; p. 752-757].

One of the rare complications of EP is the breakthrough of EC into the pleural cavity with the development of a biliary-bronchial fistula, the frequency of which reaches up to 0.3% [11; 372 p.]. The complexity of surgical intervention for

this complication contributes to the high frequency of postoperative complications, which exceeds 20% and mortality, which reaches 10% [167; p. 1772-1774].

In the presence of a biliary-bronchial fistula, surgical intervention is performed in one stage. Depending on the extent of the lesion of the lower lobe of the right lung, partial atypical lung resection or lower lobectomy is performed, followed by echinococcectomy from the liver [106; 288 p.]. Given the severity of the patient's condition, as well as with a high surgical risk, a number of authors consider it permissible to perform surgical intervention only on the liver from abdominal access. At the same time, echinococcectomy is performed with suturing of the biliary fistula and the hole in the diaphragm [162; pp. 699-704].

One of the formidable and severe complications of EP is the breakthrough of EC into the free abdominal cavity, which is characterized by the clinical picture of peritonitis with the development of anaphylactic shock and requires emergency surgical intervention [179; p. 846-848]. With the gigantic size of the EC or their localization near the portal veins as a result of their compression, the disease can be complicated by the development of portal hypertension. Performing surgical intervention aimed at eliminating the cyst contributes to the relief of this complication and does not require any intervention on the portal system [74; pp. 51-52].

Thus, the most optimal and reliable way to treat complicated forms of EP is open surgery, while the treatment of uncomplicated forms of the disease remains a matter of discussion [43; pp. 75-78, 175; pp. 490-494]. In recent years, percutaneous interventional puncture interventions have been proposed [49; pp. 29-31, 57; pp. 23-27, 125; pp. 48-51, 135; pp. 881-887, 147; pp. 1600-1606]. The disadvantage of these manipulations is the impossibility of removing the chitinous membrane, when performing the intervention, it is possible to disseminate echinococcal fluid into the abdominal cavity with the development of anaphylactic shock [142; pp. 688-689, 179; pp. 846-848].

Analysis of the clinical results of surgical treatment of EP indicates the need to perform surgical interventions at an earlier stage of the disease, before the

development of complicated forms, which is a guarantee of reducing postoperative complications and mortality.

An important component of the complex treatment of EP is the pharmacological effect on cysts to prevent their further development, since the improvement of tactics and techniques does not exclude the recurrence of the disease [6; pp. 7-10, 25; pp. 111-117, 131; pp. 15-20]. However, the issues of conservative treatment of EP are not fully resolved, and its clinical efficacy does not guarantee a complete cure of cysts with drug treatment. This justifies the search for new methods of effective intraoperative treatment of EC and prevention of recurrence of the disease. To date, antiparasitic chemotherapy with albendazole and its analogues is only an addition to surgical treatment, especially in cases of intraoperative contamination of the abdominal cavity with the contents of the cyst [24; pp. 217, 44; pp. 32-33, 103; pp. 78-83, 110; pp. 112-116, 128; pp. 205-212, 144; pp. 750-753].

In recent years, the active development of modern medical technology, the development of new pharmacological agents, the successes of anesthesiology have contributed to a radical revision of traditional approaches in the treatment of many surgical diseases [153; pp. 39-46, 169; p. 75]. This made it possible to expand the indications for simultaneous operations and reduce contraindications to various surgical interventions [132; pp. 1110-1116].

At the end of the 20th century, endosurgery began to develop. This did not bypass the problem of echinococcosis. It is gratifying to note that the world's first laparoscopic echinococcectomy was performed in Uzbekistan [53; p. 27-30]. The possibilities of laparoscopic surgery, the emergence of new and modern technologies of dosed ligating effects made it possible to take a fresh look at the problem of combined lesions of the abdominal organs in terms of echinococcosis [5; pp. 116-121, 42; pp. 13-15, 88; pp. 21-23, 100; pp. 158-161].

It should be noted that the first operations were performed using minilaparotomy and video assistance [7; p. 65-67, 50; p. 87-88, 85; p. 40-45]. At present, the indications and contraindications for laparoscopic echinococcectomy

have been clearly developed, the technique of surgical interventions is being improved, surgical instruments are being modernized, which makes it possible to expand the indications for endoscopic operations and narrow the need for open interventions [8; pp. 615-620, 54; pp. 34-36, 90; pp. 53-57, 102; pp. 472-477].

During the introduction of laparoscopic echinococcectomy, the indications were small, uncomplicated cysts, which are located on the surface of the liver and occupied the anterior segments of the organ [14; pp. 99-104, 65; pp. 147-150, 91; pp. 9-14, 172; pp. 43-50]. At present, as mentioned above, these indications are expanding, many surgeons have recognized the expediency of performing combined operations and point to the clear advantage of simultaneous interventions [32; pp. 29-33, 78; pp. 93, 93; pp. 4-10, 174; pp. 1670-1679]. However, there are many supporters of staged surgical interventions [49; pp. 29-31].

With all the undeniable advantages of laparoscopic technology, it has certain drawbacks, which does not allow it to displace competing traditional methods of echinococcectomy from the liver. Difficulties arising from the evacuation of the contents of a parasitic cyst, isolation of the abdominal cavity in order to comply with aparasiticism, elimination of the residual cavity in the liver, are among the disadvantages of purely laparoscopic technology [39; pp. 13-15, 79; pp. 66-69, 94; pp. 36-42, 170; pp. 61-64, 176; pp. 2110-2116].

Thus, the results of surgical interventions for echinococcosis currently do not fully satisfy surgeons. The currently existing chemical, physical and mechanical means of removing or destroying germinal elements outside the cuticular membrane, up to the liver parenchyma, are not effective enough and, ultimately, do not guarantee against recurrence of the disease.

1.2. The use of rating approaches in medicine

The objectivity of assessment methods in medicine, first of all, is associated with the ability to determine the boundaries of medical care for doctors. In traditional terms, we are talking about medical errors. This problem is particularly

relevant and has existed for many centuries. Of course, within the framework of the current legislation in all countries, the concept of the possibility of medical errors does not exist. The literature uses various terminology such as "deficiencies in the provision of medical care", "unsatisfactory results", "incompetent provision of medical services", etc. However, the proportion of medical errors is quite high. The success of the treatment of patients depends on the use of modern techniques and technologies in medical practice. The results of treatment of patients in different medical institutions are difficult to compare due to the different approach to the classification and determination of the severity of the disease [21; p. 17-19, 52; p. 68-70, 56; p. 20-23, 61; 100 p., 80; c. 50-54, 82; p. 38-41, 105; p. 10-17, 111; p. 3040-3048, 119; p. 144-148]

The issues of medical errors in the world literature are discussed with a certain caution, although it is significant for absolutely all countries. At the same time, statistical data in different sources vary significantly [104; c. 14-31].

Windrum V. (2013) points to a high frequency of medical errors, which is 500 cases for every 100 thousand population, and for an adequate perception of the scale of the disaster indicates that this figure corresponds to the full cabin of the "giant" passenger aircraft Boeing-747, but at the same time plane crashes attract mass attention, while the deaths of patients in clinics sometimes remain even without proper analysis [173; c. 17].

Interesting statistics on the countries of the world. In European countries, the risk of death from errors in the UK is 1: 300 and in 2008 reached up to 11 thousand cases; in Germany, more than 30 thousand patients die per year from nosocomial infection; in Holland during the year about 2 thousand deaths occur from irreparable mistakes of doctors; in Bulgaria, with a population of more than 8 million people, an annual death of 7 thousand people is reported. In Asian countries, in particular, in Saudi Arabia, the death of patients as a result of doctors' errors occurs in 0.05% of cases. In Australia and the countries of Oceania, these statistics are not inferior to the countries of Asia and Europe. In New Zealand, one in ten patients suffers from medical errors; in Australia, 1 in 9 deaths due to

iatrogenia. No less interesting is the statistics of the countries of North America. During the year 2000 in Canada, every 13 patients hospitalized were victims of medical errors; in the United States of America, up to 440,000 people die annually as a result of medical lapses [104; c. 14-31].

Given the global nature of this problem, in the 90s in the United States, the institute "To err is Human" was created, the main task of which was to collect and analyze information about errors [139; 278 c.].

The famous Mayo Brothers Clinic (USA) in 2015 provided information on the statistics of gross errors over the past 5 years. Although they did not lead to the death of patients, out of 1.5 million surgical interventions, in 24 cases the surgical intervention was performed technically incorrectly, in 22 cases the operation was performed on the contralateral side or other anatomical region, foreign bodies were left in 18 patients, and the implant was incorrectly installed in 5 patients.

Analyzing errors, the head of the research group Juliane Bingener identified 4 groups of errors:

1. Mistakes associated with the development of deliberate prerequisites for their development (stressful situations during operations, unreasonable self-confidence of the operating surgeon, neglect of the opinion of assistants, fatigue of the doctor);

2. Technically incorrect performance of operations, ignoring the standards for the implementation of surgical interventions;

3. Absence or weak system of control over the implementation of medical manipulations;

4. Tactically incorrect planning of surgical intervention [120; p. 515-521].

Awareness and understanding of medical errors requires finding ways to avoid the negative impact of the doctor's competence factor, which requires the development of systems for quantifying the level of medical personnel. Organizational issues of the activities of various hospitals and their structural divisions were covered in many research papers. They touched upon aspects of planning, organization and management of the surgical service of clinics, but the

issues of the volume of surgical interventions, depending on the technical equipment of the institutions, the qualifications of surgeons, and their number in the medical institution, were left aside.

Komarov N.V. (2001) in his scientific works emphasized that the leading factors that have a direct impact on the result of surgical intervention are the initial general condition of the patient; the degree of complexity of the upcoming surgical intervention; professional preparedness and competence of the operating surgeon. It should be noted that such indicators as the position held, the presence of an academic title and degree, qualification category, practically do not affect the rating of the surgeon.

The author, using the above indicators, developed a formula for calculating the surgeon's rating and analyzed the results of treatment of acute surgical pathology of the abdominal organs in the Department of Emergency Surgery. Studies have shown that the heads of departments, resident surgeons who have more than 15 years of practical work experience have the highest rating. The development of the rating approach contributed to the differentiated choice of the duty team, which allowed for adequate management of the surgical service and the full provision of emergency care. This set of organizational measures contributed to a decrease in the frequency of postoperative mortality in emergency abdominal surgery from 4.0 to 1.8% [58; 24 p., 59; p. 38-42].

Most researchers believe that the results of surgery correlate with the experience of the surgeon and improve as the technique is mastered. The research conducted by Matveev I.A. (2015) in order to assess the qualifications of surgeons, during 161 reconstructive operations on the rectum and colon, made it possible to rank doctors by 4 levels. Based on the analysis of the frequency of intra-abdominal complications, a high rating was found in surgeons (A, B, C) who performed from 30 to 47 operations. Their rating ranged from 19 to 83 points. Despite the high complication rate, due to the complexity of the operations they performed, the rating remained high. Surgeon D had a low rating (13 points), who rarely operated but had a high incidence of postoperative complications [63; p. 243-247].

A differentiated approach and assessment of the surgeon's rating allows, depending on the severity of the upcoming operation, to choose a surgical team and, having adequately assessed the intraoperative situation, change tactics in a timely manner. Depending on the complexity of the upcoming laparoscopic cholecystectomy (LCE), the author divided all operations into "simple" and "complex". Based on the number of operations performed, the frequency of intra- and postoperative complications, the surgeon's rating was determined. With a surgeon's rating of up to 50 points, he could perform "simple" operations, with intraoperative difficulties, the operation had to be continued with a surgeon of a higher level. In the absence of such, it is necessary to switch to an open method of operation. The next gradations were surgeons with a rating of 50 to 100, from 100 to 1000 and over 1000 points. Depending on the rating, those clinical situations were determined when it was necessary to determine not only the operating surgeon, but also his assistant, depending on their preparedness, as well as the possibility of performing LCE, depending on the severity of the operation and intraoperative changes in the course of surgical intervention, depending on the situation. A differentiated approach made it possible to reduce the frequency of conversions from 3.75% to 0.9% and significantly reduce the rate of intra- and postoperative complications [19; 18 p.].

Interesting studies of rating assessment by questionnaire. To assess the rating of a psychiatrist, a sociological study was conducted among students of a medical university. Among the 11 specialists listed in the list of doctors, students determined the 8th place for psychiatrists. Despite this, 3/4 of the students expressed confidence in psychiatrists, considering them a good and competent specialist; 1/4 of the respondents showed their distrust, citing a high risk of psychiatry for life, "low respect" of psychiatrists in the medical community, low wages, etc. This fact indicates a tendentious attitude to assessing the rating of a doctor by questioning and the lack of objectivity of sociological research in quantifying the category of a doctor [70; 21 c.].

Issues of assessing the level and quality of medical care concern not only a specific doctor, but also the whole team. In this regard, studies on the study of evidence-based assessment of the activities of private dental organizations are interesting. The activities of 100 private clinics in the Krasnodar region were studied. To assess the rating of an institution, 20 criteria were analyzed, including the equipment of clinics, qualification categories of doctors, working hours, cost of care, etc. A survey of the population to formulate a rating showed that the most significant for patients are 5 criteria: use of anesthesia; providing comprehensive information about examination methods and types of treatment; patient satisfaction with the scope and quality of examination and treatment; the effectiveness of the therapy, as well as the correspondence of the treatment fee to the economic capabilities of the patient. By assigning a certain score to each criterion, the rating of the clinics was determined. At the same time, other criteria, although they are the key to the success of a medical institution, turned out to be less important [99; p. 22-25].

It should be noted that the rating approach allows not only to improve the results of treatment of a certain group of patients, but also helps to improve the quality of research work performed.

To individually assess the performance of employees and individual departments of organizations, a scaling system was used, in which various types of products (articles, theses, monographs, etc.) were rated with certain points. This scale made it possible to determine the scientific rating of the employee and the corresponding department.

The application of this approach made it possible to improve the quality of the management system in matters of planning the scientific activities of the organization, adequately distribute material resources, determine the need for human and financial resources and “on the job” to financially reward employees [41; 132 p.].

The fact of a differentiated approach took place not only in the payment of scientific workers, but also of outpatient doctors.

To ensure adequate and effective functioning of the financial incentive system, the basic principles were identified, which determined the individual rating of the doctor:

- The criteria used to evaluate the rating of an outpatient service physician must reflect all aspects of its functional activities;

- The versatility of a doctor's functional activity cannot be assessed in single indicators, which requires their use in the form of coefficients;

- Coefficient indicators must range from 0 to 1 and have no more than 5 gradations, and their values must correspond to the factors influencing the treatment outcome.

The developed approach allows us to objectively link the amount of wages with the performance of employees, increase the motivation of medical personnel, and most importantly, contributes to the transition from a command-administrative system of work to collective management and an increase in the number of competitive medical institutions in the modern medical services market [96; p. 36-40].

Existing systems for determining the condition of patients do not relate to any specific disease, but, as a rule, characterize the degree of decompensation of organs and body systems in the event of complications that arise. Thus, modern systems for assessing the condition are fully consistent with the principle - treat not the disease, but the patient. They do not replace the classification of the disease, but complement them with an objective understanding of the course of the pathological process, clearly show its severity in an individual patient or in a group of patients, and determine the severity of organ dysfunction.

Despite such widespread use of systems for objective assessment of the severity of a patient's condition, it should be noted that they involve many indicators, the determination of which in emergency conditions is impossible for all admitted patients [61; 100 pp.]. Existing systems are not ideal in terms of predicting treatment outcomes, but they are quite capable of quantitatively assessing the condition of patients. In addition, the large number of parameters

taken into account makes many systems for assessing the severity of a patient's condition inconvenient and unacceptable in the conditions of most domestic hospitals. Therefore, it is advisable to develop criteria that are easily applicable in practice in a wide network of medical institutions.

Thus, the problem of treating EP, despite the many tactical and technical approaches in the treatment of this pathology, remains an urgent problem of modern surgery. The high prevalence of echinococcosis, the growth of the disease, the high incidence of postoperative complications and mortality, the presence of many controversial issues in diagnosis and treatment determine the relevance of the problem. In particular, these issues relate to adequate assessment of the severity of the patient's condition, in determining the severity of the upcoming surgical intervention and a differentiated approach to the selection of a surgical team depending on the preparedness of the surgeons. All this makes it advisable to conduct new scientific research.

CHAPTER II. CHARACTERISTICS OF CLINICAL CASES AND METHODS OF RESEARCH

2.1. General characteristics of clinical observations

This work is based on an analysis of the results of examination and treatment of 359 patients with various forms of EP. All patients were divided into two groups: a comparison group – 243 patients, and a main group – 116 patients. This division is associated with different approaches to treatment as therapeutic and tactical measures are developed and improved.

In the comparison group, males predominated, while in the main group there was a slight predominance of female patients (Table. 2.1.).

Table 2.1.

Distribution of patients by gender

Clinical group	Comparison group	Main group	t-Styudenta
Men	136 (56,0±3,2%)	56 (48,3±4,6%)	1,367
Women	107 (44,0±3,2%)	60 (51,7±4,6%)	1,367

EP affected people of the most working age from 19 to 44 years, the proportion of which in various clinical groups exceeded 60% (Table 2.2).

In the first months of diagnosis of the disease, no more than 7% of patients sought surgical help. In the main group, the number of patients with a disease duration of up to 12 months was significantly greater than in the main group, while those with a disease history of more than 1 year were significantly fewer (Table 2.3.).

Table 2.2.

Distribution of patients by age

Clinical group	Comparison group	Main group	t-Styudenta
Untel 19 yers	10 (4,1±1,3%)	3 (2,6±1,5%)	0,785
20-44 yers	153 (63,0±3,1%)	76 (65,5±4,4%)	0,474

45-60 years	60 (24,7±2,8%)	28 (24,1±4,0%)	0,114
61-75 years	19 (7,8±1,7%)	8 (6,9±2,4%)	0,316
Over 75 years	1 (0,4±0,4%)	1 (0,9±0,9%)	0,473

Table 2.3.

Distribution of patients by disease duration

Clinical group	Comparison group	Main group	t- Styudenta
Up to 1 month	16 (6,6±1,6%)	5 (4,3±1,9%)	0,922
From 1 to 12 months	152 (62,6±3,1%)	88 (75,9±4,0%)*	2,640
Over 12 months	75 (30,9±3,0%)	23 (19,8±3,7%)*	2,328

69 (19.2%) patients had a history of surgery for EP. Among them were patients who underwent up to 6 operations on the abdominal organs for various localizations of echinococcus.

Table 2.4.

Distribution of patients by number of operations undergone

Clinical group	Comparison group	Main group	t- Styudenta
1 operation	31 (12,8±2,1%)	17 (14,7±3,3%)	0,484
2 operation	9 (3,7±1,2%)	6 (5,2±2,1%)	0,615
3 or more operations	4 (1,6±0,8%)	2 (1,7±1,2%)	0,054
Total	44 (18,1±2,5%)	25 (21,6±3,8%)	0,758

The majority of patients who turned to us for medical help had a history of undergoing one operation for EP (48 cases). However, our observations included patients who had a history of being operated on 7 times for the underlying disease (Table No. 2.4).

294 (81.9%) patients had one hydatid cyst. In 13 (36%) patients, multiple cysts were detected (Table 2.5).

Table 2.5.

Distribution of patients by number of cysts

Clinical group	Comparison group	Main group	t- Styudenta
1 cyst	193 (79,4±2,6%)	101 (87,1±3,1%)	1,886
2 cyst	40 (16,5±2,4%)	12 (10,3±2,8%)	1,655
3 or more cysts	10 (4,1±1,3%)	3 (2,6±1,5%)	0,785

Most often (more than 80%) hydatid cysts were located in the right lobe of the liver. Due to the anatomical features of the portal bed, the left lobe was less often affected by echinococcus. In our observations, in 54 (15.0%) cases, EC was localized in the left lobe of the liver.

Table 2.6.

Distribution of patients by location of cysts in liver lobes

Number of cysts	Comparison group			Main group		
	On right	Left	Both beats	On right	Left	Both beats
1 cyst	151 (62,1±3,1%)	35 (14,4±2,3%)	7 (2,9±1,1%)	82 (70,7±4,2%)	17 (14,7±3,3%)	2 (1,7±1,2%)
t- Styudenta				1,629	0,063	0,716
2 cyst	28 (11,5±2,0%)	2 (0,8±0,6%)	10 (4,1±1,3%)	4 (3,4±1,7%)*	0 (0%)	8 (6,9±2,4%)
t- Styudenta				3,038	1,420	1,039
3 or more cysts	1 (0,4±0,4%)	0 (0%)	9 (3,7±1,2%)	0 (0%)	0 (0%)	3 (2,6±1,5%)
t- Styudenta				0,013	0,142	0,143

Often (in 39 patients) damage to both lobes was noted. Moreover, this trend was noted with multiple liver lesions (Table 2.6).

In the right lobe, cysts were most often localized in 5-6-7 segments, in the left lobe - 2-3 segments. Moreover, the incidence of cysts by liver segments in the compared groups did not differ significantly. Only with multiple lesions, the number of cysts located in 5-8 segments of the liver differed significantly in the compared groups (Table 2.7).

Table 2.7.

Distribution of patients by cyst localization by liver segments

lobe	Segment	Comparison group	Main group	t- Styudenta
Single cyst				
Left lobe	3	3 (1,2±0,7%)	1 (0,9±0,9%)	0,335
	2-3	5 (2,1±0,9%)	3 (2,6±1,5%)	0,305
	2-3-4	7 (2,9±1,1%)	2 (1,7±1,2%)	0,716
	4	6 (2,5±1,0)	4 (3,4±1,7%)	0,498
	2-4	7 (2,9±1,1%)	4 (3,4±1,7%)	0,283
	3-4	7 (2,9±1,1%)	3 (2,6±1,5%)	0,162
Right lobe	5	12 (4,9±1,4%)	8 (6,9±2,4%)	0,717
	6	9 (3,7±1,2%)	5 (4,3±1,9%)	0,271
	7	8 (3,3±1,1%)	3 (2,6±1,5%)	0,378
	8	7 (2,9±1,1%)	5 (4,3±1,9%)	0,659
	5-6	22 (9,1±1,8%)	14 (12,1±3,0%)	0,852
	6-7	28 (11,5±2,0)	13 (11,2±2,9%)	0,088
	7-8	16 (6,6±1,6%)	8 (6,9±2,4%)	0,110
	5-8	16 (6,6±1,6%)	13 (11,2±2,9%)	1,387
	5-6-7-8	15 (6,2±1,5%)	7 (6,0±2,2%)	0,051
	6-7-8	18 (7,4±1,7%)	6 5,2±2,1%)	0,842
Two beats	4-5-8	4 (1,6±0,8%)	1 (0,9±0,9%)	0,662
	4-5	3 (1,2±0,7)	1 (0,9±0,9%)	0,335

Table continuation 2.7.

