

## MODERN STATE OF THE PROBLEM OF DIAGNOSIS AND SURGICAL TREATMENT OF HEART ECHINOCOCCOSIS

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**The urgency of the problem** . Echinococcosis of the heart is rare, accounting for only up to 2.0% of all localizations of this zoonosis [1, 4, 6, 8, 10, 11]. A small number of works on cardiac echinococcosis surgery draws attention [1-3, 10]. The paucity of publications and clinical observations on diagnosis and surgical treatment indicates a lack of awareness of clinicians about diagnostic features and methods of surgical treatment. However, in endemic areas there is a rather "high" frequency of patients with cardiac echinococcosis who need surgical treatment.

The aim of the study was to analyze and evaluate the results of clinical diagnosis and surgical treatment of patients with cardiac echinococcosis.

### **Material and research methods**

In the State Institution "RSNPMTSH named after acad. V. Vakhidova " for the period from 1994 to 2022, echinococcosis of the heart was diagnosed in 83 (100%) patients and surgical treatment was performed.

The patients were divided into two groups depending on the nature of the disease:

group 1 - 59 (71%) patients with isolated cardiac echinococcosis;

Group 2 - 24 (29%) patients with combined echinococcosis of the heart / pericardium and target organs (liver, lungs, mediastinum) (Table 1).

average age of the patients was  $31.6 \pm 1.55$  years. There were 41 (49.4%) men, 42 (50.6%) women. Diagnosis of parasitic damage to the heart was made by means of X-ray examination of the chest organs , transthoracic (TT) and transesophageal (TE) echocardiography ( EchoCG ), multislice spiral computed tomography

(MSCT) and coronary angiography

*Table № 1*

**The nature of organ damage by echinococcosis**

Affected organs	1st group n=59 (71%)	2nd group n=24 (29%)
Heart	56	-
Pericardium	3	
Heart + liver		6
Heart + lungs	-	5
Pericardium + lungs	-	9
Multifocal thoracic lesion	-	4
<b>Total</b>	<b>59</b>	<b>24</b>

*Table № 2*

**Topical localization of cysts in the heart**

Place of localization	n =83	%
left ventricle	55	66.3
Pericardium	12	14.4
Interventricular septum	8	9.6
Right ventricle	3	3.6
Right atrium	2	2.4
Aortic arch	3	3.6

**RESULTS AND DISCUSSION**

Surgical intervention in 64.2% of cases was performed under cardiopulmonary bypass ( $75.0 \pm 7.6$  min) and cardioplegia ( $45.3 \pm 4.2$  min) from sternal access. In cases of parasitic lesions of the pericardium or combined echinococcosis of the pericardium and lungs, interventions were performed through a thoracotomy without EC.

Operations under cardiopulmonary bypass ( EC) included a standard connection to the EC device and antegrade pharmaco-cold cardioplegia . After asystole, the area of the parasite's hand was covered with a gauze swab, the cyst cavity was punctured in the most convex avascular part, then its contents were removed by external suction; then cystotomy and echinococectomy were performed . The residual cavity was treated with 30% sodium chloride solution or 80-100% glycerin solution.

AT 6 observations, cardiac echinococcosis was combined with a parasitic lesion of the liver and a simultaneous intervention was performed, that is, simultaneous - sequential EE was first performed echinococectomy (EE) from the heart under EC, and then - EE from the liver through the upper median laparotomic access with capitonage of the cyst bed. In 2 patients, a phased correction was carried out, that is, first, EE from the heart, and then, after normalizing the general status of the patient, after 2-3 weeks, the second stage of the operation - EE from the liver. The postoperative period in patients with combined echinococcosis of the heart and liver proceeded relatively smoothly.

In 5 (8.9%) cases, combined echinococcosis of the heart and lung was observed. At the same time, at the beginning of the activity, surgical correction was carried out in stages; in recent years, simultaneous treatment tactics have been successfully used.

