Huge Hydatid Cyst of the Right Ventricular Outflow Tract

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Abstract
Hydatid disease is a common health problem in sheep-farming countries including Iran. The liver and lungs are the most frequent primary sites of hydatid cysts in humans. Cardiac involvement is an uncommon manifestation and the right ventricle outflow tract is rarely involved. This is a case report of a 34-year-old man who presented to the Heart Clinic, Tehran, Iran, in 2019 with a history of dyspnea and fatigue. Following imaging study, the patient was diagnosed with a right ventricular outflow tract hydatid cyst. He underwent surgical resection of the cyst. The post-operative course was uneventful.

Keywords: Hydatid cyst; Right ventricular; Outflow obstruction; case report; Iran.

Introduction
Cardiac involvement is uncommon in hydatid disease. The symptoms vary depending on the size and location of the cysts. About 90% of the patients remain asymptomatic since hydatid cysts grow slowly, and a period of 5-10 years may elapse before the lesions become large enough to cause cardiovascular symptoms.¹ This is a case report of a hydatid cyst of the right ventricular outflow tract (RVOT) causing obstruction of the pulmonary valve and an RVOT gradient. Cyst resection was performed using cardiopulmonary bypass. Cardiac hydatid disease is a rare condition that could be potentially life threatening due to local and systemic
complications and can simulate a silent bomb. Surgery is the treatment of choice.

**Case report**

A 34-year-old man presented to the Heart Clinic, Tehran, Iran, in 2019 with a one month history of fatigue and progressive exertional dyspnea. He had a progressive exertional dyspnea since 10 months ago. His past medical history was unremarkable and vital signs were stable. A physical examination revealed no specific findings except a systolic murmur especially in the pulmonary zone. Chest X-ray and electrocardiogram (EKG) were normal. Transthoracic echocardiography (TTE) showed a large 40×40 mm hypoechoic mass without any internal debris in the RVOT with an obstructive effect (pressure gradient=48mmhg) and a moderate RV dilatation with mild dysfunction representing a hydatid cyst [Figure 1]. Thoracic computerized tomography angiography (CTA) showed a cystic lesion measuring about 4.33×4.20 cm in the RVOT causing narrowing and obstruction of the RVOT suggestive of a hydatid cyst [Figure 2]. No other cystic lesions were detected in thoracic, abdominal, and brain scanning by computed tomography (CT). Routine laboratory tests were normal. An enzyme-linked immunosorbent assay (ELIZA) was negative for hydatid cyst.

Based on CT and Echocardiography results and high prevalence of hydatid cyst in Iran, he was scheduled for surgical excision. Median sternotomy was performed and the operative field was wrapped with towels moistened with hypertonic saline. After performing cardiopulmonary bypass and inducing cardiac arrest, the whole content of the cyst was aspirated and hypertonic saline solution was injected. A small incision was made into the cyst to remove its germinal layers [Figure3 a-b]. The myocardial cavity was washed thoroughly with hypertonic saline solution. Histological examination confirmed the diagnosis of the hydatid cyst. Postoperative TTE was normal, without any remnant of the cyst and normal pressure gradient of the RVOT. The postoperative period was uneventful and the patient was discharged from the hospital with oral albendazole.

**Discussion**

Cardiac hydatid disease, an exceedingly rare condition, was first described by Williams in 1836. It accounts for 0.5-2% of all cases of hydatid disease. Dogs are definitive hosts while humans are accident hosts in their life cycle. After being eaten by the host, the parasite penetrates in the mucosa of the duodenum and reaches the portal venous system. Liver acts as
filter for trapping the ova of Echinococcus granulosus. Some larvae may escape via the hepatic filter and may continue to the systemic circulation including the heart. After reaching the heart the larvae become a mature cyst in about 1 to 5 years. Cardiac involvement may be seen by direct extension or hematogenous routes. Larvae reach the myocardium through the coronary circulation. The left ventricle (LV) is most frequently involved followed by the right ventricle (RV), interventricular septum, left atrium, and right atrium.

The patient may remain asymptomatic for many years or have symptoms depending on the location and size of the cysts such as chest pain, dyspnea, arrhythmia, and anaphylactic reaction. Intracavitary rupture is more frequent in the RV compared to the LV and can cause pulmonary embolization, pulmonary hypertension, and death. A diagnosis of cardiac hydatid cyst may be difficult due to the nonspecific symptoms and a high index of suspicion is crucial, especially in endemic areas. Patients with other systemic hydatid cysts should undergo echocardiography for possible cardiac involvement. Echocardiography, computed tomography, and magnetic resonance imaging are the most important tools for diagnosis.

Serology for hydatid cyst is useful to confirm the diagnosis, however, studies suggest that sensitivity of this is low with false negative results up to 50%. Differential diagnosis includes intracardiac tumors, congenital cysts, and ventricular aneurysms. Surgical excision is the treatment of choice, even in asymptomatic patients. As a rule, the heart should not be manipulated before applying a cross-clamp. Excision of myocardial hydatid cyst may be associated with some complications like damage to heart structures, cyst rupture, embolization of germinative membrane, and contamination of surrounding structure.

There are controversies about preoperative anthelmintic therapy in cardiac hydatid cysts. However, it is very important to bear in mind that anthelmintic therapy may lead to cyst death and destruction of its wall resulting in cyst rupture. Therefore, germicides must not be administered before surgical removal. Anthelmintic therapy is advised if surgical treatment is refused or if the patient is inoperable.

**Conclusion**

Isolated cardiac hydatid cyst can occur but is extremely rare. Early diagnosis and treatment are important to prevent life-threatening complication. In tropical countries like Iran, hydatid...
disease must always be kept in mind. To prevent recurrence after surgery, it is necessary to place patients on an anthelmintic therapy.

Conflict of Interest
The authors declare that there is no conflict of interest.

Patient Consent Declaration
The patient gave his consent for publication of this case report and accompanying images.

References


Figure 1: Transthoracic echocardiography view of the cardiac cyst.

Figure 2: Computed tomography show the hydatid cyst (Red arrow).
Figure 3 (A & B): Intraoperative photographs show the cavity of the hydatid cyst in RVOT (Black arrow), the germinative membrane of the cyst.