Lobs	Segment	Comparison group	Main group	t- Styudenta
Two or more cysts				
Left/lob	2-3-4	2 (0,8±0,6%)	0 (0%)	1,420
П р	5-8	4 (1,6±0,8%)	0 (0%)*	2,017

	5-6-7-8	18 (7,4±1,7%)	3 (2,6±1,5%)*	2,157
	6-7-8	7 (2,9±1,1%)	1 (0,9±0,9%)	1,469
Both beats	2-3-6	3 (1,2±0,7%)	1 (0,9±0,9%)	0,335
	3-4-6-7	2 (0,8±0,6%)	2 (1,7±1,2%)	0,672
	4-5-8	1 (0,4±0,4%)	1 (0,9±0,9%)	0,473
	4-5	3 (1,2±0,7%)	1 (0,9±0,9%)	0,335
	2-3-5-6-7-8	7 (2,9±1,1%)	4 (3,4±1,7%)	0,283
	3-5-6	3 (1,2±0,7%)	2 (1,7±1,2%)	0,349

The sizes of the cysts ranged from 2 to 32 cm. On average, the size of the cysts was 12.5 ± 2.3 cm. In both groups, cysts measuring from 6 to 10 cm were most often observed. Moreover, in the comparative groups, the frequency of occurrence of giant cysts in the main group there were significantly more cysts than in the comparison group, while the number of medium-sized cysts was the opposite (Table 2.8).

Table 2.8.

Distribution of patients by size of echinococcal cysts

Clinical group	Comparison group	Main group	t- Styudenta
Small (up to 5 cm)	33 (13,6±2,2%)	17 (14,7±3,3%)	0,272
Medium (6-10 cm)	146 (60,1±3,1%)	55 (47,4±4,6%)*	2,262
Large (11-20 cm)	52 (21,4±2,6%)	28 (24,1±4,0%)	0,575
Giant (more than 20 cm)	12 (4,9±1,4%)	16 (13,8±3,2%)*	2,537

Analysis of the origin of the cysts showed that in most cases the cysts were primary (more than 80%), however, in 65 (18.1%) cases the cysts were recurrent, and in 4 (1.1%) they were residual (Table. 2.9.).

Table 2.9.

Distribution of patients by origin of cysts

Clinical group	Comparison group	Main group	t- Styudenta
Primary	199 (81,9±2,5%)	91 (78,4±3,8%)	0,758
Recurrent	41 (16,9±2,4%)	24 (20,7±3,8%)	0,855

Residual	3 (1,2±0,7%)	1 (0,9±0,9%)	0,335

In the comparison group, 55 (22.6%) patients had a complicated course of the disease, 188 (77.4%) had an uncomplicated course; in the main group – 24 (20.7%) and 92 (79.3%), respectively. In a comparative aspect, the clinical groups were representative (Table 2.10.).

Table 2.10.

Distribution of patients according to the course of the disease

Clinical group	Comparison group	Main group	t- Styudenta
Complicated course	55 (22,6±2,7%)	24 (20,7±3,8%)	0,421
Uncomplicated course	188 (77,4±2,7%)	92 (79,3±3,8%)	0,421

Among the complicated forms of the disease in both groups, persons with suppurative EC predominated. Their number was 33 (9.2%) patients. In addition, in 11 (3.1%) cases, suppuration was combined with a breakthrough into the bile ducts, the presence of cystobiliary fistulas and portal hypertension. Complicated forms of EP in both clinical groups occurred in equal numbers, which made it possible to judge the adequacy of the comparative studies conducted (Table No. 2.11). Depending on the nature of complications of EP, surgical tactics also changed, which is reflected in the relevant chapters of the dissertation.

Table 2.11.

Distribution of patients by nature of complications

Clinical group	Comparison group	Main group	t- Styudenta
Suppuration	27 (11,1±2,0%)	8 (6,9±2,4%)	1,360
Cystobiliary fistula	15 (6,2±1,5%)	10 (8,6±2,6%)	0,808
Cyst rupture into the abdominal cavity	1 (0,4±0,4%)	1 (0,9±0,9%)	0,473
Cyst rupture into the pleural	1 (0,4±0,4%)	0 (0%)	1,002

space cavity			
Breakthrough into the bile ducts	2 (0,8±0,6%)	2 (1,7±1,2%)	0,672
Portal hypertension	1 (0,4±0,4%)	0 (0%)	1,002
Suppuration and breakthrough into the bile ducts	3 (1,2±0,7%)	1 (0,9±0,9%)	0,335
Suppuration with cystobiliary fistula	4 (1,6±0,8%)	2 (1,7±1,2%)	0,054
Suppuration and portal hypertension	1 (0,4±0,4%)	0 (0%)	1,002

In the comparison group, concomitant damage to other organs was noted in 24 (9.9%) cases, in the main group - in 12 (10.3%). In all cases of concomitant damage to other organs by echinococcosis, one- or two-stage operations were performed - echinococcectomy. If the spleen was affected, echinococcectomy or splenectomy was performed. The frequency of combined lesions of other organs in the compared groups was approximately the same (Table 2.12).

The severity of the patients' condition and the choice of surgical tactics were influenced by the presence of concomitant pathology. 125 (34.8%) patients had concomitant diseases (Table 2.13). Moreover, 12 (3.3%) patients had two or more concomitant diseases.

Table 2.12.

Distribution of patients according to combined lesions of other organs

Clinical group	Comparison group	Main group	t- Styudenta
Spleen	4 (1,6±0,8%)	2 (1,7±1,2%)	0,054
Abdomen	11 (4,5±1,3%)	7 (6,0±2,2%%)	0,584
Lungs	5 (2,1±0,9%)	2 (1,7±1,2%)	0,220
Soft fabrics	2 (0,8±0,6%)	0 (0%)	1,420
Combined lesion	2 (0,8±0,6%)	1 (0,9±0,9%)	0,038

Table 2.13.

Distribution of patients by concomitant pathology

Clinical group	Comparison group	Main group	t-Styudenta
External hernias	8 (3,3±1,1%)	2 (1,7±1,2%)	0,942
ZhKB	14 (5,8±1,5%)	8 (6,9±2,4%)	0,407
Varicose veins	3 (1,2±0,7%)	1 (0,9±0,9%)	0,335
Adhesive disease	7 (2,9±1,1%)	3 (2,6±1,5%)	0,162
Respiratory system diseases	3 (1,2±0,7%)	2 (1,7±1,2%)	0,349
Gastrointestinal diseases	21 (8,6±1,8%)	9 (7,8±2,5%)	0,288
Diseases of the cardiovascular system	11 (4,5±1,3%)	9 (7,8±2,5%)	1,146
Endocrine system diseases	5 (2,1±0,9%)	2 (1,7±1,2%)	0,220
Diseases of the genitourinary system	2 (0,8±0,6%)	3 (2,6±1,5%)	1,113
Combination of concomitant diseases	9 (3,9±1,2%)	3 (2,6±1,5%)	0,586

In the comparison group, 243 patients had 311 ECs; in the main group, 116 patients had 136 cysts. According to the classification of Gharbi H.A. (2003), 40 cysts were a variant CL, 187 – CE1, 91 – CE2, 96 – CE3, 25 – CE4 и 8 – CE5 (Table. 2.14).

Table 2.14.

Distribution of EC according to classification Gharbi H.A. (2003).

Character of the cyst	Comparison group	Main group	t- Styudenta
CL	28 (9,0±1,6%)	12 (8,8±2,4%)	0,061
CE1	128 (41,2±2,8%)	59 (43,4±4,2%)	0,438
CE2	63 (20,3±2,3%)	28 (20,6±3,5%)	0,080
CE3	67 (21,5±2,3%)	29 (21,3±3,5%)	0,052
CE4	19 (6,1±1,4%)	6 (4,4±1,8%)	0,763
CE5	6 (1,9±0,8%)	2 (1,5±1,0%)	0,355

Thus, the comparative analysis of the clinical material revealed significant differences in the compared groups in the duration of the disease (from 1 to 12 months and over 12 months), in the localization of cysts in the lobes of the liver (two cysts in the right lobe of the liver), in the localization cysts by liver segments (localization of two or more cysts in the V-VIII and V-VI-VII-VIII segments of the liver), by the size of the cysts (medium-sized cysts and giant cysts).

However, these differences did not affect the representativeness of the compared groups due to the fact that a significant increase in the number of patients according to one criterion was compensated by a significantly smaller number of another indicator. The representativeness of the compared groups allowed us to conduct an adequate comparative analysis, and the conclusions arising from the results of the studies, in our opinion, were quite justified.

2.2. Research methods

When examining patients, we used traditional research methods: clinical and biochemical blood tests, immunological studies, ultrasound and MSCT of the hepatobiliary system, endoscopic studies.

CHAPTER III. CLINICAL EVALUATION OF THE EFFECTIVENESS OF THE TRADITIONAL APPROACH IN LIVER ECHINOCOCCOSIS SURGERY

The results of surgical treatment of 243 patients with ES who were hospitalized for the period from 2013 to 2016 were analyzed. Of these, 55 had a complicated course of the disease, 188 had an uncomplicated course.

The analyzed group included only those patients who underwent surgical treatment. When starting to analyze the surgical treatment of EP, first of all, one should dwell on the criteria for assessing their results. We tried to build on the most objective criteria, such as the frequency and severity of postoperative complications, mortality, and the dynamics of changes in clinical and laboratory parameters.

As indicated in the second chapter, the choice of surgical approach and method of eliminating the residual liver cavity was determined by the course of the disease, location and size of the cyst.

236 patients underwent surgical treatment as planned after a preliminary examination and preoperative preparation; 1 patient with a breakthrough of the EC into the pleural cavity was operated on in an emergency-delayed manner after drainage of the pleural cavity, 5 patients with a breakthrough in the bile ducts and moderate obstructive jaundice were also operated on in an emergency-delayed manner after RPCG with EPST; 1 patient was operated on as an emergency when the EC had broken through into the free abdominal cavity.

The clinical picture of an uncomplicated course of the disease in 122 patients was characterized by an asymptomatic course (EP was diagnosed during a preventive examination and examination for another disease of the abdominal organs), the remaining 66 patients had only complaints of discomfort and heaviness in the right hypochondrium, loss of appetite, general weakness, fatigue.

In case of a complicated course of the disease, 15 patients with a clinical picture were characterized by an asymptomatic course; 27 patients complained of heaviness and discomfort in the right hypochondrium; in 7 cases the leading

symptom was pain in the right hypochondrium, which periodically had a paroxysmal character; 23 patients had dyspeptic symptoms in the form of nausea, vomiting, dryness and bitterness in the mouth; 15 patients complained of fever; 5 patients had yellowness of the skin and sclera and itching of the skin; in 1 – perforation of the EC developed clinical peritonitis with symptoms of anaphylactic shock; In 1 patient, when the EC ruptured into the pleural cavity, a clinical picture of acute pleural empyema developed.

An objective examination of patients with EP revealed the following characteristic signs of the disease: asymmetry of the abdomen due to the presence of a bulge in the right hypochondrium - in 11 patients; enlarged liver borders – in 12; dilatation of the veins of the anterior abdominal wall – in 2; presence of ascites in the abdominal cavity – in 2; acholic stool – in 5 patients.

The general condition of all patients upon admission with an uncomplicated course was assessed as satisfactory, body temperature did not exceed normal values, and no hemodynamic or respiratory changes were observed.

With a complicated course, the general condition of 42 patients was assessed as satisfactory, and in 13 – as moderate. 12 patients had a low-grade fever of up to 380C, 3 had a body temperature exceeding 380C, in the rest of the observations this figure was within normal values.

All patients underwent surgical treatment - echinococcectomy.

Most often, surgical interventions were performed through upper-median laparotomy (196 cases; 80.7%). When cysts were localized in the VII-VIII segments of the liver in obese patients, with combined damage to the liver and right lung, a thoracofrenolaparotomy approach was used to perform simultaneous surgical intervention on the liver and lung (14 cases; 5.8%). In 16 (6.6%) cases, the operation was performed through a subcostal approach when cysts were localized in the V-VI segments of the liver in combination with calculous cholecystitis, as well as in a previously performed operation through this access. In 17 (7.0%) previously unoperated patients with superficially located single ECs localized in the II-III-IV-V segments of the liver, without the presence of daughter cysts and

with a total size of up to 5.0 cm, echinococcectomy was performed using a laparoscopic approach. In no case was there a need for conversion.

In 55 (22.6%) cases, along with echinococcectomy, various simultaneous operations were performed. The most common surgical intervention was cholecystectomy, which was performed in 19 (7.8%) patients. In 14 patients, cholecystectomy was performed due to concomitant calculous cholecystitis; in 5 cases – due to intraoperative damage to the gallbladder and tight fusion of the fibrous capsule of the EC with the wall of the gallbladder. When the EC breaks through into the bile ducts, in 3 cases the operation was completed by cholangiostomy according to Pikovsky, in 1 case - according to Halstead, in 1 case - according to Keru.

The next most frequently performed simultaneous operations were echinococcectomies of the abdominal cavity, which were performed in 11 (4.5%) patients.

In 8 (3.3%) cases, hernia repair with on-lay alloplasty was performed due to concomitant postoperative hernia (6 patients), hernia of the white line of the abdomen (1 patient) and umbilical hernia (1 observation).

In 7 (2.9%) previously operated patients, in the presence of a pronounced adhesive process and a clinical picture of chronic adhesive intestinal obstruction, adhesions were dissected. All patients underwent intraoperative prevention of relapse of adhesive disease using agents (hydrocortisone, rheopolyglucin, mesogel) that prevent the progression of the pathological process.

In 4 (1.6%) cases, EP was combined with splenic echinococcus. In all cases, splenectomy was performed. It should be noted that in 2 (0.8%) cases, combined damage to the liver, spleen and abdominal cavity was noted. These patients, simultaneously with echinococcectomy of the liver and abdominal cavity, underwent splenectomy.

With combined damage to the liver and right lung, in 2 (0.8%) cases, echinococcectomy of the liver and lung was performed using a thoracofrenolaparotomy approach.

In 2 (0.8%) patients, echinococcus was diagnosed in the soft tissues of the chest and anterior abdominal wall. These patients underwent simultaneous soft tissue echinococcectomy.

The crucial point of the surgical intervention was the treatment of the residual cavity. When choosing the method of capitonnage, preference was given to closed methods of eliminating cysts. Most often (97 cases; 39.3%) the technique of A.A. Bobrov was performed. In 23 (9.5%) cases, capitonnage was performed using the Delbet P method. For large and gigantic EC sizes, the method of M.Yu. Gilevich was used to treat the residual cavity in 56 (23.0%) patients. In 12 (4.9%) cases capitonnage was performed according to Kourias W.K. (in 8 patients when performing laparoscopic echinococcectomy and in 4 patients when EC was localized in the VII segment of the liver with the presence of a cystobiliary fistula with the technical impossibility of suturing it). For small cysts in 6 (2.5%) cases, open treatment of the residual cavity was performed according to the method of A.A. Vishnevsky. When EC was localized in segments II and III of the liver with the presence of fibrous changes in the parenchyma in this area, liver resection was performed in 3 (1.2%) cases. In 16 (6.6%) patients, the residual cavity was treated according to the method of Askerkhanov R.P. (in 9 patients during laparoscopic echinococcectomy and in 7 patients with medium and large EC sizes). In case of multiple liver lesions, in 22 (9.1%) cases, combined methods of eliminating the residual cavity were performed. In case of marginal location of the EC, an ideal echinococcectomy was performed in 8 (3.3%) cases.

In the presence of cystobiliary fistulas (19 cases) and breakthrough of the cyst into the bile ducts (5 cases), after treatment of the residual cavity in 4 patients, due to the large size of the fistula and the close location of the main bile ducts, it was not possible to sutured the fistula. The operation was completed by draining the residual cavity.

Average laboratory test results were within normal limits, but individual values varied widely. Blood leukocyte counts ranged from 5.6 to 14.8*109/l

(average 6.4±1.6*109/l); ESR – from 5.1 to 19.3 mm/h (7.2±1.6 mm/h); eosinophils – from 3 to 15.4% (8.6±1.7%) и (Table. 3.1).

Table 3.1.

Indicators of general blood test in the comparison group

Exodus	Exodus	1 day	3 day	5 day	7 day	10 day
Leukocytes	6,4±1,6	6,5±1,5	6,3±1,5	6,4±1,4	6,3±1,2	6,0±1,0
t- Styudenta		0,046	0,046	0,000	0,050	0,212
Eosinophils	8,6±1,7	8,2±1,6	6,3±1,6	5,7±1,1	4,9±1,0	4,6±0,9*
t- Styudenta		0,171	0,985	1,432	1,876	2,080
ESR	7,2±1,6	7,0±1,4	6,5±1,4	6,0±1,3	5,6±1,2	5,2±1,0
t- Styudenta		0,094	0,329	0,582	0,800	1,060

In the postoperative period, in the dynamics of treatment, these indicators did not undergo any significant changes; during the observation period, no significant differences from the initial value were noted. Only the eosinophil indicator by the time of discharge from the hospital significantly decreased from the initial level from 8.6 ± 1.7 to 4.6 ± 0.9 (t=2.080). This was due to the fact that the focus – the EC – was removed. However, despite the removal of the cyst, a hyperallergenic background remained in the body for 2-3 days, as evidenced by eosinophil levels.

In biochemical blood tests, ALT ranged from 0.48 to 1.20 μmol/l, AST - from 0.44 to 1.24 μmol/l, bilirubin - from 10.0 to 48.5 mmol/l, total protein - from 58.5 to 72.0 g/l, creatinine – from 0.02 to 0.07 μmol/l, urea – from 3.4 to 5.5 μmol/l.

It should be noted that elevated levels of biochemical blood tests were observed in patients with complicated forms of EP, however, the average values for the group were within normal values (Table 3.2). In the postoperative period, in the dynamics of treatment, the average indicators of biochemical blood tests did not undergo any significant changes.

Table 3.2.

Biochemical blood parameters in the comparison group

Index	Exodus	5 day	10 day
ALT	0,64±0,19	0,60±0,14	0,48±0,12
t- Styudenta		0,169	0,712
ACT	0,61±0,15	0,58±0,11	0,41±0,09
t- Styudenta		0,161	1,143
Bilirubin	15,2±2,4	13,1±2,0	14,1±1,7
t- Styudenta		0,672	0,374
Total protein	61,2±2,4	62,1±2,7	63,5±3,0
t- Styudenta		0,249	0,599
Creatinine	0,04±0,004	0,04±0,003	0,03±0,004
t- Styudenta		0,000	1,768
Urea	4,0±0,5	4,5±0,3	4,2±0,4
t- Styudenta		0,857	0,312

The duration of inpatient treatment ranged from 5 to 20 days, averaging 7.2±1.7 days.

The overall postoperative complication rate was 18.9%. Of these, early surgical complications were noted in 9.9% of cases. In 8 (3.3%) cases, seroma of postoperative wounds developed, which were treated conservatively. In 5 (2.1%) patients, suppuration of postoperative wounds was noted. Against the background of additional therapeutic measures, secondary wound healing was noted. In 4 (1.6%) cases in the postoperative period, bile leakage was noted through the drainage from the abdominal cavity, which stopped spontaneously on days 6-10. In 3 (1.2%) patients, an external biliary fistula developed in the postoperative period (in 2 cases it closed on its own on days 24 and 41 after surgery; in 1 case, due to the persistence of a large volume of daily bile intake, endoscopic papilosphincterotomy was performed 2 months after surgery after which closure of the fistula was noted). In 2 (0.8%) cases, biliary peritonitis developed, which required repeat surgery. In the first case, the source of peritonitis was the stump of the cystic duct after simultaneous cholecystectomy.

After additional suturing of the stump and cholangiostomy according to Vishnevsky A.V. recovery has come. In the second case, death was noted. A

patient with a large biliary fistula developed suture failure and diffuse bile peritonitis, which required relaparotomy on the 3rd day with repeated suturing of the biliary fistula and the application of a Smith cholangiostomy. However, in the postoperative period, despite intensive therapy, the patient developed acute liver failure, the condition was aggravated by paralytic intestinal obstruction and, against the background of a progressive deterioration of the general condition, death was noted on the 9th day after the first operation.

In 1 (0.4%) patient with EC localization in the VII-VIII segments of the liver, a subdiaphragmatic abscess formed in the postoperative period, which required relaparotomy, which was performed on the 8th day after unsuccessful puncture of the abscess under ultrasound guidance. Adequate sanitation of the abscess and intensive therapy allowed us to achieve a positive result, and the patient was discharged from the hospital on the 12th day after the reoperation.

In 1 (0.4%) observation, after simultaneous surgery for EP and adhesive disease, a clinical picture of early adhesive intestinal obstruction developed on the 5th day. The conservative measures taken were ineffective, and therefore the patient was re-operated.

In 5.8% of cases, general complications developed in the postoperative period. In 5 (2.1%) cases, reactive pleurisy developed, which required pleural puncture; in 7 (2.9%) patients pneumonia developed. Carrying out conservative measures allowed us to achieve a positive result. In 1 (0.4%) patient with existing pathology of the cardiovascular system in the postoperative period on the 3rd day, the development of acute myocardial infarction was noted, which caused death.

In 1 (0.4%) case, in the early postoperative period, a patient with concomitant varicose veins developed a pulmonary embolism, which led to death.

The rate of late surgical complications was 3.3%.

