

# Interventricular hydatid cyst with atrioventricular block: a case report

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Hydatid cyst in the heart is rare, occurring in about 3% of human echinococcosis. A 21-year-old woman was admitted to hospital with a third degree atrioventricular block. Echocardiography showed a cystic mass with a diameter of 2.5 cm within the interventricular septum. Serologic testing for *Echinococcus* was clearly positive, and hence cardiac surgery was planned. Sterilization of the cystic cavity was achieved by injecting formaldehyde solution in the cavity before cystectomy. Definitive pacemaker implantation was necessary before discharge. Cardiac hydatid cysts constitute an indication for surgery which is necessary to prevent potentially lethal complications such as cystic rupture with embolic phenomena and anaphylactic shock.

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## Introduction

Hydatid disease is a zoonosis that continues to represent a significant health problem in undeveloped and developing countries including South America, Australia, New Zealand, the Philippines, China, Arabia, Eastern Europe, and the Mediterranean coast<sup>1,2</sup>. The disease is caused by *Echinococcus granulosus*, and humans are infected by various hosts including dogs, wild canines and other carnivorous animals or contaminated uncooked vegetables. Hydatid cyst in the heart is uncommon, and occurs in about 0.2 to 3% of all cases of human hydatidosis<sup>2-4</sup>. Hydatid cysts in the heart have the following predominant locations: the left ventricle (75%), the right ventricle (18%), and the interventricular septum (7%). An atrial location has rarely been reported.

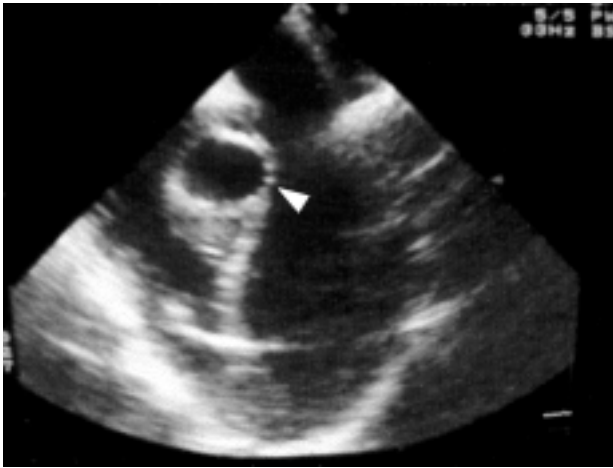
We report a case of isolated echinococcosis of the heart involving the interventricular septum that was successfully managed by surgical treatment.

## Case report

A 21-year-old woman from the farming areas of Eastern Europe was admitted to hospital with a history of palpitations and syncope. During the hospital stay serial electrocardiograms revealed a third degree atrioventricular block, and a temporary pace-

maker wire was inserted. The chest X-ray film demonstrated a normal cardiac image, without evidence of pulmonary disease. Transthoracic and transesophageal echocardiography demonstrated a cystic mass 2.5 cm in diameter without internal trabeculae. The cystic mass was localized in the proximal segment of the interventricular septum, protruding mainly into the right ventricular chamber (Fig. 1). No signs of pericardial effusion were observed. Abdominal ultrasonography was normal. A blood test showed an elevated erythrocyte sedimentation rate and eosinophilia. Immunoassay testing for *Echinococcus* was clearly positive (1/20 000). Since there were neither clinical nor instrumental signs of myocardial ischemia, coronary angiography was not performed. Furthermore, the patient's age and the cyst's localization were not risk factors for coronary disease. After 1 week of therapy with albendazole, 400 mg twice daily, cardiac surgery was planned.

The operation was performed through a median sternotomy using cardiopulmonary bypass with aortic cross-clamping. After induction of hyperkalemic blood cardioplegic solution (antegrade followed by retrograde flow via the coronary sinus), a longitudinal right atriotomy was performed. The cystic mass could easily be seen through the tricuspid valve orifice immediately beyond the septal leaflet (Fig. 2). To prevent contamination of the surrounding area, the cystic fluid was first aspirated and



**Figure 1.** Intraoperative transesophageal echocardiography showing the cardiac cyst located in the proximal interventricular septum (arrow).



