

# Cardiac Echinococcosis: Surgical Treatment and Results in 10 Cases

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## Abstract

**Objective-** Cardiac hydatid cyst is an uncommon disease, its prevalence being about 0.5–2%. 90% of parasites which are digested orally are removed by the liver and lung, 10% enter the general circulation and 1% enters the coronary arteries. Its cause is echinococcus, which is found in animals such as sheep and dogs. The mortality rate of disease is 10.2%. The aim of this study is to present the results of 10 cases with cardiac echinococcosis operated in Shaheed Madani Heart Hospital in Tabriz.

**Methods-** From 1992 to 2004, ten cases of hydatid cyst of the heart underwent surgical excision. For collecting data a questionnaire was used and statistical analysis was performed with SPSS software and was done through descriptive statistical method.

**Results-** There were 7 females and 3 males (F/M ratio = 2.3/1). The mean age of patients was 25.6 years old. All patients were operated through median sternotomy with CPB. Surgical treatment included puncture of the cyst and sterilization with hypertonic saline solution and total cyst extirpation. There was one perioperative mortality and one case with cerebral hydatid cyst one year later. All patients received albendazole pre- and postoperatively.

**Conclusion-** Surgical treatment of cardiac hydatid cyst is safe. It is recommended that patients receive mebendazole or albendazole 30-40 mg/kg for 6-24 months postoperatively. Reduction of serum levels or achievement of negative test results indicates positive therapeutic effects (*Iranian Heart Journal 2006; 7 (4): 67-71*).

**Key words:** hydatid cyst ■ cardiac tumor ■ cardiac surgery

Hydatid cyst of the heart is an uncommon lesion.<sup>1</sup> Hydatidosis is a parasitic infection caused by *Echinococcus granulosus*, a widely known zoonosis. The life cycle of this cestode tape worm involves dogs and other canines as definitive hosts and domestic and wild ungulates, usually sheep, as intermediate hosts. Human beings are only incidental intermediate hosts of the parasitic agent. The infection - often acquired in childhood via playing with infected dogs, is

common in the sheep – raising areas of the world. In human beings, the most frequent locations of the hydatid cysts are the liver (in more than 65% cases) and lungs (25%).

A mean of only about 0.5- 2% of hydatid cysts are located in the heart.<sup>2</sup>

Because of continuous growth of the cysts, the surrounding tissues and cardiac structures become progressively affected, leading to the impairment of the hemodynamic function of the

Received Oct 25, 2005; Accepted for publication May. 2, 2006.

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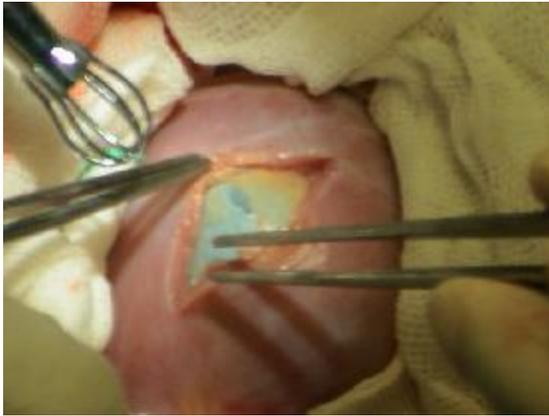


Fig. 3. LV cyst mass



Fig.4. Daughter cysts

Cyst mass location was in LVOT of 60% and RVOT in 40% and two patients had extra cardiac cyst mass (10%). All patients received albendazole 400mg/bd for 4 weeks after operation.

In all patients the operation was performed with median sternotomy. Cardiopulmonary bypass time was 48±20 minutes, ranging from 30 to 77 minutes. Intraoperative sterilization of cysts was performed by injection of hypertonic saline solution. After cyst sterilization, cysts were enucleated and the cavity was closed in all patients. In one case the cyst cavity was marsupialized. The postoperative course was uneventful in nine, but one patient died from acute renal failure (10%). One patient, a 16 year-old female had complaints of cerebral hydatid cyst about one year after left ventricular cyst

operation, suspected from LV cyst embolization. There were no other complications or recurrences in follow up of mean of 5 years. 60% of patients were treated with albendazole 400mg/bd for 4 weeks and 30% of patients received mebendazole 50-70 mg/kg/daily for several months postoperatively.

## Discussion

Cardiac involvement of hydatid cyst is an uncommon lesion if compared with hepatic or pulmonary hydatidosis. Human echinococcosis is caused most commonly by *Echinococcus granulosus*.<sup>3</sup> The reported prevalence is about 0.5%-2. Another type is *Echinococcus multilocularis*,<sup>2</sup> the agent of alveolar hydatid disease. Human beings are only incidental hosts by contamination from contact with animals. After infection, the embryo usually reaches the myocardium via coronary circulation from the left side of the heart. The cyst is then formed within a period of 1 to 5 years. Myocardial reaction consists of a fibrous adventitial pericyst layer surrounding the laminated membrane.<sup>4</sup>

A wide variation in age has been reported with this condition, without prevalence for age. Some reports indicate that cardiac hydatidosis tends to manifest in individuals over the age of 20 years; however, several cases have been reported in younger patients<sup>1</sup>. In spite of our experience, it seems that a prevalence for infection exists in female patients.