In the long-term period, from 3 to 10 months, 4 (1.6%) patients were diagnosed with a residual liver cavity, which was clinically manifested by only moderate discomfort in the right hypochondrium. In 2 cases, due to the large size of the residual cavity (7 and 9 cm), puncture and drainage of the cavity were

performed under ultrasound guidance. Constant active aspiration for 4 and 6 months made it possible to significantly reduce the size of the residual cavity and eliminate the clinical symptoms of the disease. When re-examined after 12 months, only thickening of the liver parenchyma is noted in the surgical area.

In 2 cases, due to the small size of the residual cavity (3.2 and 3.5 cm), the patients were under dynamic observation for 1.5 years, during which the cavities completely shrank and the clinical manifestations disappeared.

In 2 (0.8%) patients, suppuration of the residual cavity was noted within 15 and 40 days after surgery. In both clinical situations, percutaneous drainage of the residual cavity was performed, followed by its sanitation.

1 (0.4%) patient developed a postoperative ventral hernia 2 years after surgery. The patient underwent routine hernia repair with on-lay alloplasty.

In 1 (0.4%) observation, 2.5 years after echinococcectomy, with concomitant adhesive disease, acute adhesive intestinal obstruction developed, which required emergency surgery (Table 3.3).

Thus, the analysis of the clinical results of treatment of patients in the comparison group showed that the frequency of postoperative complications is quite high (18.9%). The mortality rate was 1.2%. The high incidence of postoperative complications and mortality justifies the advisability of finding ways to improve treatment outcomes for this category of patients.

We conducted a critical analysis of postoperative complications that developed in the comparison group, the purpose of which was to identify existing shortcomings and eliminate them.

As the analysis of the results showed, one of the main reasons for the development of postoperative complications is the surgeon’s inadequate preparation for surgery, that is, the lack of the necessary experience in performing surgical interventions and technical skills. Insufficient preparation of the surgeon contributed to the development of wound complications, residual liver cavity, and their suppuration.

To clarify the role of microbial flora on the results of treatment, we conducted bacteriological studies in 27 patients: 11 with an uncomplicated course of the disease and 16 with a complicated course. Bacteriological studies were carried out before (at the time of EC puncture and obtaining echinococcal fluid) and after treatment of APP (after treatment of APP before capitonnage).

Table 3.3.

Clinical results in the comparison group

INDICATORS	**N**	**B %**
Early surgical complications	**24**	**9,9±1,9**
Postoperative wound seroma	8	3,3±1,1
Postoperative wound suppuration	5	2,1±0,9
Bile leakage	4	1,6±0,8
External biliary fistula	3	1,2±0,7
Biliary peritonitis	2	0,8±0,6
Subphrenic abscess	1	0,4±0,4
Early adhesive intestinal obstruction	1	0,4±0,4
General complications	**14**	**5,8±1,5**
Reactive pleurisy	5	2,1±0,9
Postoperative pneumonia	7	2,9±1,1
Acute myocardial infarction	1	0,4±0,4
Pulmonary embolism	1	0,4±0,4
Late surgical complications	**8**	**3,3±1,1**
Development of the residual liver cavity	4	1,6±0,8
Suppuration of the residual liver cavity	2	0,8±0,6
Postoperative hernia	1	0,4±0,4
Acute adhesive intestinal obstruction	1	0,4±0,4
Total complications	***46***	***18,9±2,5***
Mortality	3	1,2±0,7

With an uncomplicated course, out of 11 cases, no growth of microorganisms was noted in 7 cases. In 4 observations, only an aerobic culture

was sown, which was represented only by epidermal staphylococcus and Escherichia coli. The reason for the growth of these microorganisms, in our opinion, was probably the contamination of echinococcal fluid from the air during EC puncture or the presence of a microbial agent in the echinococcal fluid, which could be a trigger in the development of such a complication of EP as suppuration of the EC. Moreover, in 2 cases there was an increase in monoculture, in 2 – an association of aerobic bacteria. No growth of anaerobic cultures was observed. The initial level of bacterial contamination was quite low and ranged from 103-105 CFU/ml (on average 3.9□0.31 lg CFU/ml).

After traditional treatment of AKI, only 3 cases showed growth of microorganisms. Moreover, the growth of the same microorganisms was noted, the concentration of which did not change much. The bacterial content ranged from 103-104 CFU/ml (average 3.6□0.29 lg CFU/ml; t=0.707).

With a complicated course of EP, bacterial growth was observed in all cases. Moreover, in 7 observations out of 16, an association of aerobic and anaerobic bacteria was noted. Aerobic microflora was represented by cultures of Staphylococcus aureus and Staphylococcus epidermidis, Streptococcus, Escherichia coli and Pseudomonas aeruginosa, Proteus and Klebsiella. Anaerobic flora was represented by bacteroides and peptococci. In 3 cases, an increase in the monoculture of aerobes was noted; in 6 crops, an increase in the association of aerobic microorganisms was noted.

The initial concentration of aerobic bacteria ranged from 105-108 CFU/ml (average 7.2□0.72 lg CFU/ml), anaerobic - 105-107 CFU/ml (average 6.8□0.53 lg CFU/ ml). After treatment with AKI, growth of microorganisms was observed in all observations. In 5 cases, an increase in the monoculture of aerobes was observed, in 3 observations an association of aerobic and anaerobic bacteria was sown, in 8 cases an increase in the association of aerobic microorganisms was observed.

The concentration of aerobic bacteria decreased to 104-107 CFU/ml (average 6.3□0.52 lg CFU/ml; t=1.013), anaerobic - 105-106 CFU/ml (average

6.2□0.36 lg CFU/ml; t=0.936). Moreover, the microbial spectrum of aerobic cultures after treatment with APP was represented by the same microorganisms as before treatment, and only bacteroids were sown from the anaerobic flora.

One of the unsatisfactory results of treatment for EP is the rate of disease relapse. Of course, it would be methodologically incorrect to consider recurrence of the disease as a complication of surgical intervention, but this fact indicates the need to find ways to reduce them.

Indicators of disease relapse, although their frequency is quite low (2.1±0.9%), cannot fully satisfy surgeons, since this indicator does not correspond to the true state of affairs. The relapse may have been due to inadequate intraoperative treatment of EC, low antiparasitic effectiveness of the agents used to treat the residual cavity, and dissemination of echinococcal fluid during the primary operation.

Analysis of a fatal case against the background of the development of bile peritonitis showed that suturing large fistulas does not allow achieving adequate tightness, and when the latter is achieved, the risk of developing incompetence is high.

Thus, our analysis of the results of treatment of patients with EP showed a direct dependence of the results on the initial condition of the patients. In uncomplicated disease, the incidence of postoperative complications and mortality was minimal. Complications were due to technical errors in performing surgical interventions, high microbial contamination of the residual liver cavity during a complicated course of the disease, which persisted after treatment, and mortality was due to progression and decompensation of the body due to concomitant pathology.

The analysis of the results of treatment of patients in the comparison group showed that it is necessary to continue the scientific search in terms of substantiating a differentiated approach to the selection of a surgical team depending on the severity of the upcoming operation and the surgeon's preparedness, to modernize approaches to the elimination of large biliary fistulas,

to develop new ways to achieve intraoperative aparasis with minimal aggression on liver tissue.

In general, despite the comparability of the results of treatment of patients in the comparison group with the literature data, the results we obtained showed a number of our shortcomings, which made it possible to outline ways to resolve this problem, which is reflected in the next chapter.

CHAPTER IV. DEVELOPMENT OF NEW APPROACHES IN SURGERY FOR LIVER ECHINOCOCCOSIS

4.1. Development of a system for assessing the complexity of surgical intervention for liver echinococcosis

To determine a differentiated approach to choosing a surgical team, we were faced with the question of developing a system for quantitatively assessing the complexity of the upcoming operation for EP. We used the "expert assessment" method. The main condition of the expert assessment was to establish not the absolute value of a given sign in the diagnosis of a disease or its complication, but the relative value of the sign in terms of its positive or negative effect on the severity of the disease, which could subsequently influence the choice of surgical treatment method. When assigning this or that value to a specific sign, we proceeded from the fact that the difference in quantitative gradations within one sign should correspond to the level of reflection of the severity of the patient's condition by this sign.

Based on the above principles, we selected 7 main criteria for EP as the main criteria affecting the complexity of the operation: the number of cysts; the presence of concomitant damage to other organs; localization of cysts by liver segments; features of cyst localization; presence of complications of EP; cyst diameter; concomitant pathology that influences the technical aspects of surgery. Each criterion was conditionally divided into three gradations: light, moderate and severe.

In order to objectify the criteria we have chosen and their gradations, 12 independent experts (surgeons dealing with the problem of EP) were involved in the analysis of our proposed system, who assessed our development.

The results of the expert assessment showed that there was no consensus on the complexity of surgical intervention, but indicated the presence of a general trend in assessing the complexity of EP. The opinions of the majority of experts corresponded to the scale we proposed (Table. 4.1).

Table 4.1.

Results of expert assessment of the complexity of surgical intervention

Difficulty criteria		Light	Medium	Heavy
Number of cysts				
Single cyst	Light	12 (100%)	0 (0%)	0 (0%)
Multiple cysts affecting one lobe	Medium	2 (16,7%)	9 (75,0%)	1 (8,3%)
Multiple cysts affecting both lobes	Heavy	0 (0%)	4 (33,3%)	8 (66,7%)
Presence of combined lesions of other organs				
Isolated liver damage	Light	12 (100%)	0 (0%)	0 (0%)
Combined liver damage with other abdominal organs, requiring immediate surgical treatment	Medium	0 (0%)	10 (83,3%)	2 (16,7%)
Combined damage to the liver with other organs of the abdominal cavity and chest, requiring simultaneous surgical treatment	Heavy	0 (0%)	5 (41,7%)	7 (58,3%)
Localization of cysts by liver segments				
3, 4b, 5 segmente	Light	12 (100%)	0 (0%)	0 (0%)
2, 4a, 6 segmente	Medium	5 (41,7%)	7 (58,3%)	0 (0%)
1, 7, 8 segmente	Heavy	1 (8,3%)	5 (41,7%)	6 (50,0%)
Features of cyst localization				
Edge localization	Light	12 (100%)	0 (0%)	0 (0%)
Cysts occupying the entire lobe	Medium	5 (41,7%)	7 (58,3%)	0 (0%)
Cysts in the hilum of the liver, intraparenchymal cysts	Heavy	0 (0%)	4 (33,3%)	8 (66,7%)

Table continuation 4.1.

Presence of complications of echinococcosis				
No complications	Light	12 (100%)	0 (0%)	0 (0%)
Cyst suppuration, calcification, cyst rupture into the abdominal cavity	Medium	4 (33,3%)	7 (58,3%)	1 (8,3%)
Portal hypertension, breakthrough in the biliary tract, compression of the biliary tract and other complications, recurrent echinococcosis.	Heavy	1 (8,3%)	3 (25,0%)	8 (66,7%)
Diameter of cysts				
Untel 10 cm	Light	12 (100%)	0 (0%)	0 (0%)
11-20 cm	Medium	5 (41,7%)	6 (50,0%)	1 (8,3%)
More than 20 cm	Heavy	3 (25,0%)	4 (33,3%)	5 (41,7%)
Concomitant pathology affecting the technical aspects of surgery				
There are no concomitant pathologies	Light	12 (100%)	0 (0%)	0 (0%)
Liver cirrhosis (stage compensation, subcompensation), pregnancy (first half), obesity (2-3 stages),	Medium	5 (41,7%)	7 (58,3%)	0 (0%)
Liver cirrhosis (decompensation stage), pregnancy, obesity (4 degrees), adhesive disease	Heavy	1 (8,3%)	2 (16,7%)	9 (75,0%)

If, when creating a component of the system for assessing the complexity of surgical interventions in EP, certain disagreements arose between experts, then when summing up the results and choosing combinations of gradations of complexity criteria, no discussions arose. All experts were unanimous in the opinion that a mild degree of surgical intervention for EP is considered if there are “mild” complexity criteria or their combination with at least one “moderate” complexity criterion; average degree of complexity - in the presence of “easy” criteria in combination with two or more criteria of “medium” complexity or a combination of “light” and “medium” complexity criteria with at least one criterion of “heavy” degree; severe degree of difficulty - with various combinations of “easy” and “medium” in combination with at least 2 “severe” criteria.

According to the proposed system for assessing the complexity of surgical interventions, we conducted a retrospective analysis of surgical operations in the control group. Of the 243 patients, 131 (53.9%) had a mild degree of complexity of the surgical intervention, 74 (30.5%) had a moderate degree of complexity, and 38 (15.6%) had a severe degree of complexity. In order to assess the dependence of the frequency of postoperative complications and mortality on the complexity of the surgical intervention, we analyzed the clinical results.

With a mild degree, the frequency of postoperative complications was 1.2% (3 cases), with a moderate degree - 5.8% (14 observations) and with a severe degree - 11.9% (29 patients). The mortality rate was 0%, 0.4% (1 case) and 0.8% (2 observations), respectively. Overall, in the comparison group, the overall rate of postoperative complications was 18.9%, and mortality was 1.2% (Table 4.3).

Table 4.3.

Clinical results of treatment of patients in the comparison group depending on the complexity of operations

Clinical indicators	quantity	in % (M±m)
Rate of postoperative complications	46	18,9±2,5
With an “easy” degree of complexity of operations	3	1,2±0,7
With a “moderate” degree of complexity of operations	14	5,8±1,5
For “severe” degree of complexity of operations	29	11,9±2,1
Mortality rate	3	1,2±0,7
With an “easy” degree of complexity of operations	0	0
With a “moderate” degree of complexity of operations	1	0,4±0,4
For “severe” degree of complexity of operations	2	0,8±0,6

Thus, our proposed system for assessing the complexity of surgical interventions for EP, as well as analyzing the frequency of postoperative

complications and mortality, will allow us to develop a system of differentiated approach to performing surgical interventions.

4.2. Development of a differentiated approach to performing surgical interventions for liver echinococcosis

For a differentiated approach to the selection of a surgical team, we have developed a system for assessing the rating of a surgeon. The main principle was to quantify the level of professional training of the surgeon, which was determined by the dependence of the frequency and severity of postoperative complications on the number of operations performed of varying complexity.

In developing a system for assessing the rating of a surgeon, the results of treatment of patients in the comparison group were used as objective criteria, which were used as objective coefficients of our proposed criteria.

The general rating of the surgeon was assessed by summing up the indicators of operating and assisting in operations for EP.

R total = R op+R assist, where

R general - overall rating, R op - rating as an operator, R assist - rating as a first assistant

The operating and assisting indicator was composed of points for "light", "moderate" and "severe" operations.

R opera = B leg + B medium + B heavy, where

R opera – operator rating, B light – points for "light" operations, B medium – points for "moderately heavy" operations, B heavy – points for "heavy" operations.

Scores for operations were calculated by the ratio of the number of operations performed of varying complexity to the ratio of the sum of complication scores at various degrees of complexity.

B leg = N o l / (O leg + 1), where

N o l – the number of “light” operations, O leg – the score of complications for a “light” operation, 1 – the coefficient entered into the formula so that if the frequency of complications is zero, division by zero does not occur.

In avg = N about s / (About avg+1), where

N about s - the number of “moderate” operations, O average - the number of complications during a “moderate” operation.

B strand = N o t / (O strand + 1), where

N o t – number of “heavy” operations; About the seriousness of complications during “heavy” operations.

To determine the complication scores for various degrees of severity, it was necessary to define the concept of “mild”, “moderate”, “severe” complication. A critical analysis of the complications that arose allowed us to identify gradations between the degrees of severity of complications. Thus, “mild” complications were considered to be the development of wound and other complications that did not significantly affect the duration of the postoperative hospital period, in contrast to the usual postoperative course, and their treatment could be carried out on an outpatient basis; “moderate” complications were wound (suppuration) and other complications that did not require additional surgical procedures, but significantly increased the duration of the postoperative hospital period, in contrast to the usual course, or postoperative complications; “severe” were considered complications, the elimination of which required additional therapeutic measures (repeated operations, punctures, drainage, etc.).

Complication scores for each degree of complexity were determined by the frequency of complications in the comparison group at different degrees of complexity of the surgical intervention. The frequency of complications in the comparison group with a “mild” degree of complexity of surgical interventions was 1.2%, with a “moderate” degree of complexity - 5.8%, with a “severe” degree - 11.9%. Taking the coefficient of complications for a “mild” degree as 1, we calculated the coefficient for “moderate” and “severe” degrees of complexity of surgical interventions, taking into account the frequency of postoperative complications, which amounted to 4.8 and 9.9, respectively.

Complication scores were calculated using the following formulas:

O leg = (1*N o l l) + (4.8*N o c l) + (9.9*N o l l), where

N o l l – number of “mild” complications with “mild” complexity of the operation, N o s l – number of “moderate” complications with “mild” complexity of the operation, N o t l – number of “severe” complications with “mild” complexity of the operation .

O avg = (1*N o l s) + (4.8*N o c s) + (9.9*N o t s), where

N o l s – the number of “mild” complications during a “moderate” operation, N o c s – the number of “moderate” complications during a “moderate” operation, N o t s – the number of “severe” complications during a “moderate” operation.

O heavy = (1*N o l t) + (4.8*N o c t) + (9.9*N o t t), where

N o l t – the number of “mild” complications with a “severe” degree of complexity of the operation, N o s t – the number of “moderate” complications with a “severe” degree of complexity of the operation, N o t t – the number of “severe” complications with a “severe” degree of complexity of the operation.

According to the research carried out by Lokhvitsky V.S. (1991) the ratio of the number of points for professionalism between the operator and the assistant during echinococcectomy is 4/1. Taking this fact into account, the assistant’s rating was calculated similarly to the operator’s rating, but the quantitative indicator was used with a coefficient of 0.25 (Certificate of official registration of the computer

program No. DGU 08977 “Evaluation of the surgeon’s rating for performing surgical interventions for liver echinococcosis (SD.exe) dated June 29. 2020).

We determined the rating of 7 surgeons who performed surgical interventions in the comparison group (Table 4.4, 4.5.).

Table 4.4.

Evaluation of the rating of surgeons-operators for the comparison group

Indicators/surgeons	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Overall score for "light" operations	1,7	2,1	0,9	5,0	20,0	2,4	2,8
Overall score for "moderate" operations	0,3	0,2	0,1	3,4	1,4	0,6	0,3
Overall score for "heavy" operations	0,0	0,1	0,1	0,4	0,9	0,3	0,3
Number of operations of “easy” degree of complexity	10	12	10	29	40	14	16
Number of operations of “medium” complexity	2	5	4	20	29	9	5
Number of operations of “heavy” degree of complexity	0	2	3	14	15	2	2
Donkey points for “easy” operations	4,8	4,8	9,9	4,8	1,0	4,8	4,8
Donkey points for “moderate” operations	4,8	20,5	40,0	4,8	19,5	14,7	14,7
Donkey points for “heavy” operations	0,0	14,7	31,4	30,4	15,7	4,8	4,8
Number of “light” donkeys with “light” surgery	0	0	0	0	1	0	0
Number of “moderately severe” donkeys with “light” surgery	1	1	0	1	0	1	1
Number of “heavy” donkeys with “light” surgery	0	0	1	0	0	0	0
Number of “light” donkeys during “moderate” surgery	0	1	1	0	0	0	0
Number of “moderately severe” donkeys during “moderately severe” surgery	1	2	4	1	2	1	1
Number of “severe” donkeys during a “moderate” operation	0	1	2	0	1	1	1
Number of “light” donkeys during “heavy” surgery	0	0	2	1	1	0	0
Number of “moderately severe” donkeys during “severe” surgery	0	1	2	2	1	1	1
Number of “severe” donkeys during a “severe” operation	0	1	2	2	1	0	0
Operator rating	***2,1***	***2,4***	***1,1***	***8,9***	***22,3***	***3,3***	***3,4***

Table 4.5.

Evaluation of the rating of assistant surgeons in the control group

Indicators/surgeons	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Overall score for "light" operations	16,0	2,5	2,6	3,3	3,0	3,2	2,9
Overall score for "moderate" operations	0,5	0,5	0,5	3,0	0,6	0,8	0,5
Overall score for "heavy" operations	0,4	0,9	0,5	0,3	0,3	0,3	0,2
Number of operations of “easy” degree of complexity	16	26	28	19	3	22	17

Table continuation 4.5.

Evaluation of the rating of assistant surgeons in the control group

Indicators/surgeons	**A**	**B**	**C**	**D**	**E**	**F**	**G**
Number of operations of "medium" complexity	18	13	10	3	4	12	14
Number of operations of "heavy" degree of complexity	8	5	6	7	4	5	3
Donkey points for "light" operations	0,0	9,6	9,9	4,8	0,0	5,8	4,8
Donkey points for "moderate" operations	34,2	24,3	20,5	0,0	5,8	14,7	29,4
Donkey points for "heavy" operations	20,5	4,8	10,9	20,5	14,7	15,7	14,7
Number of "light" donkeys during a "light" operation	0	0	0	0	0	1	0
Number of "moderately severe" donkeys with "light" surgery	0	2	0	1	0	1	1
Number of "heavy" donkeys with "light" surgery	0	0	1	0	0	0	0
Number of "light" donkeys during "moderate" surgery	0	0	1	0	1	0	0
Number of "moderately severe" donkeys during "moderately severe" surgery	3	3	2	0	1	1	2
Number of "severe" donkeys during a "moderate" operation	2	1	1	0	0	1	2
Number of "light" donkeys during "heavy" surgery	1	0	1	1	0	1	
Number of "moderately severe" donkeys during "severe" surgery	2	1	0	2	1	1	1
Number of "severe" donkeys during a "severe" operation	1	0	1	1	1	1	1
Assistant rating	***4,2***	***1,0***	***0,9***	***1,7***	***1,0***	***1,1***	***0,9***
Overall surgeon rating	**6,3**	**3,4**	**2,0**	**10,5**	**23,3**	**4,4**	**4,3**

The analysis, taking into account the complexity of postoperative complications for each surgeon, allowed us to recommend a surgical team depending on the preoperative assessment of the complexity of the upcoming operation.

With an overall rating of up to 3.4 points, the surgeon does not have the right to perform the operation independently; with a rating of 3.5 to 4.3 points, the surgeon can independently perform "light" operations and "moderate" operations

together with a surgeon with a higher rating; with a rating from 4.4 to 10.5 points, the surgeon can independently perform “moderate” operations with a surgeon of lower professional training, and “heavy” operations with a surgeon with a higher rating, and finally, a surgeon with a rating of 10.6 points and more can perform any surgical interventions for EP (Table 4.6).