**Figure 2.** Intraoperative picture (surgeon's view) of the cardiac cyst (\*), which is clearly visible below the septal leaflet (and chordae) of the tricuspid valve.

then sterilization of the cystic cavity was achieved by injecting a 3% formaldehyde solution for about 20 min into the cavity. Then, cystectomy was performed partially resecting the side of the cyst facing the right ventricular chamber and a glutaraldehyde preserved bovine pericardial patch was sutured all around to prevent the development of an interventricular defect. Single sutures were used across the tricuspid annulus for the upper portion of the patch, and a running suture for the lower part of the patch. The right atrium was closed with a running suture and the patient was weaned from the cardiopulmonary bypass.

The patient needed external pacing until postoperative day 7 when a definitive pacemaker was implanted. She was discharged from the hospital on postoperative day 10 and medical treatment with albendazole was continued for 4 weeks. Histopathological analysis of the surgical specimen confirmed the diagnosis of a hydatid cyst.

## Discussion

Echinococcosis is a tissue infestation caused by the larva of *Echinococcus granulosus*. Adult helminths mature in the intestinal mucosa of the final host, usually dogs or wild canines, which have eaten the uncooked meat containing cysts from the intermediate host. In its early stage, the *Echinococcus* larva reaches the left cardiac cavities via the pulmonary veins or the right atrium owing to the presence of a patent foramen ovale. Having arrived at the coronary arteries, the larva invades the myocardium, requiring 1 to 5 years to reach an adult form. The infection may be accompanied by multiorgan involvement<sup>1</sup>. Hydatid cyst disease in the heart is rare (0.5 to 3%), but it is potentially fatal. It may mimic valvular lesions, give signs of an intracardiac mass, or lead to congestive heart failure. Cardiac involvement usually occurs during adulthood. The latent phase between infection and the clinical manifestation of the disease is long and symptoms may be non-specific. Hence, an early diagnosis is difficult. The clinical evolution of a cardiac hydatid cyst depends on the location and size of the cyst. It may be asymptomatic or cause electrocardiographic signs of subepicardial ischemia<sup>4</sup> and conduction disorders of the His bundle or its branches<sup>5</sup> such as in this case. Symptoms may also be due to complications such as rupture, obstruction or compression. Massive pulmonary embolism and anaphylactic reactions have also been reported. An early diagnosis is difficult in the absence of one or more of these signs. Echocardiography, computed tomography and magnetic resonance imaging are valuable diagnostic tools<sup>1,2</sup>.

The presence of hydatid cysts in heart tissue constitutes an indication for surgery<sup>1,2,6</sup>. The left ventricle is the most frequently involved site (55 to 75%), due to its high blood supply. Involvement of the interventricular septum is reported in 5 to 7% of cases<sup>2</sup>. Hydatid cysts originating from the right atrial wall and right ventricular myocardium (15%) have also been reported<sup>2</sup>. Usually, at two-dimensional echocardiography, hydatid cysts are described as cystic masses with well-defined edges and internal trabeculae (the "daughter" vesicles). In some patients hydatid cysts appear as solid masses (remnants of a degenerated cyst) very difficult to differentiate from heart tumors<sup>3</sup>. Hydatid cysts may also calcify and become visible at standard chest X-ray.

In the present case we found an old degenerated cyst in which trabeculae were not evident and daughter vesicles were absent. Hydatid cysts of the left ventricle are usually located subepicardially and rupture into the pericardial space is a rare complication. Conversely, when the cyst is in the right ventricle, the localization is subendocardial. Therefore rupture is more frequent and causes pulmonary embolization<sup>1</sup>. Cysts located within the septum may cause conduction disorders including complete atrioventricular block as in the present case. Some authors have reported reversible atrioventricular block with restoration of a normal atrioventricular conduction after the surgical removal of the septal cyst<sup>5</sup>.

Secondary hydatidosis and recurrence of hydatidosis are serious complications of hydatid surgery. Albendazole, a derivative of benzoimidazole, is the most commonly used drug in the medical treatment of echinococcosis and pre- and post-surgical treatment is very effective in preventing the recurrence of hydatidosis.

In conclusion, whatever the localization, the treatment of choice for a cardiac hydatid cyst is surgical and it should not be delayed. In case of an interventricular location of the cyst, gentle manipulation of the heart is recommended in order to minimize the risk of accidental rupture. Because of the favorable position of the cyst, we could approach the lesion by a right atriotomy which is a less invasive access than ventriculotomy. Complete sterilization should be performed with infiltration of either formaldehyde solution or a hypertonic saline or other solution<sup>6</sup>. If total excision of the cyst wall is not possible (as in the present case), the remaining cavity should be closed by obliteration, plication or both<sup>6</sup>.

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