In 9 cases, we observed a combined lesion of the pericardium and lungs. In all cases, the patients were successfully operated on from the thoracotomy without the use of EC, simultaneous EE was performed from the lung and pericardium with excision of the latter. The pericardial cysts in these cases were located extrapericardially . In one case, pulmonectomy was performed (due to multifocal recurrent lung disease) with EE from the pericardium.

In 2 (3.5%) cases, there was a multifocal lesion of the heart, pericardium, lungs and mediastinum. Despite the prevalence of the process, patients were operated on for health reasons. The size of the cysts ranged from 3 to 8 cm. In the process of sternotomy, a clinical picture of anaphylactic shock was observed, which led to a

fatal outcome. Autopsy confirmed multifocality of parasitic lesions of the chest organs with perforation of cysts in the heart cavity.

In the postoperative period, all patients underwent three courses of anthelmintic chemotherapy using mebendazole or albendazole (10–15 mg/kg/ day) at monthly intercourse intervals under the control of blood tests [1;2;13;15;16].

The overall postoperative mortality in groups was 6 % (5 patients).

In group 1, 2 patients (3.3%) died in the early postoperative period. In one of these patients, critical LAD stenosis was detected on coronary angiography . A simultaneous operation was performed - EE from the left ventricle and coronary artery bypass grafting of the LAD under conditions of EC and CP. The early postoperative period was complicated by bleeding. Performed resternotomy , debridement and stop bleeding. The patient died of multiple organ failure; in the second case, the patient died of bleeding due to rupture of the thinned wall of the left ventricle after removal of an intramurally located cyst.

In the 2nd group, mortality was 1 2.5% (3 patients). When removing an echinococcal cyst of the interventricular septum, damage to the anterior interventricular artery occurred, which led to the development of incurable cardiac weakness and ended in death.

Perforation is a fatal complication that was observed in 2 (3.5%) patients at the stage of sternotomy. Both patients had perforation of a tense cyst of the right heart into the cavity of the right ventricle with the development of severe anaphylactic shock, which led to a fatal outcome.

In the postoperative period, anthelmintic therapy was carried out according to the recommendations.

Among non-fatal complications, ventricular arrhythmias were the most common, which were noted in the 1st group in 7 patients (11.8%), and in the 2nd group - in 6 (25%). Heart failure in group 1 was observed in 4 (6.7%) patients, and in group 2 — in 5 (20.8%) patients. In 2 (3.4%) patients of the 1st group, in the early postoperative period, a clinical picture of compressive exudative pericarditis was observed, which required drainage of the pericardial cavity. 2 patients (one in each

group) had pneumopathy. Complications from the organs of the abdominal and pleural cavity were not revealed.

There were no changes in the volumetric and functional parameters of the heart. Fluid accumulation or suppuration of the residual cavity was not detected. In the dynamics, there was a decrease in the residual cavity.

In the world literature there is evidence that patients with heart echinococcosis are hospitalized in hospitals with a clinic of coronary blood flow disorders [1;4;10]. In our study, in 22.7% of cases, ECG myocardial ischemia was detected in the preoperative period, the signs of which disappeared after surgery. Only in one case coronary artery bypass grafting was required due to critical stenosis of the anterior interventricular artery. In other cases, ischemia was caused by compression of nearby coronary vessels by a tense parasitic cyst and was of a transient nature.

In our cohort of patients, the combination of echinococcosis of the heart and target organs was observed in 29% of cases; isolated cardiac echinococcosis in-71%.

According to the literature, in 7-15% of cases there is spontaneous perforation of the cyst into the pericardial cavity or into the cavity of the heart with the development of anaphylactic shock [ 2;13;17]. Some authors describe cases of cyst perforation during cardiopulmonary resuscitation. In our study, 2 (2.4%) patients died due to rupture of echinococcal cysts in the heart cavity at the stages of sternotomy, due to pressure on the sternum during the latter.

Echocardiography occupies a special place in the intravital diagnosis of cardiac echinococcosis [8;9;15]. We consider it expedient to carry out transesophageal EchoCG and MSCT for all patients, which allows not only to detect cystic formation of the heart, but also to detail the topographic localization, size of the cyst and the relationship with the coronary vessels [9;14-16]. echocardiography also plays an important role in postoperative monitoring of patients and for the timely diagnosis of disease recurrence [8;9].