Table 4.6.

Algorithm for performing surgical interventions for liver echinococcosis of varying degrees of complexity

Complexity of operations	Performing the operation yourself	Performing the operation under control
Easy	3,5-4,3	Untel До 3,4
Medium-heavy	4,4-10,5	3,5-4,3
Heavy	10.6 or more	4,4-10,5

Clinical example: Patient K., 21 years old (case history No. 7073) was admitted on July 6, 2019. to the thoracoabdominal surgery department of the TMA multidisciplinary clinic with complaints of periodic discomfort occurring in the epigastric region. From the anamnesis: the above complaints during the last month. During examination at the place of residence, echinococcosis of the abdominal cavity was diagnosed.

Upon admission: the general condition of the patient is satisfactory. The skin is of normal color. Blood pressure is 120/70 mmHg, pulse is 86, rhythmic. The abdomen is soft and painless. Intestinal peristalsis is heard.

The patient is examined in the clinic. In the tests: hemoglobin – 121 g/l, erythrocytes – 4.6, leukocytes – 6.5, ESR – 7 mm/hour, eosinophils – 4.6, ALT – 0.6; AST – 0.3 μmol/l, bilirubin – 15 mmol/l, total protein – 74.0 g/l.

Ultrasound and MSCT show multiple cysts of various sizes in all parts of the abdominal cavity and in both lobes of the liver (Fig. 4.1).

ECG: EOS is not rejected. Heart rate 80. ECG without pathology.

Plain X-ray of the chest and abdominal organs revealed no pathology.

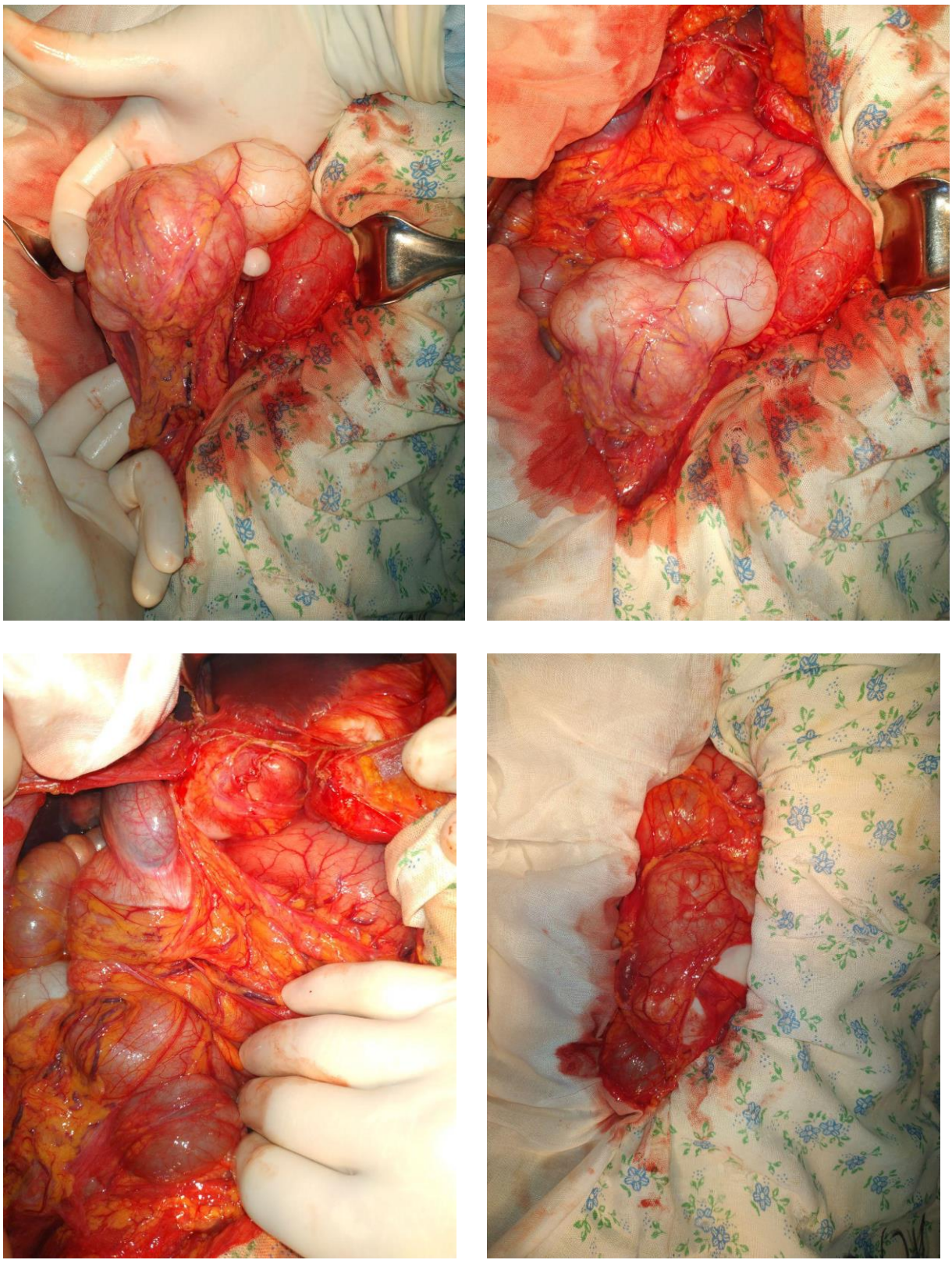
The assessment of the complexity of the proposed operation was assessed as severe. An operating team has been assigned with surgeon “D” and assistant “A”.

07/08/2019. The operation was performed: “Combined echinococcectomy of the liver, cholecystectomy from the neck, echinococcectomy of the abdominal cavity.”

During the operation, during revision, the entire greater omentum with multiple echinococcal cysts, which are located in all parts of the abdominal cavity and reach the pelvis. Cysts ranging in size from 3-4 cm to 15 cm. A number of these cysts are in a collapsed state. Several echinococcal cysts ranging in size from 3 to 10 cm in diameter were embedded in the small pelvis. In the left lobe of the liver in the projection of segment IV there are 3 cysts with a diameter of 7, 8 and 10 cm. Some of the cysts are in a collapsed state. Next to these cysts there is a limited accumulation of echinococcal fluid with fragments of the chitinous membrane measuring up to 15 cm in diameter.

dr. 4.1. MSCT of patient K. in the preoperative period.

The accumulation of fluid is limited to the anterior wall of the stomach and the greater omentum, formed as a result of perforation of a nearby collapsed echinococcal cyst. In the epigastric region there is an hydatid cyst measuring 8x6 cm, which is intimately fused to the gallbladder. In the area of the VII segment of the liver there is an echinococcal cyst, which continues into the area of the VIII segment (p. 4.2).



dr. 4.2. Intraoperative photographs of the abdominal cavity.

Large echinococcal cysts of the greater omentum were ideally removed. A cyst located in the area of the gallbladder was opened. The chitinous membrane is removed, the cavity is processed, and the free edges of the fibrous capsule are excised. Part of the fibrous capsule remained on the surface of the gallbladder. In this regard, a cholecystectomy was performed from the cervix. Cysts in the left

lobe of the liver were opened and treated. The residual cavities are combined into one single cavity. In the depths of the residual cavity there is a bile fistula. Considering the pronounced adhesive process in the upper half of the abdomen, it is not possible to sutured the biliary fistula in the depths of the wound. This cavity was processed according to Kurya. A cyst was opened in the area of the VII segment of the liver, the chitinous membranes with daughter cysts were removed. During digital revision, the residual cavity moves towards the VIII segment of the liver. There are no bile fistulas. The cavity was treated according to Vishnevsky.

Dr. 4.3. MSCT of patient K. in the postoperative period.

Echinococcal cysts were removed from the abdominal cavity in stages with resection of the greater omentum. Most cysts were removed perfectly. A number of cysts that were adjacent to the large and small intestines were opened, processed, the chitinous membranes were removed, and the free edges of the fibrous capsule were excised. Echinococcal cysts located in the pelvis were treated in a similar way.

The duration of the operation is 4 hours 30 minutes.

The postoperative period proceeded smoothly, without complications. About 150 ml of bile was separated from the drained cavity every day. Drains from the abdominal cavity were removed on days 4-6.

On the control MSCT there is a drained cavity in the left lobe of the liver. No hydatid cysts were found (Fig. 4.3).

On the 10th day, the patient was discharged in satisfactory condition for outpatient observation. During the first month, the flow of bile from the AKI stopped. On control fistulography, the cavity was preserved. After 3 months the cavity was completely closed. Drainage removed. Recovery.

Thus, the differentiated approach we propose to performing surgical interventions for EP will improve treatment results for this category of patients.

4.3. Improving the technical aspects of surgical interventions for liver echinococcosis

We analyzed the reasons for unsatisfactory treatment results in the comparison group. In our opinion, the reason for the failure of sutured biliary fistulas was their large size. In addition, when bile fistulas are located close to the main bile ducts, when they are sutured, deformation and narrowing of the lumen occurs, which contributes to disruption of the passage of bile and the development of obstructive jaundice.

Taking into account the above, in the presence of large fistulas, their location close to the lobar ducts, a new method of closing it began to be used. After conventional echinococcectomy, a trapezoidal flap was cut out from the removed fibrous capsule. The flap was sutured around the fistula opening at a distance of 2-3 mm from each other. When the sutures were tightened, the fistula opening was closed with a flap in the form of a sealed patch (Rationalization proposal No. 782 “Method of suturing a cystobiliary fistula” dated December 16, 2019) (dr. 4.4).

Indications for suturing cystobiliary fistulas using the method we propose are:

1. The diameter of the fistula opening is 5 mm or more;

2. Technical impossibility of suturing a fistula in the presence of inflammation, infiltration or calcification of tissues around the fistula due to the risk of cutting through the sutures.

dr. 4.4. Stages of suturing a cystobiliary fistula using the method we propose.

3. Cases when the fistula comes directly from the walls of the right or left lobar ducts.

4.4. Development of a method for intraoperative treatment of the residual cavity using electrolysis aqueous solutions of sodium hypochlorite

After echinococcectomy, scolex may remain in the residual cavities, which contribute to the relapse of echinococcosis. To avoid this complication after echinococcectomy, the cavity is treated with various medicinal and disinfectant solutions. Analysis of long-term results of 100% glycerol, widely used in recent years, showed that the proportion of relapse of EP does not change particularly.

In this regard, we decided to justify the feasibility of using an electrolysis aqueous solution (EAS) of sodium hypochlorite for intraoperative treatment of cavities after echinococcectomy.

In this regard, we conducted research to determine the optimal mode (concentration and duration of treatment) of EVR treatment in order to achieve 100% inactivation of echinococcal fluid.

To study the antiparasitic effect of sodium hypochlorite EVR, we conducted screening studies in the concentration range from 0.1 to 0.8% with a treatment duration of 1 to 30 minutes.

The studies were carried out in vitro. 2 ml of echinococcal fluid was poured into the well. 2 ml of EVR sodium hypochlorite was added to each well at various concentrations (0.1, 0.2, 0.4, 0.6 and 0.8%). Then the time was recorded and at the 1st, 2nd, 3rd, 4th, 5th, 7th minutes, studies were carried out on staining and microscopy of the material. EC protoslexes were examined under a light microscope and their viability was determined by the presence of their mobility, shape and staining with 0.1% eosin. Living protoslexes did not perceive paint, but dead ones were stained red or red-brown with 0.1% eosin for 1 minute. The assessment was carried out by counting living and dead protoslexes in the field of view and then calculating them as a percentage. For greater reliability of the results, 8 studies were carried out in each mode (Table. 4.7).

Studies have shown that 0.1% EVR sodium hypochlorite does not have a sufficiently destructive effect on Echinococcus protoscolexes. With exposure up to 5 minutes, 37.0% of protoscolexes remained alive. When treated with 0.2% EVR sodium hypochlorite, as well as when treated with a 0.1% solution, starting from the 2nd minute there is an increase in the death of protoscolexes, although we did not achieve a 100% effect when treating for up to 7 minutes. The greatest effect was noted when using 0.4-0.8% solutions for 3-5 minutes. It was in these modes that the optimal result was achieved. As our studies have shown, the most optimal mode is treatment with a 0.8% solution for 4 minutes, 0.4 and 0.6% solutions for 5 minutes.

Table 4.7.

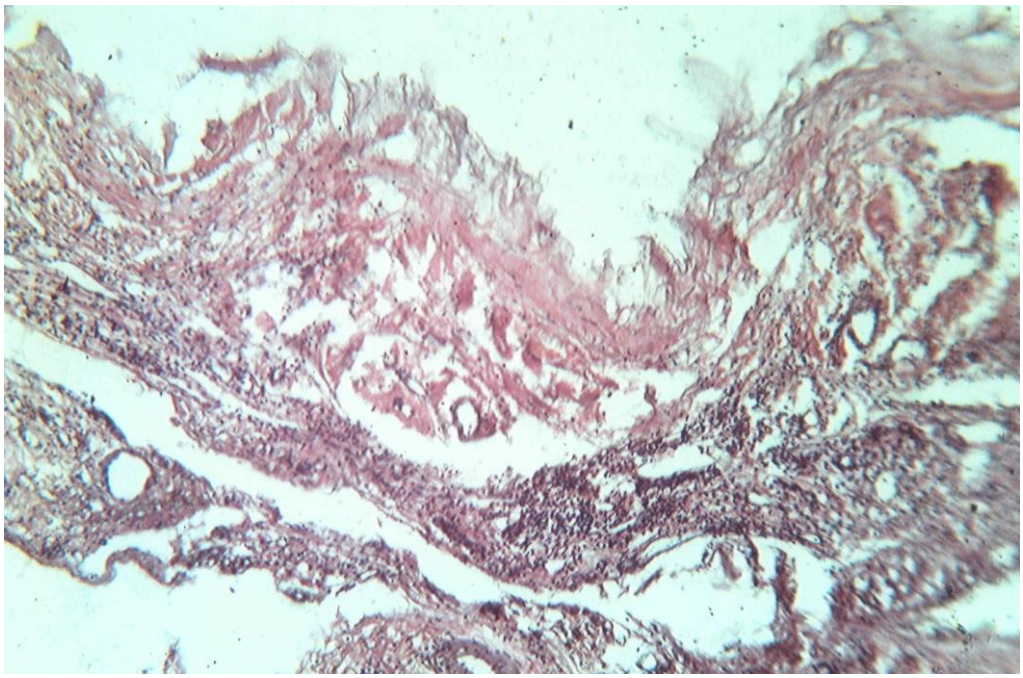
Results of assessing the antiparasitic effectiveness of sodium hypochlorite EVR in liver echinococcosis

Exposure time, min	% EVR sodium hypochlorite				
	0,1	0,2	0,4	0,6	0,8
1	1,3±1,1%	3,8±2,6%	11,2±3,1%	20,6±5,6%	40,8±4,6%
2	4,2±2,7%	7,6±5,7%	27,7±7,4%	40,4±4,6%	61,0±4,9%
3	12,1±3,8%	26,5±4,5%	76,0±4,7%	90,1±2,5%	98,8±2,2%
4	27,2±6,0%	44,5±4,1%	94,2±5,8%	96,3±4,7%	100%
5	37,0±8,7%	55,0±6,8%	100%	100%	100%
7	56,5±3,5%	75,6±4,7%	100%	100%	100%

Thus, in vitro studies allow us to recommend 0.4% sodium hypochlorite EVR for the effective destruction of protoscolexes as the least toxic compared to 0.6 and 0.8% sodium hypochlorite EVR on healthy tissues of the human body (Rationalization proposal No. 783 “Method of treatment echinococcal cavity" dated December 16, 2019).

Along with the effective destruction of protoscolexes, sodium hypochlorite EVR affects the structure of echinococcus and liver parenchyma. In this regard, we carried out morphological studies to study the effect of various modes of treatment of sodium hypochlorite with EV on the fibrous and chitinous membranes and liver parenchyma.

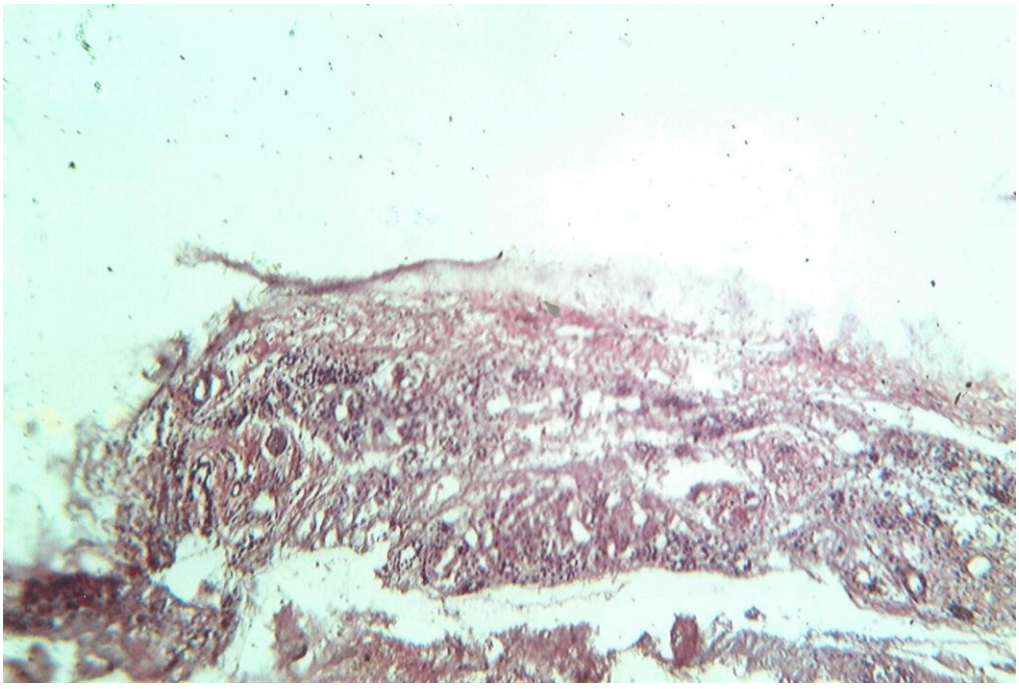
Morphological study of the effect of various processing methods on the fibrous capsule of echinococcus. The fibrous capsule around the echinococcus consists of several layers: an inner layer of fibrinoid necrosis, a middle dense fibrous layer consisting of fibrous connective tissue and an outer perifocal inflammatory-granulation tissue layer (dr. 4.5).



dr. 4.5. Fibrous capsule without treatment. Consists of internal fibrinoid necrosis, middle fibrous layer and perifocal inflammatory infiltrate. Staining: hematoxylin and eosin. X:ок.10, об. 20.

In this case, internal fibrinoid necrosis is represented by a structureless, loose, sometimes homogeneous eosinophilic mass. The fibrous layer has uneven thickness and consists of randomly arranged fibrous structures, thick-walled vessels and a small number of mature connective tissue cells. Moreover, in some places fibrinoid necrosis penetrates into this layer of the capsule from the inner layer, and cellular infiltrate from the outer layer. The outer perifocal infiltrative layer is represented by massive inflammatory cells, thin-walled vessels and newly formed fibrous structures that form inflammatory granulation tissue.

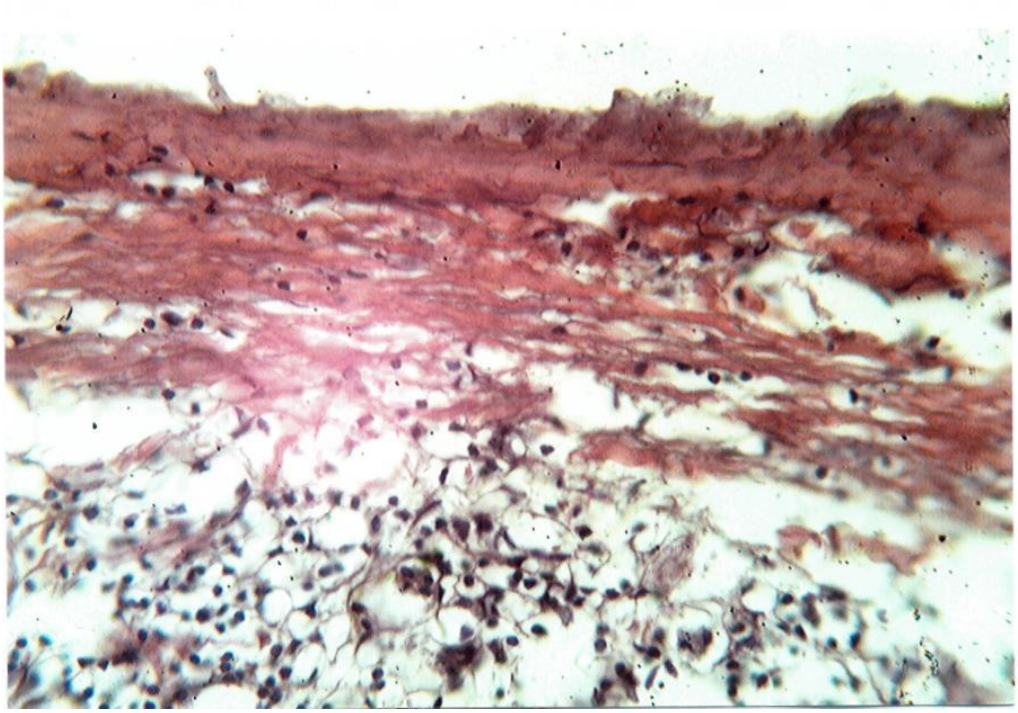
A morphological study of the effect of 0.2% EVR sodium hypochlorite with a 5-minute exposure showed that in the structural elements of all layers of the fibrous capsule, no special changes were found from the morphological picture without treatment. There was only a slight decrease in the volume of internal fibrinoid necrosis, loosening of the external inflammatory granulation tissue (dr. 4.6).



dr. 4.6. Fibrous capsule treated with 0.2% EVR sodium hypochlorite. Loosening all layers of the capsule. Staining: hematoxylin and eosin. X:ок.10, об. 20.