The cardiac hydatid cysts are surrounded by the periparasitic host tissue (pericyst), encompassing the endocyst of larval origin. Inside the laminated layer, or hyaline membrane, the cyst is covered by a multipotential germinal layer giving rise to the production of brood capsules and protoscolices. In addition, daughter cysts of variable size are often detected. The growth rate of cysts is highly variable and may depend on strain differences. Estimates on the average increase of cyst diameter vary from about 1 to 1.5 cm per year.<sup>5</sup>

The left ventricular and interventricular septum free walls are the most frequent locations of the cysts in the myocardial region. In our series

moreover, right – sided cardiac hydatid cysts have some different characteristics when compared with left-sided ones. Right-sided cysts have a tendency to expand intracavitarily and subendocardially,<sup>6,7</sup> whereas the left-sided cysts tend to grow sub-epicardially. This may be due to the thicker and denser myocardium of the left than the right heart. It has been reported that most of the cysts were located in the left ventricular wall because of the rich vascular supply of the left ventricle.<sup>8</sup>

The rupture rate of the cyst is higher in the right ventricular side cysts than left ventricular cysts, possibly because of lower pressure in the right chambers.<sup>9</sup>

Cardiac hydatid cysts produce a large variety of symptoms via any of four mechanisms. They can obstruct blood flow or cause valve dysfunction. They can lead to arrhythmias or pericardial effusion with tamponade by local invasion. Rupture of the cyst causes embolization, causing systemic deficits when the cysts are on the left side of the heart, or pulmonary embolism when the cysts are on the right side. Moreover, some cardiac hydatid cysts may stay asymptomatic for many years.

Recently Bennis et al. reported a case of cardiac hydatid cyst located in the interventricular septum and revealed by complete heart block.<sup>10</sup> They removed the cyst under cardiopulmonary bypass. The spectrum of symptoms depends on the involved part of the heart, size of the cysts, interaction between the expanding cysts and adjacent structures, particularly the conducting system, coronary arteries and valves, and complications caused by rupture of the cysts (pericardial tamponade, pulmonary emboli, anaphylaxis).<sup>11</sup> The most important complication of right-sided cardiac hydatid cysts is pulmonary emboli due to the intracavitary rupture of the cyst.<sup>12,13</sup> The most important complications of left-sided cardiac hydatid cysts are pericardial tamponade due to the intrapericardial rupture of the cyst and cerebral embolism due to systemic embolization. In our patients we had one case of cerebral embolism. Recently, Ulgen et al. reported an astonishing case of cardiac hydatid cyst with fatal recurrent cerebral embolism, and

the unusual involvement of both the left ventricle and the interventricular septum.<sup>14</sup>

Although right-sided cardiac masses do not have a uniform clinical presentation, a successful diagnosis mainly depends on a high index of suspicion and appropriate echocardiographic examination. The chest X-ray film often shows deformation of the cardiac silhouette, or a spherical mass, which may sometimes be calcified. Diagnosis is made by using echocardiography and serologic tests (agglutination or complement fixation), but excision and pathological examination of the lesion is required to confirm it.

Echocardiography is the imaging method of choice for the diagnosis of cardiac cysts. Serologic and echocardiographic controls are recommended for 5 years after extirpation to detect recurrences after surgical manipulation or cysts that were not discovered at operation.<sup>6</sup> The ability of magnetic resonance imaging to provide a global view of cardiac anatomy in any plane with high contrast between flowing blood and soft tissue ensures its important role in the diagnosis and preoperative assessment of hydatid disease of the heart.<sup>15</sup> Surgical therapy still remains the treatment of choice in the management of hydatid disease.<sup>7,12,13,16</sup> Although anti-helminthic drugs have been used since 1977 as treatment agents in the preoperative and postoperative periods, their clinical efficacy has not yet been proved.<sup>4</sup> Extirpation of the lesion is recommended under cardiopulmonary bypass. The cystic content should be aspirated carefully, and then with the addition of hypertonic saline solution the cystic content should be rapidly and completely sterilized.<sup>7,13,16,17</sup> Because of toxic effects of iodine and silver nitrate for the myocardium, the best agents for sterilization of cyst material is hypertonic saline solution.

Although the mortality and recurrence rates of cardiac hydatid cysts are very low, these cysts can be fatal. Occasionally, death occurs due to anaphylactic shock, cardiac tamponade, or pulmonary or systemic embolization. Rupture into the pericardium may cause acute pericarditis and tamponade, or chronic constrictive pericarditis. Bayezid et al. reported a right-sided

cardiac hydatid cyst that caused complete occlusion of the right pulmonary artery and pulmonary hypertension.<sup>18</sup> Their reported patients has congestive heart failure two months after operation. Erol et al. reported a right – sided cardiac hydatid cyst causing tricuspid stenosis.<sup>19</sup> Such a situation may also be fatal by causing acute obstruction of the right ventricular inflow tract. No cardiac recurrence occurred in our patients, only one patient died as the result of renal failure.

### Acknowledgements

We would like to thank Cardiovascular Research Center of Tabriz University of Medical Sciences, Tabriz – Iran, especially Mr. Mosharkesh and Miss Salek.

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