When analyzing the literature, it was found that every sixth patient dies from bleeding during surgical treatment, especially if the latter is not performed under EC conditions. Therefore, some authors, fearing the occurrence of a number of

complications (bleeding, myocardial rupture, etc.), consider it expedient to perform EE from the heart under conditions of EC and CP [3;4;6;11;12;14;16]. We also consider it expedient and justified to perform EE under conditions of EC and CP on an “immobilized” heart.

In the literature, unfortunately, there is no single point of view regarding the tactics of surgical treatment of combined echinococcosis of the heart and target organs. So, many sources report on the gradual removal of echinococcal cysts, first from the target organ , after a short period of time - from the heart. In contrast , Kabbani S.S. et al . (2007) in their 8 observations, the first stage of EE was performed from the heart, after 3-6 months - from the liver or lungs.

The problem of the residual cavity after EE from the heart, especially with the so-called "large" cysts, is still debatable. Some authors fill the parasite cavity with a piece of autopericardium or move a strand of the greater omentum from the abdominal cavity into the cyst cavity [1–3]. With "large" intramural LV cysts after EE, a large cavity with thin walls remains and the risk of rupture and development of an aneurysm is high. In such cases, we performed partial pericystectomy , taking into account the variant anatomy of the coronary arteries. Pericistectomy - allows you to reduce the depth of the "residual" cavity. Next, the LV wall was sutured according to the Cooley method within healthy tissues with a two-row suture with etibond 2/0 thread - the first row with U -shaped sutures on gaskets, the second row with a continuous upholstery suture.

Anthelmintic agents are used to treat the residual cavity of the cyst. The most reliable and suitable for practical use were 30% sodium chloride solution and 80-100% glycerol solution [1-3]. There are reports of positive results of conservative treatment with albendazole. Other authors limit the scope of non-surgical chemotherapy only to patients with unresectable options or who refuse surgery. Still others perform intervention on the heart after a course of chemotherapy, and also recommend that therapy be carried out after surgery [15;18]. The fourth consider the treatment with albendazole before surgery to be deadly and absolutely contraindicated due to the softening of the parasite wall during treatment and the

multiply increasing risk of cyst rupture [1;3;13;14]. Finally, fifthly note the low effectiveness of chemotherapy even after the removal of hydatids. We use chemotherapy only in the postoperative period to prevent recurrence of the disease.

Hospital mortality after surgical treatment in the literature is not covered enough, because in most observations, we are talking about single operations. So, in 45 cases, according to Thameur H. \_ et al. (2001) mortality was observed in 5.5%, recurrence of the disease - 4.4%; according to Elhattaoui M., et al. (2006) lethality was observed in 28% of cases; according to Jerbi S. \_ et al (2008) - in 20% of cases. Orhan G. et al. (2008) notes mortality and recurrence in 4% of cases. Our postoperative mortality was 6.8%.

In the postoperative period, non-fatal complications include pericarditis, pleurisy, and rhythm disturbances [17]. In our study, rhythm disturbances were noted in 7 (11.8%) patients of the 1st and 6 (25%) patients of the 2nd group. Echocardiography before and postoperative periods did not reveal significant changes in the volumetric and functional parameters of the heart.

### **Conclusions**

1. Transthoracic EchoCG is a screening method for diagnosing cardiac echinococcosis

2. Patients with cardiac echinococcosis, in addition to TT echocardiography, need to undergo TE echocardiography and MSCT to select the optimal tactics of surgical treatment.

3. Echinococcectomy from the heart is advisable to perform under conditions of cardiopulmonary bypass and cardioplegia.

4. Topographic anatomy of an echinococcal cyst is important in developing the optimal tactics of surgical treatment.

5. In our cohort of patients, the combination of echinococcosis of the heart and target organs was observed in 29%; isolated cardiac echinococcosis in - 71% of cases

6. The overall postoperative mortality was 6 % (5 patients); in 2 (2.4%) cases, patients died due to rupture of echinococcal cysts in the heart cavity.

## LITERATURE

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