The inner fibrous layer had a normal structure, in which fibrous structures and cell accumulations are located randomly and chaotically. In the external perifocal inflammatory infiltration, the development of slight edema and loosening of the intercellular space was noted.

With a 10-minute exposure, the above-described changes become somewhat deeper in the form of rejection of fibrinoid necrosis, loosening of the fibrous and outer inflammatory layer of the capsule. The results of a microscopic examination of the fibrous capsule of echinococcus after treatment with 0.4% EVR sodium hypochlorite for 5 minutes showed that the internal fibrinoid layer is thinned and is represented by intensely stained eosin, a compacted homogeneous mass (dr. 4.7).

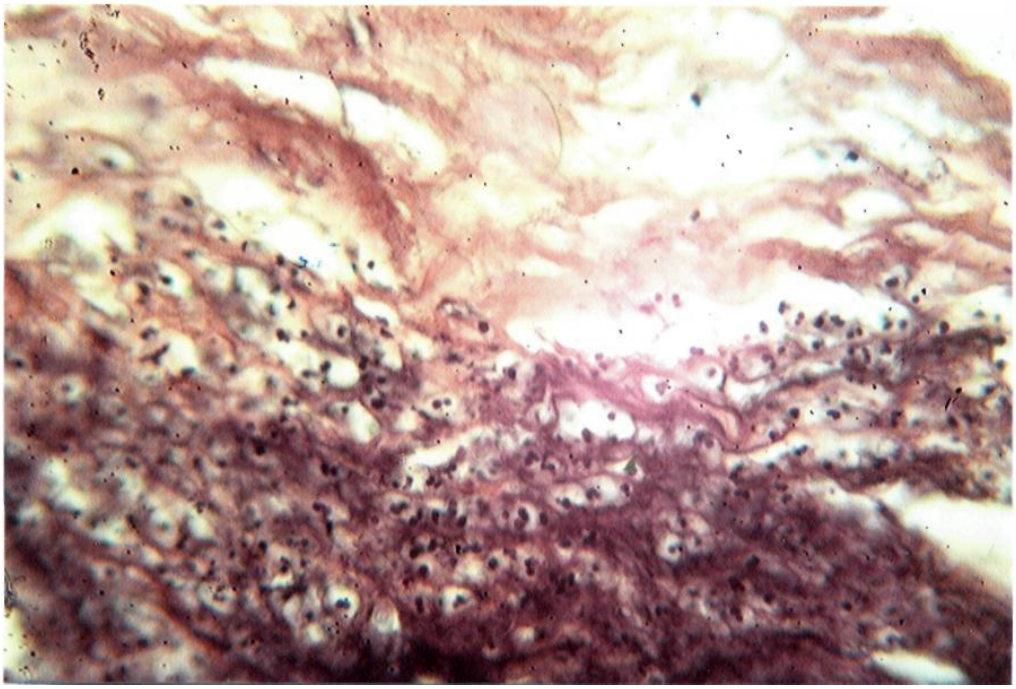


dr. 4.7. Fibrous capsule treated with 0.4% EBP sodium hypochlorite for 5 minutes. Compaction of the layer of fibrinoid necrosis, loosening of the fibrous layer. Staining: hematoxylin and eosin. X:ок. 10, об. 20.

At the same time, the inner fibrous and outer inflammatory layers are somewhat loosened due to swelling of the intercellular substance. The fibrous structures and connective tissue cellular elements of the fibrous layer are disintegrated and subject to mucoid swelling. In the outer inflammatory layer, pronounced swelling and loosening of cellular elements are noted, and intracellular edema, karyopyknosis and karyolysis of some nuclear structures are revealed.

With a 10-minute treatment with 0.4% sodium hypochlorite EVR, the development of pronounced edematous and destructive phenomena was noted in all layers of the capsule. At the same time, the internal fibrinoid layer became significantly thinner. In the middle fibrous layer, more pronounced destructive changes were detected in the form of loosening and destruction of fibrous structures, as well as vacuolization and disintegration of connective tissue cells. In this layer, mucoid swelling of the fibrous structures was more pronounced with the transition to myxamatosis in the form of basophilic staining of the intercellular substance. In the outer inflammatory layer, the development of disorganization and

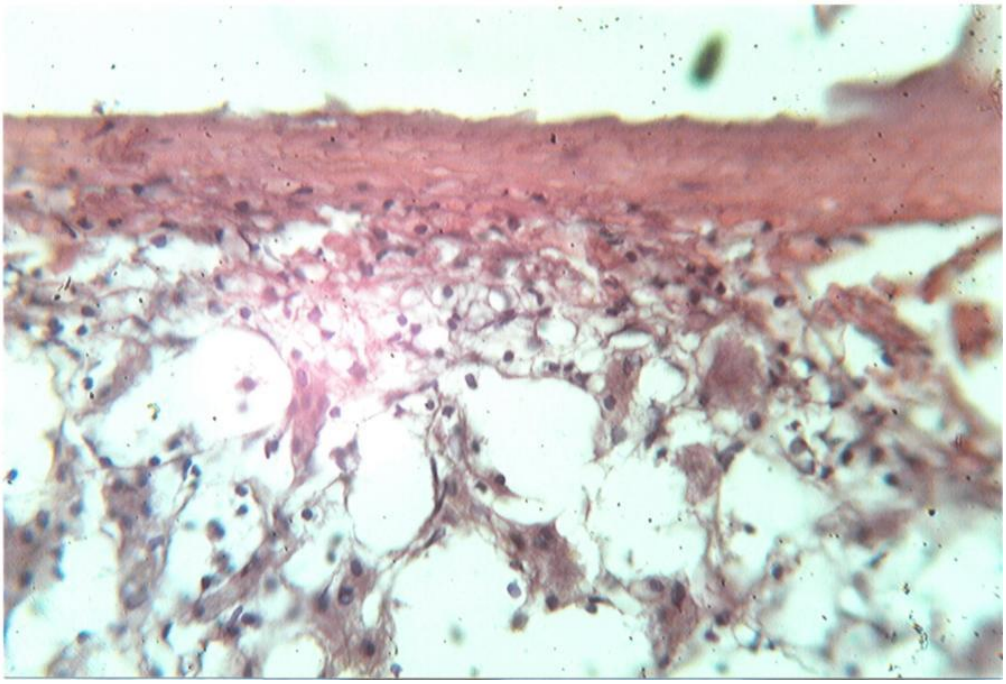
destructive changes was also noted in the form of lysis and disintegration of cellular elements and fibrinoid swelling of fibrous structures (dr. 4.8).



dr. 4.8. Fibrous capsule treated with 0.4% EBP sodium hypochlorite for 10 minutes. Loosening and destruction of the fibrous layer, liquefaction of the perifocal infiltrate. Staining: hematoxylin and eosin. X:ок.10, об. 20.

The results of a microscopic examination of the fibrous capsule of echinococcus after treatment with 0.6% EVR sodium hypochlorite for 5 minutes showed that the inner layer of fibrinoid necrosis is absent, the middle layer consisting of fibrous tissue is thinned and compacted and is represented mainly by parallel fibrous structures (dr. 4.9).

It contains single, elongated connective tissue cells. The volume of the outer perifocal layer is also reduced and is represented by loose inflammatory granulation tissue. It has an increased number of randomly arranged fibrous structures and thin-walled vessels, and the number of cellular elements is significantly reduced. In the hepatic tissue adjacent to this layer of the capsule, pronounced swelling of the space of Disse and compression of the hepatic parenchyma are noted.



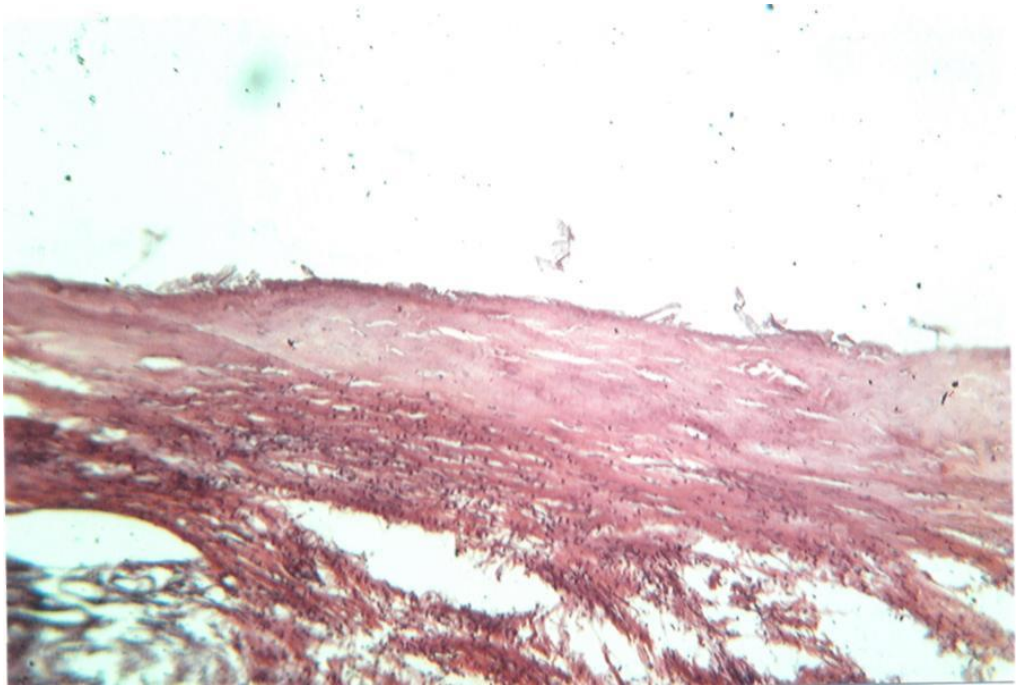
dr. 4.9. Fibrous capsule treated with 0.6% EBP sodium hypochlorite for 5 minutes. Compaction and thinning of the fibrous layer of the capsule, loosening of the perifocal infiltrate. Staining: hematoxylin and eosin. X:ок. 10, об. 20.

With a 10-minute treatment with 0.6% sodium hypochlorite EVR, pronounced edematous and destructive phenomena were observed in all layers of the capsule. In this case, the internal fibrinoid layer is absent. In the middle fibrous layer, more pronounced destructive changes were observed in the form of edema of the intercellular space with loosening and destruction of fibrous structures, as well as vacuolization and disintegration of connective tissue cells. In fibrous structures, mucoid swelling was more pronounced with a transition to fibrinoid swelling and myxamatosis in the form of basophilic staining of the intercellular substance. In the outer inflammatory layer, there was a decrease in the inflammatory cellular infiltrate and the development of disorganized changes in connective tissue elements in the form of lysis of fibers and disintegration of cellular elements.

For the purpose of comparative assessment of the morphological picture during the treatment of EVR with sodium hypochlorite, we conducted studies to study the effect of glycerol treatment on the structures of EC.

The results of a microscopic examination of the fibrous capsule after treating it with glycerol for 5 minutes showed that in all layers of the capsule there was development of edema and compaction of the intercellular substance. The inner

layer of fibrinoid necrosis is somewhat thickened, loosened, and the appearance of edematous cracks and tears is determined in its thickness (dr. 4.10).



dr. 4.10. Fibrous capsule, glycerin treatment. Consolidation of fibrinoid necrosis, fibrous layer, loosening of perifocal infiltrate. Staining: hematoxylin and eosin. X:ок.10, об. 20.

The middle fibrous layer, in contrast to those described above, is thinned and loosened, although the fibrous structures are located parallel to each other, they form thick homogenized bundles, between which cellular elements are located. In this layer, the intercellular substance is also compacted and stained with eosin more intensely. The outer perifocal layer of the inflammatory infiltrate is significantly subject to swelling and loosening. Where connective tissue fibers are disrupted and torn, the volume of inflammatory cell infiltrate is markedly reduced. With a 10-minute treatment with glycerol in all layers of the fibrous capsule, the above-described pathomorphological changes are more pronounced and significantly widespread.

Morphological study of the influence of various processing methods on the chitinous membrane of echinococcus. The results of a microscopic examination of the chitinous shell showed that it consists of a longitudinally striped structured homogeneous substance, weakly stained with hematoxylin, with a thickness from 100 μm to several mm. In the chitin shell, two types of stripes are determined by the

intensity of staining: dark stripes intensely stained with hematoxylin alternate with light stripes weakly stained with hematoxylin (dr. 4.11).

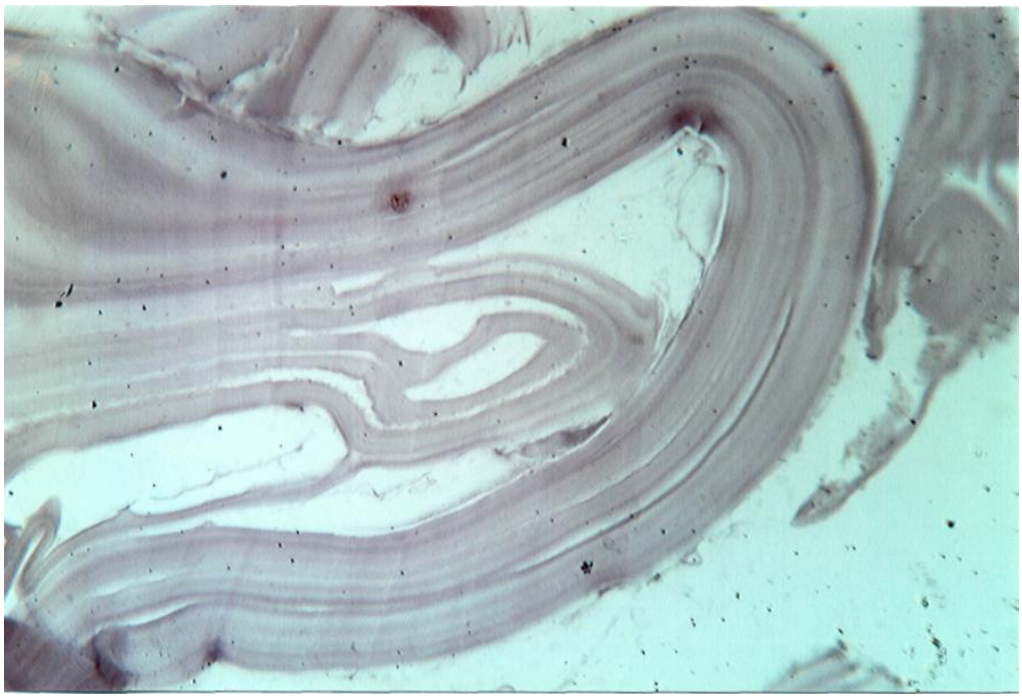
dr. 4.11. Chitin shell without treatment. Consists of uniform parallel dark and light stripes. Staining: hematoxylin and eosin. X:ок. 10, об. 20.

They normally have almost the same thickness, and in the entire chitinous shell there are on average 15-20 light and dark stripes. The outer surface of the chitinous shell is uneven, loosened due to the presence of foci of edema and compaction. The inner surface is smooth, even; in the cavity of the EC there are thin, newly formed chitinous shells of daughter vesicles.

When treated with 0.2% EVR sodium hypochlorite for 5 and 10 minutes, no deviations from the norm were found in the composition of the chitin shell. Only a slight thickening of the light stripes and the appearance of tortuosity in the dark stripes were noted. Small fragments and fragments appeared on the outer surface, separated from the main mass of the chitinous shell. No visible morphological changes were found in the inner surface.

When treated with 0.4% EVR sodium hypochlorite for 5 minutes, areas of edema of light stripes and disintegration of dark stripes were found in certain areas of the chitin shell. In such zones, around foci of edema, part of the chitinous membrane became hyperchromic due to thickening of dark stripes. After 10 minutes of treatment, areas of edema and fiber disintegration in the chitin shell

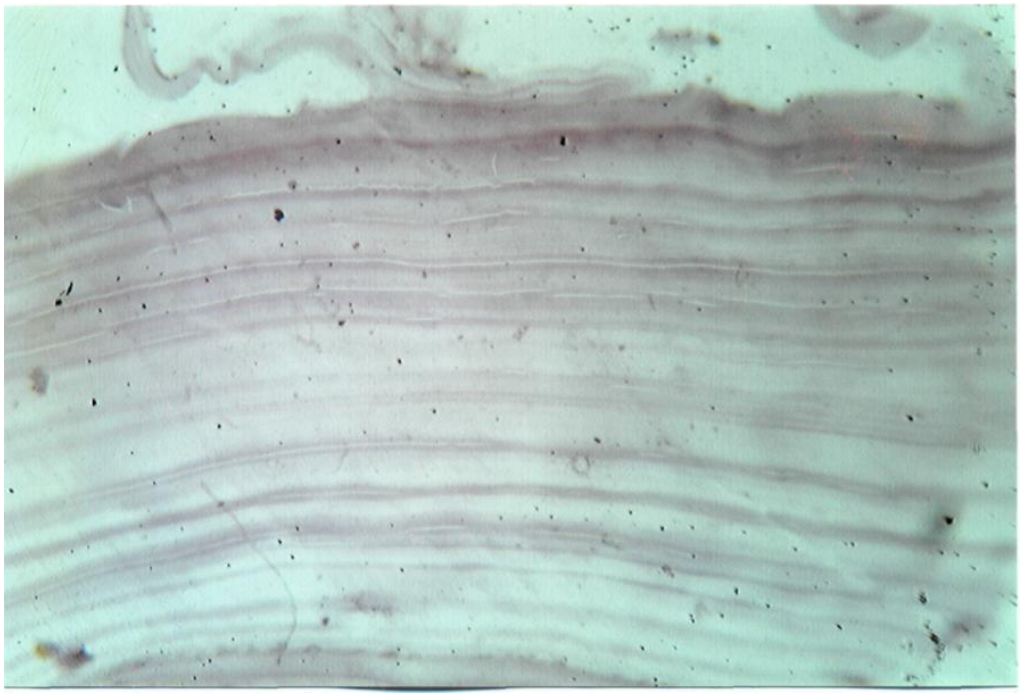
increased, sometimes resulting in the detachment of some strips from the main mass of chitin. At the same time, the color intensity of the dark stripes became multi-colored due to the homogenization of the chitin matrix (dr. 4.12).



dr. 4.12. Chitin shell, treated with 0.4% EBP sodium hypochlorite for 10 minutes. Loosening and defibration, thickening of light stripes. Staining: hematoxylin and eosin. X:ок. 10, об. 20.

When treated with a 0.6% sodium hypochlorite solution for 5 and 10 minutes, the pathomorphological changes developing in the composition of the chitin shell, just as in the previous series, developed in the form of edema of light stripes and disintegration of dark stripes, only they differed in intensity and distribution in all sections of chitin.

When treated with glycerin as part of the chitin shell, a more significant thickening of the area of light stripes without swelling and loosening was noted. Unlike previous series, when treated with glycerin, the light stripes became more hyperchromatic and in some places merged in color with the dark stripes (dr. 4.13).

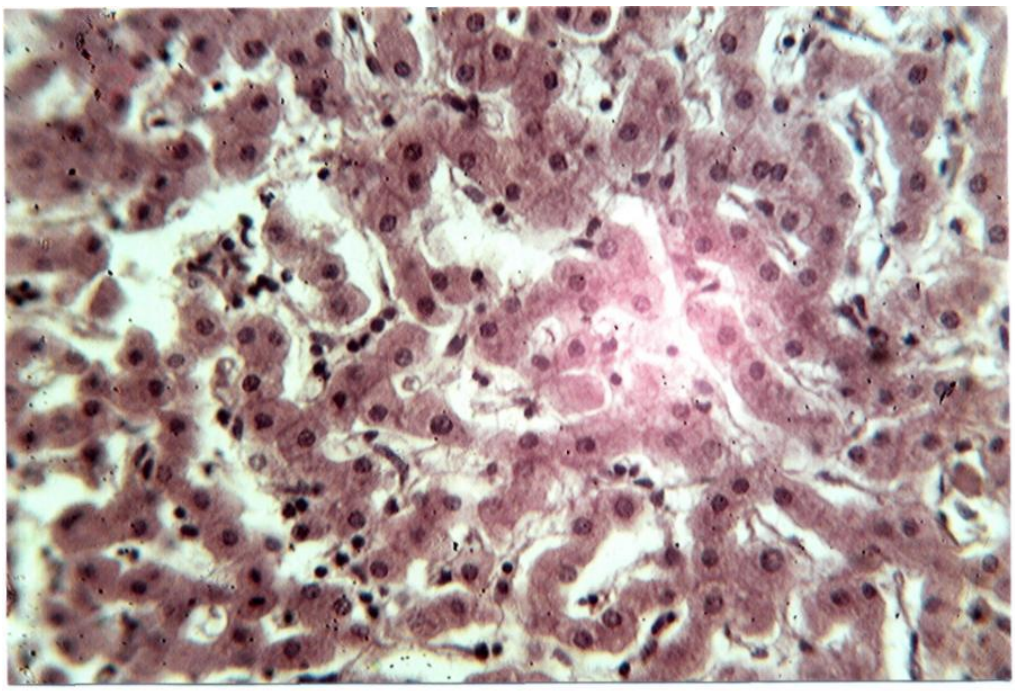


dr. 4.13. Chitin shell, glycerin treatment. Compaction of dark stripes, thickening of light stripes. Staining: hematoxylin and eosin. Х:ок. 10, об. 40.

The thickness of the dark stripes on the outer and inner surfaces of chitin increased due to merging with each other and thinning of the light zones. Also, in this series of experiments, small hyperchromic foci appeared within the chitin shell.

Morphological study of the effect of various processing methods on liver parenchyma.

The results of a microscopic examination of liver tissue with echinococcosis showed that the beam and lobular structure of hepatocytes is relatively preserved. In the peripheral part of the lobules, the volume of hepatocytes is slightly increased due to the presence of hyaline-droplet and fine-bubble vacuolar degeneration in them (dr. 4.14).

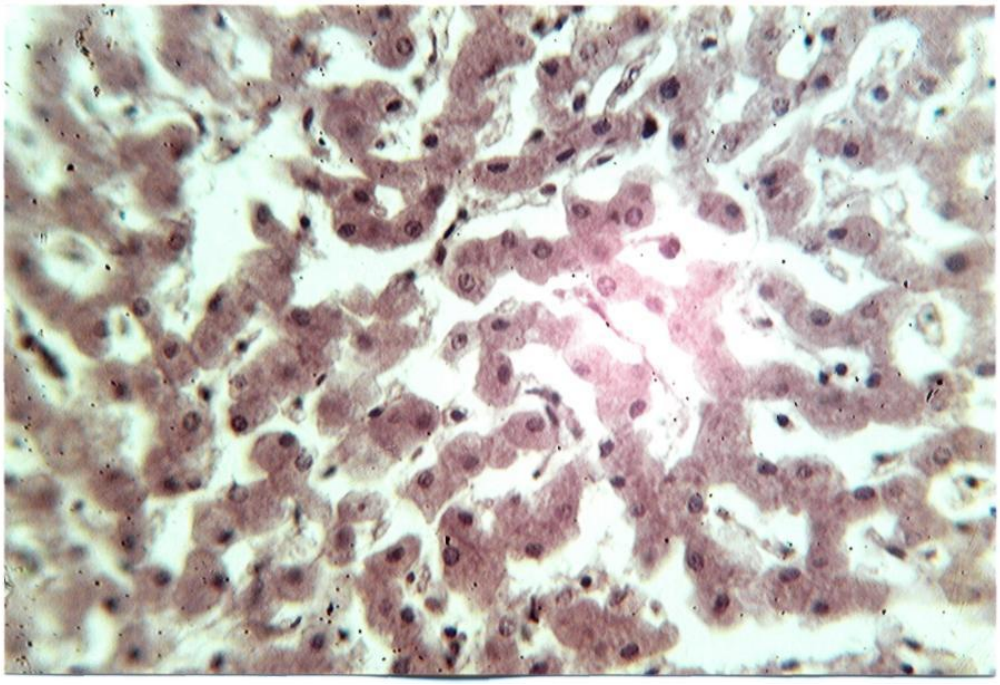


dr. 4.14. Liver without processing. Preservation of the beam structure of hepatocytes, the presence of a small inflammatory infiltrate in the inter-beam space. Staining: hematoxylin and eosin. X:ок. 10, об. 40.

Sinusoids and Disse spaces are collapsed and without visible deviations from the norm. In the central part of the lobules, on the contrary, the sinusoids and spaces of Disse are dilated and edematous and contain single mononuclear inflammatory cells. Hepatocytes are compressed and somewhat atrophic with intensely stained cytoplasm.

When treated with 0.2% sodium hypochlorite EVR for 5 and 10 minutes, only edematous phenomena were detected in the liver parenchyma, expressed by dilation of the sinusoids and the space of Disse (Fig. 4.15).

In this case, rejection of the endothelial cover of the sinusoids from the hepatocyte beams was noted. On the part of hepatocytes, only moderate hyperchromasia of nuclear structures was noted. In the cytoplasm of hepatocytes, slight hyperpigmentation and the development of focal fine-bubble vacuolar degeneration were detected.

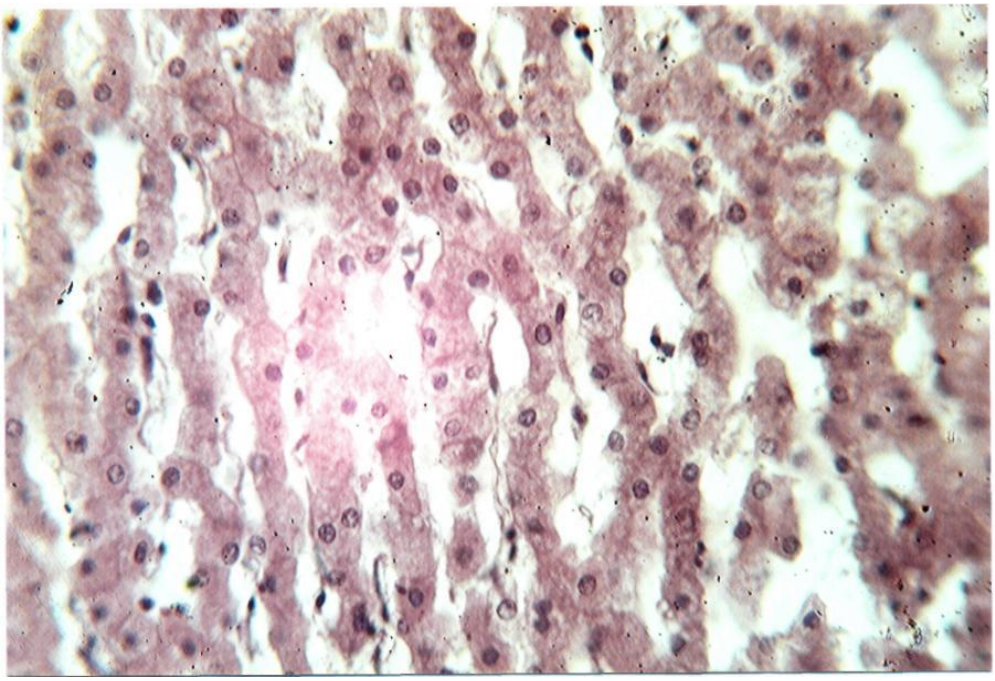


Rice. 4.15. Liver, treatment with 0.2% sodium hypochlorite EVR. Dilatation of sinusoids and central vein. Staining: hematoxylin and eosin. X:ок. 10, об. 40.

Microscopic examination of liver tissue when treated with 0.4% sodium hypochlorite EVR for 5 minutes showed that dyscirculatory and edematous changes in the liver stroma were widespread and more pronounced than in the previous series. At the same time, the central veins of the lobules were paralytically dilated and full of blood, the adjacent parts of the sinusoids were also dilated with rejection of the endothelial cover.

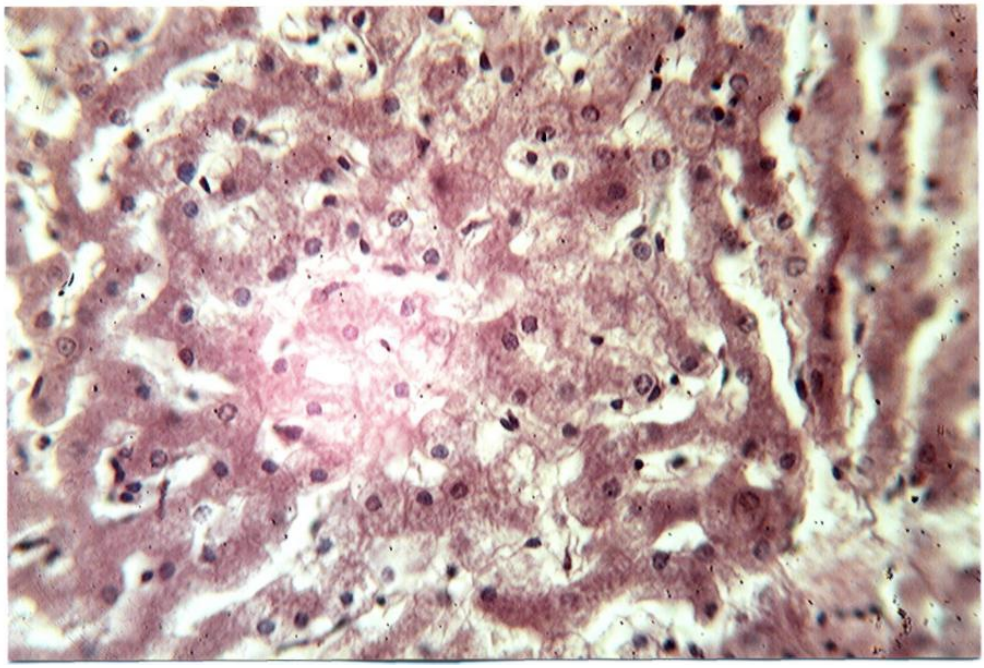
On the part of the liver parenchyma, the development of hyaline-droplet and vacuolar degeneration in the cytoplasm of hepatocytes was noted. The nuclear structures retained their shape and stainability, only a slight clearing of the karyoplasm matrix was noted. After a 10-minute exposure during treatment with 0.4% sodium hypochlorite EVR, diffuse dilation of the sinusoids and central veins of the lobules was detected (Fig. 4.16).

Edema of the space of Disse led to the rejection of the cellular elements of the sinusoid wall from the hepatocyte beams. On the part of hepatocytes, preservation of hyaline-droplet and vacuolar degeneration of the cytoplasm was noted.



Pic. 4.16. Liver, treatment with 0.4% sodium hypochlorite EVR. Dilation of sinusoids, hyperpigmentation of hepatocytes. Staining: hematoxylin and eosin. Х:ок. 10, об. 40.

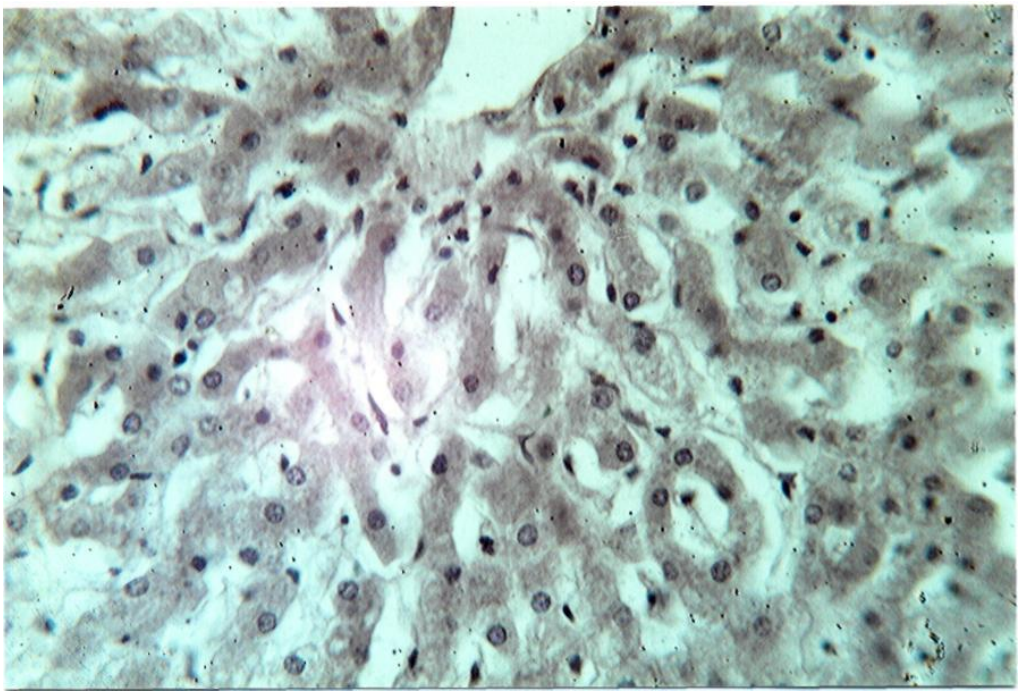
The results of a microscopic examination of liver tissue when treated with 0.6% sodium hypochlorite EVR for 5 minutes showed that, unlike previous series of experiments, in this series the development of focal small- and large-droplet vacuolar degeneration was noted in the cytoplasm of hepatocytes, which were located mainly in the intermediate functional zone of the liver lobules (pic. 4.17).



Pic. 4.17. Liver, treatment with 0.6% sodium hypochlorite EVR. Development of focal vacuolar degeneration in the cytoplasm of hepatocytes. Staining: hematoxylin and eosin. Х:ок.10,об.40.

Due to such pronounced dystrophy, there was a violation of the beam structure of hepatocytes and proliferation of stromal cellular elements with hypertrophy of Kupffer cells. In other functional areas of the liver lobules, expansion of the sinusoids and space of Disse, compression and some atrophy of hepatocytes remained. With a 10-minute exposure, more pronounced dystrophic and dyscirculatory changes in the liver tissue were detected.

The results of a microscopic examination of liver tissue after treatment with glycerin for 5 minutes showed the development of minor dyscirculatory and dystrophic changes. Discirculatory changes manifested themselves in the form of a slight expansion of the central vein and sinusoids, edema of the perisinusoidal space of Disse (pic. 4.18).



Pic. 4.18. Liver, glycerin treatment. Moderate expansion of the central vein and sinusoids, small-droplet vacuolar degeneration of hepatocytes. Staining: hematoxylin and eosin. X:ок.10,об.40.

At the same time, activation of Kupffer cells with hypertrophy and elongation of their nuclei was noted. Hepatocytes, in contrast to previous series of experiments, were slightly increased in size due to diffuse hyperpigmentation and protein degeneration. With a 10-minute treatment with glycerol in the liver tissue, the morphological changes were more pronounced and diffuse. On the part of

hepatocytes, there was a predominance of small-droplet vacuolar degeneration in the first and second functional zones of the liver lobules.

Thus, the results of a microscopic study of the effect of EVR of sodium hypochlorite of different concentrations for 5 and 10 minutes on the fibrous capsule, chitinous membrane and liver tissue showed that under the influence of sodium hypochlorite in the fibrous capsule the volume of fibrinoid necrosis decreases, the layers of fibrous connective tissue thicken and the perifocal tissue becomes thinner inflammatory infiltrate. In the composition of the chitinous shell, thickening and loosening of light stripes and hyperchromasia of dark stripes are observed, especially when treated with 0.4% sodium hypochlorite EVR. On the part of the liver tissue, the development of widespread dyscirculatory disorders and focal dystrophic changes in the form of dilation of the sinusoids, central veins and perisinusoidal spaces of Disse was mainly detected.

Summarizing the chapter, it should be noted that our research allowed us to identify a number of reasons for the unsatisfactory results of treatment of patients with EP in the comparison group. In particular, this is the lack of a differentiated approach to the selection of an adequate surgical team depending on the initial complexity of the planned operation; high incidence of suture failure in the presence of large and “difficult” biliary fistulas; low effectiveness of antiparasitic agents used during surgery.

Taking into account the above disadvantages, we have developed a system for assessing the complexity of surgical interventions for EP. This scale included 7 main criteria: number of cysts; the presence of concomitant damage to other organs; localization of cysts by liver segments; features of cyst localization; presence of complications of EP; cyst diameter; concomitant pathology that influences the technical aspects of surgery. Each criterion was conditionally divided into three gradations: light, moderate and severe. Depending on the combination of different grades of complexity criteria, all operations for EP were divided into three grades. A mild degree of surgical intervention was considered in the presence of “mild” complexity criteria or their combination with at least one “moderate” complexity

criterion; average degree of complexity - in the presence of “easy” criteria or their combination with criteria of “medium” complexity or a combination of “light” and “medium” complexity criteria with at least one criterion of “heavy” degree; severe degree of complexity - with various combinations of “easy”, “medium” and “hard” criteria in combination with at least 2 “heavy” complexity criteria.

Based on a retrospective analysis of the results of the comparison group, we created a system for quantitative assessment of preparedness - surgeon rating. The calculations made it possible to come to the conclusion that with a rating of up to 3.4 points, the surgeon does not have the right to perform the operation independently; with a rating of 3.5 to 4.3 points, the surgeon can independently perform “light” operations and “moderate” operations together with a surgeon with a higher rating; with a rating from 4.4 to 10.5 points, the surgeon can independently perform “moderate” operations with a surgeon of lower professional training, and “heavy” operations with a surgeon with a higher rating, and finally, a surgeon with a rating of 10.6 points and more can perform any surgical interventions for EP.

In the presence of large and “difficult” biliary fistulas, we proposed a new method of closing it. After conventional echinococcectomy, a trapezoidal flap was cut out from the removed fibrous capsule. The flap was sutured around the fistula opening at a distance of 2-3 mm from each other. When tightening the sutures, the fistula opening was closed with a flap in the form of a sealed patch, which ensured sufficient reliability of the sutures.

For intraoperative treatment of the cavity of the removed EC, we proposed to use sodium hypochlorite EVR. To study the antiparasitic effect of sodium hypochlorite EVR, we conducted screening studies in the concentration range from 0.1 to 0.8% with a treatment duration of 1 to 30 minutes. Studies have shown that treatment with a 0.8% solution for 4 minutes, and 0.4 and 0.6% solutions for 5 minutes has the highest antiparasitic effect. Morphological studies of the chitinous and fibrous membranes and liver parenchyma showed that the safest is treatment with 0.4% sodium hypochlorite EVR for 5 minutes.

Taking into account the above points, we proposed a tactic for the surgical treatment of EP, which consisted of a differentiated approach to the selection of a surgical team, the use of our proposed technical development according to indications in the presence of large cystobiliary fistulas, intraoperative treatment of the residual liver cavity with sodium hypochlorite EVR, which, along with an antiparasitic effect, has high antimicrobial effectiveness, which becomes especially important in complicated forms of EP. In general, the developments we proposed turned out to be quite effective, which is reflected in the next chapter of the dissertation work.

CHAPTER V. CLINICAL EVALUATION OF THE EFFECTIVENESS OF AN IMPROVED APPROACH IN THE TREATMENT OF LIVER ECHINOCOCCOSIS

The results of surgical treatment of 116 patients with ES who were hospitalized for the period from 2017 to 2019 were analyzed. Of these, 24 had a complicated course of the disease, 92 had an uncomplicated course.

After examination and preoperative preparation, 112 patients underwent surgical treatment as planned; 3 patients with a breakthrough into the bile ducts and symptoms of obstructive jaundice were operated on in an emergency and delayed manner after RPCG with EPST; 1 patient was operated on as an emergency when the EC ruptured into the free abdominal cavity.

According to the system we proposed, in 61 (52.6±4.6%) cases the surgical intervention was assessed as “mild”, in 36 (31.0±4.3%) – as “moderate” and in 19 (16.4± 3.4%) – as “heavy”. In the control group, respectively, there were 131 (53.9±3.2%; t=0.235), 74 (30.5±3.0%; t=0.112) and 38 (15.6±2.3%; t= 0.179) observations. The absence of a statistically significant difference in the frequency of surgical interventions according to their severity in clinical groups indicates the representativeness of the comparative studies conducted.

The clinical picture of the disease in its uncomplicated course in 81 patients was characterized by an asymptomatic course (EP was diagnosed during a preventive examination and examination for another disease of the abdominal organs), the remaining 11 patients had only complaints of discomfort and heaviness in the right hypochondrium, loss of appetite, general weakness.

With a complicated course of the disease in 9 patients, the clinical picture was characterized by an asymptomatic course; 15 patients complained of heaviness and discomfort in the right hypochondrium; 8 patients had dyspeptic symptoms in the form of nausea, vomiting, dryness and bitterness in the mouth; 4 patients complained of fever; 3 patients had yellowness of the skin and sclera; in 1 case, perforation of the EC developed clinical peritonitis with symptoms of anaphylactic shock.

A general examination of EP patients revealed abdominal asymmetry in 2 patients; enlarged liver borders – in 6; acholic stool – in 3 patients.

The general condition of all patients upon admission with an uncomplicated course was assessed as satisfactory, body temperature did not exceed normal values, and no hemodynamic or respiratory changes were observed.

With a complicated course, the general condition of 19 patients was assessed as satisfactory, and in 5 – as moderate. 3 patients had a low-grade fever of up to 380C, 1 had a body temperature exceeding 380C, in other cases this figure was within normal values.

All patients underwent surgical treatment. Most often, surgical interventions were performed using the upper-middle laparotomy approach (94 cases; 81.0%). In 2 (1.7%) cases with combined lesions of the liver and right lung, echinococcectomy was performed using the thoracofrenolaparotomy approach. Unlike the control group, in the main group, in no case of isolated liver damage through this access was echinococcectomy performed. In 2 (1.7%) cases, in patients who had previously repeatedly undergone surgical intervention through the upper-middle laparotomy approach, when EC was localized in the zone of the V-VI segments of the liver, the operation was performed through a subcostal approach. Unlike the control group, in the main clinical group we expanded the indications for laparoscopic echinococcectomy. Thus, in the main group we performed these interventions on several superficially located ECs; the size of the cysts, which reached up to 10-15 cm; when cysts are localized in the VII-VIII segments of the liver in asthenic patients.

In 27 (23.3%) cases, along with echinococcectomy, various simultaneous operations were performed.

As in the control group, the most common surgical intervention was cholecystectomy, which was performed in 11 (9.5%) patients. In 8 patients, cholecystectomy was performed due to concomitant calculous cholecystitis; in 3 cases – due to intraoperative damage to the gallbladder and tight fusion of the fibrous capsule of the EC with the wall of the gallbladder. In case of EC

breakthrough into the bile ducts in 2 cases, after RPCG with EPST, surgical intervention was completed by cholangiostomy according to Pikovsky-Halsted, in 1 case - according to Keru.

The next most frequently performed simultaneous operations were echinococcectomies of the abdominal cavity, which were performed in 7 (6.0%) patients.

In 2 (1.7%) cases, hernia repair was performed with on-lay alloplasty due to a concomitant postoperative hernia.

In 3 (2.6%) patients who had undergone several operations in their anamnesis, in the presence of a pronounced adhesive process, dissection of adhesions was performed with intraoperative prevention of relapse of the adhesive process.

In 2 (1.7%) cases, EP was combined with splenic echinococcus. One patient underwent splenectomy. In the second case, with combined damage to the liver and spleen, laparoscopic echinococcectomy was performed from both organs. It should be noted that in 1 (0.9%) case there was combined damage to the liver, spleen and abdominal cavity. These patients, simultaneous with echinococcectomy of the liver and abdominal cavity, underwent splenectomy.

In 1 (0.9%) case, simultaneous laparoscopic liver echinococcectomy and phlebectomy were performed.

As in the control group, when choosing the method of capitonage, preference was given to closed methods of eliminating cysts. Most often (38 cases; 32.8%) the technique of A.A. Bobrov was performed. In 11 (9.5%) patients, the residual cavity was treated using the Delbet P method. For large EC, in 20 (17.2%) patients, capitonnage was performed using the method of M.Yu. Gilevich. In 17 (14.7%) cases capitonnage was performed according to Kourias W.K. (in 14 patients when performing laparoscopic echinococcectomy and in 3 patients when EC was localized in the VII-VIII segments of the liver with the presence of a cystobiliary fistula and the technical impossibility of suturing it).

For small cysts in 4 (3.4%) patients, open treatment of the residual cavity was performed according to the method of A.A. Vishnevsky. As in the control group, in the main group, when EC was localized in segments II and III of the liver with the presence of cirrhotic changes in the parenchyma in this area, liver resection was performed in 4 (3.4%) cases. In 8 (6.9%) cases, the residual cavity was treated according to the method of Askerkhanov R.P. (in 4 patients during laparoscopic echinococcectomy and in 4 patients with medium and large EC sizes). In case of multiple liver lesions, in 10 (8.6%) cases, combined methods were used to eliminate the residual cavity. In case of marginal location of the EC, an ideal echinococcectomy was performed in 4 (3.4%) cases.

In 12 cases, cystobiliary fistulas were detected during surgery. In addition, the presence of cystobiliary fistulas was diagnosed in the preoperative period in 3 cases when the cyst ruptured into the bile ducts. During surgery, in 11 cases, cystobiliary fistulas were sutured. In the remaining 4 patients, the fistulas were sutured with a flap according to the technique we proposed.

Average laboratory test results were within normal limits, but individual values varied widely. Initial blood leukocyte counts ranged from 5.2 to 14.5*109/l (average 6.7±1.5*109/l); ESR – from 5.0 to 18.6 mm/h (7.1±1.7 mm/h); eosinophils - from 3.2 to 15.0% (8.7±1.8%) (Table 5.1).

In the postoperative period, in the dynamics of treatment, the indicators of blood leukocytes and ESR did not undergo any significant changes; during the observation period, no significant differences from the initial value were noted. Only the eosinophil indicators in the control group by the 10th day and in the main group by the 7th day significantly decreased from the initial level, respectively, from 8.6±1.7 to 4.6±0.9 (t=2.080) from 8. 7±1.8 to 4.7±0.8 (t=2.031). A comparative assessment of the indicators of leukocytes, ESR and blood eosinophils in the dynamics of treatment between the main and control groups did not reveal significant differences.

In the main group, in biochemical blood tests, the initial ALT values ranged from 0.43 to 1.20 μmol/l (average 0.68±0.16), AST – from 0.42 to 1.20 μmol/l (0.

65±0.13), bilirubin – from 8.5 to 43.0 mmol/l (14.2±2.1), total protein – from 56.5 to 74.5 g/l (61.6±4 ,2), creatinine - from 0.02 to 0.06 μmol/l (0.04±0.006), urea - from 3.8 to 5.9 μmol/l (4.2±0.4) (Table. 5.2).

They did not undergo any significant changes in the dynamics of treatment. A comparative assessment of the indicators between the control and main groups did not reveal any significant changes.

The duration of inpatient treatment in the main group ranged from 4 to 18 days, averaging 6.4±1.2 days. This indicator did not differ significantly from the results of the control group (7.2±1.7 days; t=0.384).

Table 5.1.

Comparative assessment of laboratory parameters in clinical groups

Options	Observation period	Original	1 day a/o	3 day a/o	5 day a/o	7 day a/o	10 day a/o
Leukocytes, x*10^9/л	control group	6,4±1,6	6,5±1,5	6,3±1,5	6,4±1,4	6,3±1,2	6,0±1,0
	t-Stydenta 1		0,046	0,046	0,000	0,050	0,212
	Main group	6,7±1,5	6,6±1,5	6,4±1,5	6,0±1,3	6,1±1,2	5,9±1,0
	t- Stydenta 1		0,047	0,141	0,353	0,312	0,444
	t- Stydenta 2	0,137	0,047	0,047	0,209	0,118	0,071
СОЭ, мм/час	control group	7,2±1,6	7,0±1,4	6,5±1,4	6,0±1,3	5,6±1,2	5,2±1,0
	t- Stydenta 1		0,094	0,329	0,582	0,800	1,060
	Main group	7,1±1,7	7,2±1,6	6,2±1,5	5,8±1,3	5,5±1,1	5,0±1,0
	t- Stydenta 1		0,043	0,397	0,607	0,790	1,065
	t- Stydenta1	0,043	0,094	0,146	0,109	0,061	0,141
Эозино-филы, %	control group	8,6±1,7	8,2±1,6	6,3±1,6	5,7±1,1	4,9±1,0	4,6±0,9*
	t- Stydenta 1		0,171	0,985	1,432	1,876	2,080
	Main group	8,7±1,8	8,2±1,7	6,1±1,5	5,8±1,0	4,7±0,8*	4,5±0,9*
	t- Stydenta 1		0,202	1,110	1,408	2,031	2,087
	t- Stydenta 2	0,040	0,000	0,091	0,067	0,156	0,079

Note: here and further in the tables of this chapter, t-Student 1 is the dependence of the indicator of the main or control group on the initial level; t-Student 2 – dependence between compared groups. * - significant difference from the initial level.

Table 5.2.

Comparative assessment of biochemical parameters in clinical groups

Options	Observation days	Original	5 day a/o	10 day a/o
AJIT, mmol/l	control group.	0,64±0,19	0,60±0,14	0,48±0,12
	t- Stydenta – 1		0,169	0,712
	Main group.	0,68±0,16	0,51±0,14	0,39±0,11
	t- Stydenta – 1		0,800	1,494
	t- Stydenta – 2	0,161	0,455	0,553
ACT, mkmol/l	control group.	0,61±0,15	0,58±0,11	0,41±0,09
	t- Stydenta – 1		0,161	1,143
	Main group.	0,65±0,13	0,48±0,14	0,32±0,12
	t- Stydenta – 1		0,890	1,865
	t- Stydenta – 2	0,202	0,562	0,600
Bilirubin, mmol/l	control group.	15,2±2,4	13,1±2,0	14,1±1,7
	t- Stydenta – 1		0,672	0,374
	Main group.	14,1±2,1	13,7±2,2	14,4±1,9
	t- Stydenta – 1		0,132	0,106
	t- Stydenta – 2	0,345	0,202	0,118
Total protein, g/l	control group.	61,2±2,4	62,1±2,7	63,5±3,0
	t- Stydenta – 1		0,249	0,599
	Main group.	61,6±4,2	62,4±3,5	64,5±3,2
	t- Stydenta – 1		0,146	0,549
	t- Stydenta – 2	0,083	0,068	0,228
Urea, mmol/l	control group.	4,0±0,5	4,5±0,3	4,2±0,4
	t- Stydenta – 1		0,857	0,312
	Main group.	4,2±0,4	4,0±0,4	4,1±0,2
	t- Stydenta – 1		0,354	0,224
	t- Stydenta – 2	0,312	1,000	0,224
Creatinine, mmol/l	control group.	0,04±0,004	0,04±0,003	0,03±0,004
	t- Stydenta – 1		0,000	1,768
	Main group.	0,04±0,006	0,05±0,005	0,03±0,004
	t- Stydenta – 1		1,280	1,387
	t- Stydenta – 2	0,000	1,715	0,000

Table 5.3.

Clinical results in the compared groups

INDICATORS	Control group		Main group		t-Stydenta
	N	в %	n	в %	
Early surgical complications	**24**	**9,9±1,9**	**5**	**4,3±1,9***	2,072
Postoperative wound seroma	8	3,3±1,1	2	1,7±1,2	0,942
Postoperative wound suppuration	5	2,1±0,9	1	0,9±0,9	0,955
Bile leakage	4	1,6±0,8	1	0,9±0,9	0,662
External biliary fistula	3	1,2±0,7	0	0	1,743
Biliary peritonitis	2	0,8±0,6	0	0	1,420
Subphrenic abscess	1	0,4±0,4	0	0	1,002
Bleeding into the abdominal cavity	0	0	1	0,9±0,9	1,004
Early adhesive intestinal obstruction	1	0,4±0,4	0	0	1,002
General complications	**14**	**5,8±1,5**	**5**	**4,3±1,9**	0,603
Reactive pleurisy	5	2,1±0,9	0	0*	2,259
Postoperative pneumonia	7	2,9±1,1	4	3,4±1,7	0,283
Acute myocardial infarction	1	0,4±0,4	1	0,9±0,9	0,473
Pulmonary embolism	1	0,4±0,4	0	0	1,002
Late surgical complications	**8**	**3,3±1,1**	**2**	**1,7±1,2**	0,942
Development of residual cavity	4	1,6±0,8	1	0,9±0,9	0,662
Suppuration of the residual cavity	2	0,8±0,6	0	0	1,420
Postoperative hernia	1	0,4±0,4	1	0,9±0,9	0,473
Acute adhesive intestinal obstruction	1	0,4±0,4	0	0	1,002
Total complications	**46**	**18,9±2,5**	**12**	**10,3±2,8***	2,269
Mortality	3	1,2±0,7	0	0	1,743

The overall rate of early postoperative surgical complications was 4.3%. Seroma of the postoperative wound was most often observed, the frequency of which was 1.7% (2 cases). Against the background of additional therapeutic measures, wound healing was noted. In 1 (0.9%) patient, suppuration of the postoperative wound was noted, which required daily dressings. The postoperative wound healed by secondary intention. In 1 (0.9%) observation, bile leakage was noted, which did not require additional surgical intervention and self-limited on the 12th day of the postoperative period against the background of conservative therapy (Table 5.3.).

Clinical example: Patient D., 34 years old (case history No. 9028) was admitted on July 5, 2017. to the thoracoabdominal surgery department of the TMA multidisciplinary clinic with complaints of moderate pain in the right hypochondrium, periodic nausea, fever, and weakness. From the anamnesis: the above complaints during the last 10 days. 3 months ago the patient was diagnosed with EP.

Upon admission: the general condition of the patient is moderate, the patient is conscious and adequate. The skin is pale in color. Blood pressure is 110/70 mmHg, pulse is 80, rhythmic. The abdomen is soft, painful in the right hypochondrium. There are no symptoms of peritoneal irritation. Intestinal peristalsis is heard.

The patient is examined in the clinic. In the tests: hemoglobin – 112 g/l, erythrocytes – 4.1, leukocytes – 10.4, ESR – 8 mm/hour, eosinophils – 9.6, ALT – 0.6; AST – 0.5 μmol/l, bilirubin – 18 mmol/l, total protein – 76.3 g/l.

On ultrasound: in segments III-IV a cyst with a total size of 42.3x56.8 mm is detected, the contours of the cyst are uneven, the contents are cloudy, with sediment (Fig. 5.2).

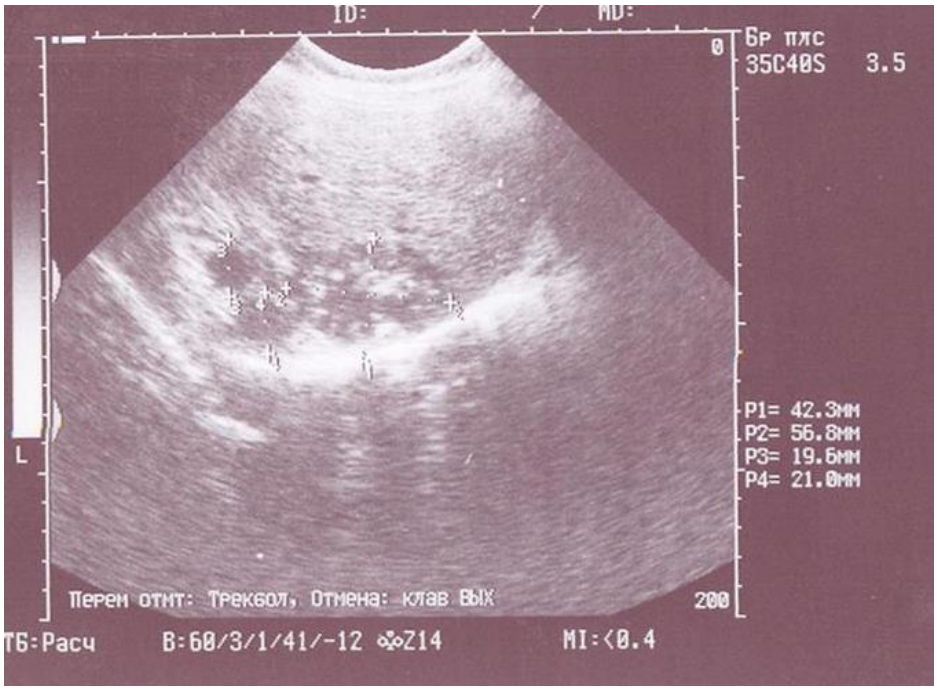
ECG: EOS is not rejected. Heart rate 80. ECG without pathology. Plain X-ray of the chest and abdominal organs revealed no pathology.

The assessment of the severity of the proposed operation was assessed as moderate.

07/06/2017. A semi-closed echinococcectomy was performed according to Gilevich through an upper-median laparotomy. During the operation, a suppurating cyst was revealed with the presence of 3 biliary fistulas measuring 2-3 mm, which were sutured. The operation was performed by surgeon “D” with an overall rating of 23.3 points and assistant “A” with a rating of 6.3 points.

In the postoperative period, starting from the second day, bile leakage was noted in a volume of 30-40 ml per day. On control ultrasound, no free fluid was noted in the abdominal cavity. The patient is prescribed bed rest. The volume of bile secreted decreased daily.

Against the background of conservative therapy, bile leakage completely stopped on day 12. Recovery.



DR. 5.1. Echotomogram of patient D. before surgery.

In 1 (0.9%) case, on the 2nd day after liver echinococcectomy and dissection of adhesions for recurrent echinococcosis, bleeding from the abdominal cavity was noted. The conservative hemostatic therapy was ineffective. The patient was re-operated. During the operation, the source of bleeding was the area of dissection of adhesions.

In a comparative aspect, the frequency of early surgical complications in the main group significantly decreased relative to the control group from 9.9±1.9% to 4.3±1.9% (t=2.072).

The overall incidence of general complications in the postoperative period in the main group was 4.3%. In 4 (3.4%) cases, the development of postoperative congestive pneumonia was noted. Recovery was noted against the background of additional conservative measures. In 1 (0.9%) patient, the development of acute myocardial infarction was noted in the early postoperative period against the background of existing coronary artery disease. The conservative therapy carried out was effective. Coronary angiography showed stenosis of the left coronary artery. On the 7th day after surgery, stenting of the coronary artery was performed.

In a comparative aspect, no special differences were noted between the clinical groups; the frequency of general postoperative complications in the main group decreased slightly relative to the control group from 5.8±1.5% to 4.3±1.9% (t=0.603).

In the late postoperative period, the complication rate was 1.7%. In 1 (0.9%) patient with a giant ES, complicated with a breakthrough into the abdominal cavity, a residual liver cavity measuring 3.5x4.2 cm developed in the postoperative period. This patient was under outpatient observation for 1.5 years, during which no other complications developed and the cavity was completely eliminated. In 1 (0.9%) case, 1 year after surgery, a patient who had bleeding from the abdominal cavity in the early postoperative period developed a ventral hernia. The patient underwent a planned hernia repair with on-lay alloplasty.

There were no cases of disease relapse. It should be noted that the long-term follow-up period in the main group did not exceed 2 years. In this regard, at present it would be incorrect to talk about the absence of disease relapse in the main group.

In the comparative aspect, a statistically insignificant decrease in late postoperative complications was noted in the main group relative to the control group from 3.3±1.1% to 1.7±1.2% (t=0.942).

Analyzing each complication, it should be noted that only in terms of the frequency of reactive pleurisy, a significant decrease was noted, but in a comparative aspect with the clinical results of the control group, a significant decrease in the overall frequency of all of the above complications was noted by 1.8 times (from 18.9 ± 2.5% to 10.3±2.8%; t=2.269) (Table 5.3). It should be noted that such serious complications as suppuration of AKI, development of subdiaphragmatic abscess, and biliary peritonitis were not observed in the main group.

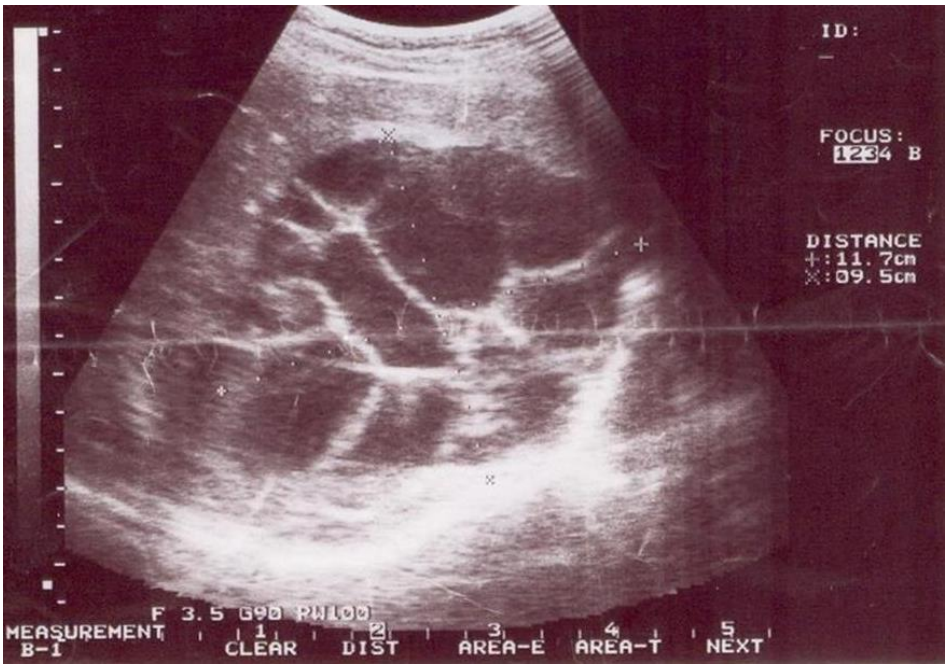
Clinical example: Patient Zh., 46 years old (case history No. 10172) was admitted to the surgical department of the Khorezm Regional Multidisciplinary Medical Center on 10.30.18. He made no complaints upon admission. From the anamnesis: EP was diagnosed 3 months ago during an examination for abdominal discomfort.

Upon admission: the general condition of the patient is satisfactory, the patient is conscious and adequate. A patient with high nutritional status, II degree obesity. No hemodynamic or respiratory disorders were noted. Blood pressure is 120/80 mmHg, pulse is 84, rhythmic. The abdomen is soft, painless, there are no peritoneal phenomena. Intestinal peristalsis is active. Physiological functions are normal.

The patient is examined in the clinic. In the tests: hemoglobin – 127 g/l, erythrocytes – 3.8, leukocytes – 5.4, ESR – 7 mm/hour, eosinophils – 9.2, ALT – 0.5; AST – 0.4 μmol/l, bilirubin – 17.5 mmol/l, total protein – 73.5 g/l.

General urine analysis without changes.

On ultrasound: in segments II-III-IV a multi-chamber cyst with a total size of 117x95 mm is detected, the contours of the cyst are smooth and clear (dr.5.2).



Dr. 5.2. Echotomogram of patient Zh. before surgery.

ECG: EOS is not rejected. Heart rate 80. ECG without pathology.

The assessment of the severity of the proposed operation was assessed as moderate.

10/31/18. A semi-closed echinococcectomy was performed according to Gilevich through an upper-median laparotomy. During the operation, a multilocular EC with multiple daughter cysts was revealed. The operation was performed by surgeon “G” with a total rating of 10.5 points and assistant “A” with a rating of 6.3 points.

The postoperative period was complicated by congestive hypostatic pneumonia. Against the background of conservative therapy and physical therapy, the symptoms of pneumonia resolved on days 8-9. Recovery.

There were no fatal cases in the main group, but in a comparative aspect with the control group, where the mortality rate was 1.2±0.7%, no statistically significant difference was noted (t=1.743).

To assess the effectiveness of intraoperative treatment of the residual cavity, we conducted bacteriological studies in 23 patients: 13 with an uncomplicated course of the disease and 10 with a complicated course.

In the uncomplicated course of the disease in the main clinical group, microbiological studies were performed intraoperatively in 13 cases. In 8 cases, no bacterial growth was observed. In 5 observations, only an aerobic culture was sown, which, as in the control group, was represented by epidermal staphylococcus and Escherichia coli. In 2 cases, a growth of monoculture was noted, in 3 cases an association of aerobic bacteria was observed. No growth of anaerobic cultures was observed. The initial level of bacterial contamination was extremely low and ranged from 103-105 CFU/ml (average 4.0□0.23 lg CFU/ml). Unlike the control group, the initial level of bacterial contamination was approximately equal (t=0.259).

After treatment of APP with 0.4% sodium hypochlorite EBP, bacterial growth was not observed in any case (t=17.391). Unlike the control group, after treatment with AKI, the level of bacterial contamination in the main group decreased significantly from 3.6□0.29 lg CFU/ml to 0 (t=12.414).

This was the main determining factor in the absence of complications such as suppuration of AKI, formation of subhepatic abscesses, etc.

In case of a complicated course of the disease in the main clinical group, microbiological studies were performed intraoperatively in 10 cases.

As in the control group, with a complicated course of the disease in the main group, bacterial growth was observed in all cases. In 5 cases, an association of aerobic and anaerobic bacteria was sown, in 2 – a monoculture of aerobes, in 3 – an association of aerobic microorganisms. The microbial spectrum was represented

by strains of Staphylococcus aureus and Staphylococcus epidermidis, Streptococcus, Escherichia coli and Pseudomonas aeruginosa, Proteus and Klebsiella. Anaerobic flora was represented by bacteroides and peptococci. As can be seen from the above, the bacterial flora in the main group did not differ from the nature of microbial contamination in the control group. Moreover, their concentration was approximately equal; no significant difference was noted between the compared groups. The initial concentration of aerobic bacteria ranged from 105-108 CFU/ml (on average 7.3±0.67 lg CFU/ml; in the control group 7.2±0.72; t=0.102), anaerobic - 105-107 CFU /ml (on average 6.5□0.41 lg CFU/ml; in the control group 6.8±0.53; t=0.448).

After treatment with AKI, no growth of microorganisms was observed in 7 observations. In 3 cases, an increase in aerobic microflora was noted (of which 1 patient had a monoculture sown, 2 – an association of aerobic bacteria), no anaerobic microorganisms were sown. The microbial spectrum was represented by Staphylococcus epidermidis, Streptococcus, Proteus and Klebsiella. The concentration of aerobic strains ranged from 103-105 CFU/ml. The concentration of aerobic bacteria significantly decreased relative to the initial level from 7.3±0.67 lg CFU/ml to 3.8±0.21 lg CFU/ml (t=4.985) and relative to the control group (t=4.458). After treatment of OPP EVR with sodium hypochlorite, the concentration of anaerobic microflora significantly decreased relative to the initial level from 6.5□0.41 lg CFU/ml to 0 (t=15.854) and relative to the control group (t=17.222). A sharp decrease in anaerobic flora is associated with the effect of the antiseptic used to treat AKI, which, being a strong oxidizing agent, has a detrimental effect on anaerobic strains.

In order to evaluate the effectiveness of our proposed developments for various degrees of severity of surgical intervention for EP, we conducted a comparative analysis of the frequency of postoperative complications and mortality separately. With a mild degree of severity of the operation, the frequency of complications decreased from 1.2% to 0%, with a moderate degree of severity - from 5.8% to 1.7%; with severe – from 11.9% to 8.6%. Only with moderate

severity of surgical intervention was there a significant decrease in postoperative complications, which led to a significant decrease in the overall frequency of complications in general for the compared clinical groups (Table 5.4).

The mortality rate in the control group, depending on the severity of the surgical intervention, increased in arithmetic progression. With a mild degree this figure was 0%, with a moderate degree – 0.4%, with a severe degree – 0.8%. There were no deaths in the main group, but no significant difference was achieved between the compared groups.

Thus, the clinical studies we conducted, in particular, the analysis of the results of treatment of patients in the comparison group, allowed us to identify a number of disadvantages of the traditional approach in the surgical treatment of EP, namely the lack of a differentiated approach in choosing a surgical team depending on the severity of the upcoming operation and the surgeon's preparedness, which is an important fact in the success of surgical treatment.

Table 5.6.

Dependence of the frequency of postoperative complications and mortality on the complexity of the operation

	Postoperative complications				Postoperative mortality			
	Lightweight	Average	Heavy	Total	Lightweight	Average	Heavy	Total
Control group	131	74	38	243	131	74	38	243
Main group	61	36	19	116	61	36	19	116
Control group	3 (1,2±0,7%)	14 (5,8±1,5%)	29 (11,9±2,1%)	46 (18,9±2,5%)	0	1 (0,4±0,4%)	2 (0,8±0,6%)	3 (1,2±0,7%)
Main group	0 (0%)	2 (1,7±1,2%)*	10 (8,6±2,6%)	12 (10,3±2,8%)*	0	0 (0%)	0 (0%)	0 (0%)
t-Stydenta	1,743	2,100	0,994	2,269	-	1,002	1,420	1,743

It should be noted that the cause of a number of purulent complications from AKI, especially with a complicated course of the disease, is the low antiseptic effectiveness of the agents used. Taking these facts into account, we have developed quantitative criteria for assessing a surgeon's rating, methods for assessing the severity of surgical interventions in EP, as well as a differentiated approach to choosing a surgical team depending on the complexity of the upcoming operation. For intraoperative treatment of AKI, we chose sodium hypochlorite EVR, which has a number of properties that completely meet our requirements. Our experimental studies made it possible to identify the antiparasitic properties of sodium hypochlorite EVR, once again prove the high antimicrobial effectiveness of this antiseptic, and the morphological studies carried out proved its safety. Of course, our research does not completely solve the problem of surgical treatment of ES. Currently, it is necessary to continue the search for ways to improve the results of surgical treatment of echinococcosis. It is necessary to improve methods for early diagnosis of the disease, prevention of relapses of the disease, reducing the frequency of complicated forms, it is necessary to search for means that can achieve high parasitism and reduce microbial contamination with minimal aggression on liver tissue, there is a need to develop treatment standards for the use of video endoscopic interventions in EP. In general, this is an incomplete range of issues that await solutions. Of course, the tactical and technical solutions to the problem of EP that we propose are not a sufficient condition for solving the global task of curing patients from echinococcosis. However, the main goal of any development is to improve treatment results, which in our opinion has been achieved.

CONCLUSION

Human echinococcosis remains an urgent health problem in endemic regions, which includes the Republic of Uzbekistan [51; With. 111-112, 73; With. 50-51, 81; With. 31-35]. Echinococcosis represents a serious medical problem in many countries of the world, where large endemic foci remain and an increase in the number of cases is observed. The disease affects almost all organs and systems of the body [25; With. 111-117, 87; With. 64-67, 117; With. 555-558, 130; With. 337-343, 166; With. 1880].

In recent years, there has been an increase in the number of patients with EP. This is due both to the introduction of highly informative diagnostic methods into clinical practice and to the deterioration of the social standard of living of the population in some regions. The effectiveness of treatment of echinococcosis is associated with timely and correct diagnosis of this disease. The widespread introduction into clinical practice of modern highly informative instrumental research methods (primarily ultrasound and CT) has significantly improved the early diagnosis of EP [12; c. 49-53, 37; With. 35-37, 73; With. 50-51, 83; 32 pp., 130; With. 337-343, 166; With. 1880].

Despite improved diagnosis of the disease, the frequency of unsatisfactory treatment results and postoperative complications exceeds 20%, and mortality ranges from 1-2% depending on the nature of the disease. One of the unfavorable aspects is the fact that, despite the high antiparasitic effectiveness of the agents used for intraoperative treatment of AKI (in particular 100% glycerol), analysis of long-term results shows that the proportion of relapse of EP has not changed much [24; With. 217]. Echinococcectomy, especially in complicated forms of the disease and giant cysts, is accompanied by suppuration of the residual cavity and the formation of bile-purulent fistulas [49; With. 29-31, 101; With. 71-72, 162; With. 699-704]. As was indicated in the introduction of the dissertation, in our opinion, improving the results of surgical treatment largely depends on an adequate approach to assessing the severity of the patient's condition, a rating approach to surgical intervention.

Considering the above, we were given the goal of the study, which was to improve the results of treatment of patients with EP by developing a differentiated approach to surgical treatment and improving the tactical and technical aspects of treatment.

This work is based on an analysis of the results of examination and treatment of 359 patients with various forms of EP. All patients were divided into two groups: a comparison group - 243 patients admitted between 2013 and 2016, and a main group - 116 patients who were hospitalized in 2017-2019. This division is associated with different approaches to treatment as therapeutic and tactical measures are developed and improved.

In the comparison group, 55 patients had a complicated course of the disease, 188 had an uncomplicated course. 236 patients underwent surgical treatment as planned after a preliminary examination and preoperative preparation; 1 patient with a breakthrough of the EC into the pleural cavity was operated on in an emergency-delayed manner after drainage of the pleural cavity, 5 patients with a breakthrough in the bile ducts and moderate obstructive jaundice were also operated on in an emergency-delayed manner after RPCG with EPST; 1 patient was operated on as an emergency when the EC had broken through into the free abdominal cavity.

The overall rate of postoperative complications was 18.9%. Of these, early surgical complications were noted in 9.9% of cases. In 8 (3.3%) cases, seromas of postoperative wounds developed, in 5 (2.1%) patients suppuration of postoperative wounds was noted, in 4 (1.6%) cases, bile leakage through drainage from the abdominal cavity was noted in the postoperative period, in 3 (1.2%) patients developed an external biliary fistula in the postoperative period, in 2 (0.8%) cases biliary peritonitis developed (in 1 patient there was death), in 1 (0.4%) patient a subphrenic fistula was formed in the postoperative period abscess, in 1 (0.4%) observation a clinical picture of early adhesive intestinal obstruction developed.

In 5.8% of cases, general complications developed in the postoperative period. In 5 (2.1%) cases, reactive pleurisy developed, in 7 (2.9%) patients pneumonia developed, in 1 (0.4%) patient the development of acute myocardial infarction was noted, which caused the patient's death, in 1 (0.4%) .4%) case, pulmonary embolism occurred, which led to death.

The rate of late surgical complications was 3.3%. In 4 (1.6%) patients, a residual liver cavity was diagnosed, in 2 (0.8%) cases, suppuration of the residual cavity was noted, in 1 (0.4%) patient a postoperative ventral hernia developed, in 1 (0.4%) case, acute adhesive intestinal obstruction developed.

Thus, the analysis of the clinical results of treatment of patients in the comparison group showed that the frequency of postoperative complications is quite high (18.9%). The mortality rate was 1.2%.

The results of treatment of patients with EP that we obtained fully correlate with the data of R.M. Agayev. (2001), Vafina A.Z. (2002), Zhuravleva V.A. (2004), who indicate that the frequency of postoperative complications ranges from 4.8% to 9.7%, with overall mortality reaching up to 1% [4; With. 32-36, 23; With. 56-59, 40; With. 51-54]. It should be noted that the relatively high incidence of postoperative complications is due to tactical approaches to the treatment of EP. In the treatment of this disease, these authors adhere to resection methods of treatment (pericystectomy, economical liver resections, anatomical liver resections). Many domestic researchers (Akhmedov R.M., 2003; Karimov Sh.I., 2006), like us, consider echinococcectomy with various methods of capitonnage of AKI to be the main method of treatment. The results they obtained are approximately identical to ours (the rate of postoperative complications ranges from 5.2 to 5.9%, mortality – from 0.6 to 0.9%) [15; With. 18-21, 54; With. 34-36].

We conducted a critical analysis of postoperative complications that developed in the comparison group, the purpose of which was to identify existing shortcomings and eliminate them. As the analysis of the results showed, one of the main reasons for

the development of postoperative complications is the surgeon's inadequate preparation for surgical intervention, inadequate intraoperative treatment of EC, and low antiparasitic effectiveness of the agents used to treat the residual cavity.

To clarify the role of microbial flora on the results of treatment, we carried out bacteriological cultures. These studies were carried out before (at the time of puncture of the EC and obtaining echinococcal fluid) and after treatment of AKI (after treatment of AKI before capitonnage). Analysis of bacterial contamination showed that after treatment with APP, the level of both aerobic and anaerobic cultures does not decrease significantly from the initial level. A persistent bacterial focus contributes to the development of various infectious complications.

So, Gaibatov S.P. (2006), in his studies proved the direct dependence of the frequency of infectious complications from AKI on the level of microbial contamination. The frequency of development of suppuration of AKI with bacterial contamination of echinococcal fluid in 103-104 CFU/ml is 5.4%, and with contamination of 107-108 CFU/ml – 64.8% [30; With. 16-19].

Analysis of a fatal case against the background of the development of bile peritonitis showed that suturing large fistulas does not allow achieving adequate tightness, and when the latter is achieved, the risk of developing incompetence is high.

The analysis of the results of treatment of patients in the comparison group showed that it is necessary to continue the scientific search in terms of justifying a differentiated approach to the selection of a surgical team depending on the severity of the upcoming operation and the preparedness of the surgeon, it is necessary to improve the technical aspects of surgical interventions for giant cysts located in the posterior segments of the liver, modernize approaches to the elimination of large biliary fistulas, develop new ways to achieve intraoperative aparasiticity with minimal aggression on liver tissue.

In practical medicine, various systems for quantitative assessment of the severity of a condition are widely used. These are the scale of Ranson, Imrie Glasgow, Tolstoy A.D. to assess the condition of patients with acute pancreatitis; Forrest classification, scale Zatevakhin I.I., Ratner G.L., Kuzeev R.E., Pantsyrev Yu.M. to assess gastroduodenal bleeding; Dellinger E. scale, Svetukhina A.M., Gostishcheva V.K., Mannheim index to characterize the severity of patients with acute peritonitis; Napalkov P.N., Fedorov V.D., Abashidze Z.Sh., Child-Pugh scale for assessing the severity of liver failure, etc. [52; With. 68-70, 61; 100 pp.].

Taking into account the principles of compiling these systems, we have developed a system for assessing the complexity of surgical interventions for EP. This scale included 7 main criteria: number of cysts; the presence of concomitant damage to other organs; localization of cysts by liver segments; features of cyst localization; presence of complications of EP; cyst diameter; concomitant pathology that influences the technical aspects of surgery. Each criterion was conditionally divided into three gradations: light, moderate and severe. Depending on the combination of different grades of complexity criteria, all operations for EP were divided into three grades. A mild degree of surgical intervention was considered in the presence of "mild" severity criteria or their combination with at least one "moderate" severity criterion; moderate severity - in the presence of "mild" criteria or their combination with criteria of "moderate" severity or a combination of "mild" and "moderate" severity criteria with at least one criterion of "severe" severity; severe severity - with various combinations of "mild" and "moderate" in combination with at least 2 "severe" severity criteria.

As Lebedev N.V. showed in his research. (2007), the high frequency of postoperative complications is due to the difficulties of diagnosing complicated forms of the disease, the lack of objective criteria that determine the degree of complexity of the upcoming operation, the presence of errors and complications during the surgical treatment of EP [61; 100 p.].

Considering this fact, Lokhvitsky V.S. (1991) believes that improving the results of surgical treatment largely depends on an adequate approach to assessing the severity of the patient's condition, a rating approach to surgical intervention [62; With. 22-25].

All this contributed to the fact that, based on a retrospective analysis of the results of the control group, we created a system for quantitative assessment of preparedness - a surgeon rating. With an overall rating of up to 3.4 points, the surgeon does not have the right to perform the operation independently; with a rating of 3.5 to 4.3 points, the surgeon can independently perform "light" operations and "moderate" operations together with a surgeon with a higher rating; with a rating from 4.4 to 10.5 points, the surgeon can independently perform "moderate" operations with a surgeon of lower professional training, and "heavy" operations with a surgeon with a higher rating, and finally, a surgeon with a rating of 10.6 points and more can perform any surgical interventions for EP.

If the diameter of the biliary fistula is 5 mm or more; technical impossibility of suturing due to the presence of inflammation, infiltration or calcification of tissue around the fistula; In cases where the fistula comes directly from the walls of the right or left lobar ducts, a method of suturing the cystobiliary fistula has been proposed. After conventional echinococcectomy, a trapezoidal flap was cut out from the removed fibrous capsule. The flap was sutured around the fistula opening at a distance of 2-3 mm from each other. When tightening the sutures, the fistula opening was closed with a flap in the form of a sealed patch, which ensured sufficient reliability of the sutures.

In recent years, electrolysis aqueous solutions obtained by electrochemical oxidation, in particular sodium hypochlorite, have found increasing use in medicine. As studies by Petrosyan E.A. have shown. (1991), during blood electrolysis, sodium hypochlorite is formed as an intermediate product, which has a number of properties: a pronounced antibacterial effect; a sharp increase in the sensitivity of bacteria to

antibiotics; detoxifying effect when used locally and intravascularly through the oxidation of various substrates; local and general immunostimulating effect; improvement of regional microcirculation with intravascular administration; disinfectant effect [86; 37 p.].

Taking this fact into account, we proposed to use sodium hypochlorite EVR for intraoperative treatment of the cavity of the removed EC. To study the antiparasitic effect of sodium hypochlorite EVR, we conducted screening studies in the concentration range from 0.1 to 0.8% with a treatment duration of 1 to 30 minutes. Studies have shown that treatment with a 0.8% solution for 4 minutes, and 0.4 and 0.6% solutions for 5 minutes has the highest antiparasitic effect. Morphological studies of the chitinous and fibrous membranes and liver parenchyma showed that the safest is treatment with 0.4% sodium hypochlorite EVR for 5 minutes.

Taking into account the above points, we proposed a tactic for the surgical treatment of EP, which consisted of a differentiated approach to the selection of a surgical team, suturing of the cystobiliary fistula using the method we proposed, intraoperative treatment of EVR with sodium hypochlorite, which, along with the antiparasitic effect, has high antimicrobial effectiveness, which becomes especially relevant in complicated EC, in particular suppuration of cysts.

The treatment tactics we propose were used in 116 patients of the main group. Of these, 24 had a complicated course of the disease, 92 had an uncomplicated course.

After examination and preoperative preparation, 112 patients underwent surgical treatment as planned; 3 patients with a breakthrough into the bile ducts and symptoms of obstructive jaundice were operated on in an emergency-delayed manner after RPCG with EPST; 1 patient was operated on as an emergency due to a breakthrough of the EC into the free abdominal cavity.

According to the system we proposed, in 61 (52.6±4.6%) cases the surgical intervention was assessed as “mild”, in 36 (31.0±4.3%) – as “moderate” and in 19 (16.4± 3.4%) – as “heavy”. In the control group, respectively, there were 131

(53.9±3.2%; t=0.235), 74 (30.5±3.0%; t=0.112) and 38 (15.6±2.3%; t= 0.179) observations. The absence of a statistically significant difference in the frequency of surgical interventions according to their complexity in clinical groups indicates the representativeness of the comparative studies conducted.

The overall rate of early postoperative surgical complications was 4.3%. Seroma of the postoperative wound was observed most often, the frequency of which was 1.7% (2 cases), in 1 (0.9%) patient suppuration of the postoperative wound was noted, in 1 (0.9%) case bile leakage was noted. In 1 (0.9%) case, on the 2nd day after liver echinococcectomy and dissection of adhesions for recurrent echinococcosis, bleeding from the abdominal cavity was noted. The conservative hemostatic therapy was ineffective. The patient was re-operated. In a comparative aspect, the frequency of early surgical complications in the main group significantly decreased relative to the control group from 9.9±1.9% to 4.3±1.9% (t=2.072).

The total incidence of general complications in the postoperative period in the main group was 4.3%. In 4 (3.4%) cases, the development of postoperative congestive pneumonia was noted; in 1 (0.9%) patient, against the background of existing coronary artery disease, the development of acute myocardial infarction was noted in the early postoperative period. In a comparative aspect, no special differences were noted between the clinical groups; the frequency of general postoperative complications in the main group decreased slightly relative to the control group from 5.8±1.5% to 4.3±1.9% (t=0.603).

In the late postoperative period, the complication rate was 1.7%. In 1 (0.9%) patient with a giant ES, complicated by a breakthrough into the abdominal cavity, a residual liver cavity developed in the postoperative period; in 1 (0.9%) case, 1 year after surgery, the patient developed a ventral hernia. There were no cases of disease relapse. In the comparative aspect, a statistically insignificant decrease in late postoperative complications was noted in the main group relative to the control group from 3.3±1.1% to 1.7±1.2% (t=0.942).

There were no fatal cases in the main group, but in a comparative aspect with the control group, where the mortality rate was 1.2±0.7%, no statistically significant difference was noted (t=1.743).

Thus, the clinical studies we conducted, in particular, the analysis of the results of treatment of patients in the comparison group, allowed us to identify a number of shortcomings of the traditional approach in the surgical treatment of EP, which contributed to a number of developments, which was the subject of the dissertation work.

Of course, our research does not completely solve the problem of surgical treatment of ES. Currently, it is necessary to continue the search for ways to improve the results of surgical treatment of echinococcosis. It is necessary to improve methods for early diagnosis of the disease, prevention of relapses of the disease, reducing the frequency of complicated forms, it is necessary to search for means that can achieve high parasitism and reduce microbial contamination with minimal aggression on liver tissue, there is a need to develop treatment standards for the use of video endoscopic interventions for EP. In general, this is an incomplete range of issues that await solutions.

CONCLUSIONS

1. With traditional treatment of EP, the overall incidence of postoperative complications was 18.9%, mortality – 1.2%. The analysis revealed that unsatisfactory treatment results were due to the lack of a differentiated approach to the selection of a surgical team depending on the complexity of the upcoming operation and the surgeon's preparedness, the presence of technical shortcomings of surgical interventions with a high risk of developing failure of the sutures of sutured large biliary fistulas, the need to develop new ways to achieve intraoperative aparasiticity with minimal aggression on liver tissue.

2. Analysis of the main clinical criteria (number of cysts; presence of combined lesions of other organs; localization of cysts by liver segments; features of the localization of cysts; presence of complications of EP; diameter of cysts; concomitant pathology), which were divided into three gradations (mild, moderate, severe) allows us to distinguish between mild, moderate and severe degrees of complexity of surgical interventions.

3. Determining the surgeon's level of preparedness allows for a differentiated approach to choosing a surgical team depending on the severity of the upcoming operation. With an overall rating of up to 3.4 points, the surgeon does not have the right to perform the operation independently; with a rating of 3.5 to 4.3 points, the surgeon can independently perform "light" operations and "moderate" operations together with a surgeon with a higher rating; with a rating from 4.4 to 10.5 points, the surgeon can independently perform "moderate" operations with a surgeon of lower professional training, and "heavy" operations with a surgeon with a higher rating, and finally, a surgeon with a rating of 10.6 points and more can perform any surgical interventions for EP.

4. Intraoperative treatment of residual liver cavities with sodium hypochlorite EVR allows achieving the highest antiparasitic effect when treated with a 0.8% solution for 4 minutes, 0.4 and 0.6% solutions for 5 minutes. Morphological studies have shown

that the safest for the fibrous membrane and liver parenchyma is treatment with 0.4% sodium hypochlorite EVR for 5 minutes.

5. The developed technique for the intraoperative elimination of large and “difficult” cystobiliary fistulas makes it possible to reduce the incidence of postoperative bile leakage, external biliary fistulas and its complications from 2.9% to 0.9%.

6. The proposed set of therapeutic measures for EP allows for a differentiated approach to the selection of a surgical team depending on the severity of the surgical intervention, increases the efficiency of intraoperative treatment of the residual cavity, improves the technical aspects of surgical intervention and helps reduce the incidence of postoperative complications from 18.9% to 10.3%, postoperative mortality from 1.2% to 0%.

PRACTICAL RECOMMENDATIONS

1. To select an adequate surgical team for EP, it is advisable to use our proposed system for assessing the severity of surgical intervention, which allows us to objectively determine the severity of the upcoming operation.

2. In order to determine the level of preparedness of the surgeon, to objectively assess the possibility of performing the operation depending on the complexity of the upcoming surgical intervention, it is advisable to use the developed system for calculating the rating of the surgeon and the rating approach to performing echinococcectomy in various clinical variants of the disease, which helps reduce the number of possible technical complications.

3. To achieve high aparasiticity of surgical intervention, it is advisable to use the technique we have developed for intraoperative treatment of residual cavities of EVAR with sodium hypochlorite, which has minimal aggression on the liver parenchyma and fibrous capsule of the EC.

4. In the presence of large and “difficult” cystobiliary fistulas, it is advisable to suturing them with the “trapezoidal” flap made from a fibrous capsule that we offer, which helps reduce the incidence of biliary fistulas and its complications.

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