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Case Report Open Access

A rare and unruptured but potentially life-threatening presentation of a huge cardiac hydatic cyst

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ABSTRACT

Hydatid cyst is a parasitic infectious disease caused by *Echinococcus granulosus*, commonly involving cysts in the liver and lungs. Cardiac hydatid cysts are rare but can lead to severe, life-threatening complications. This case report presents the surgical treatment of an unruptured, but potentially life-threatening multivesicular hydatid cyst occupying a large area within the left ventricular cavity.

Keywords: Anaphylactic reaction, cardiac, cystic echinococcosis.

Hydatid cyst is a common parasitic infection endemic to regions with widespread livestock farming, including Türkiye.[1] While hydatid cyst disease is most frequently observed in the liver and lungs, *Echinococcus* parasites can infiltrate neighboring organs or spread to distant ones via hematogenous and lymphatic routes. Liver involvement constitutes 65% of cases, lung involvement constitutes 25%.[1,2] Cardiac involvement occurs in <2% of cases.[1,2] The distribution of echinococcosis within the heart depends on the blood flow to specific regions of the heart. Coronary circulation is the primary route through which parasitic larvae reach the heart, pulmonary veins have also been implicated. Due to its rich coronary blood flow, the left ventricular wall is the most common site of cardiac involvement, followed by the right ventricle, pericardium, atria, and interventricular septum.[2]

Medical treatment of cardiac cysts can reduce their dissemination during and after surgery. However, it may not prevent cyst rupture or the development of life-threatening complications. Therefore, the treatment of cardiac cysts is primarily surgical, accompanied by pre- and postoperative medical therapy to prevent recurrence.[1]

In this article, we present a rare and unruptured, but potentially life-threatening case of a huge cardiac hydatic cyst.

CASE REPORT

A 44-year-old male patient presented to the emergency department with complaints of swelling in the eyelids, hands, and lips, along with shortness of breath, chest pain, and palpitations. His medical history included surgery for a liver hydatid cyst 11 years prior. No abnormality such as ischemia or conduction disorder was detected on electrocardiography. The chest radiography demonstrated a normal cardiac image. Due to the potential recurrence of the hydatid cyst and the risk of rupture leading to an anaphylactic reaction, the patient was referred to the Department of Dermatology. Medical treatment for anaphylactic reaction was initiated. Following symptomatic improvement, transthoracic echocardiography (TTE), contrast-enhanced thoracic computed tomography (CT), and contrast-enhanced magnetic resonance imaging (MRI) were promptly performed. The patient was referred to our clinic with a preliminary diagnosis of cardiac hydatid cyst.

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Transthoracic echocardiography showed that the left ventricle ejection fraction was 60%. Aortic and mitral valve structure and function were normal. Transthoracic echocardiography revealed a well-defined hypoechoic cystic structure, measuring 63×52 mm (Figure 1a), occupying a large portion of the left ventricular cavity, with daughter cysts observed within the anterolateral wall of the left ventricle's apical segment. Thoracic CT confirmed the presence of a cardiac hydatid cyst (Figure 1b). Thoracic MRI identified a well-demarcated 67×51 mm cystic hyperintense structure with septations and daughter vesicles in the apicolateral region of the left ventricle (Figure 1c, d). To assess the potential dissemination of the cyst, cranial and abdominal MRI scans were also performed, but no pathology indicative of hydatid cysts was detected. Laboratory tests revealed elevated high-sensitivity troponin I (1.96 µg/L), procalcitonin (2.85 ng/mL), and eosinophilia (1.03 K/uL). The hydatid cyst indirect hemagglutination test was positive at 1/640. Albendazole 400 mg twice a day was started five days before the surgical treatment. After discharge, a three-month course of medical therapy and follow-up by the Department of Infectious Diseases and Clinical Microbiology were planned.

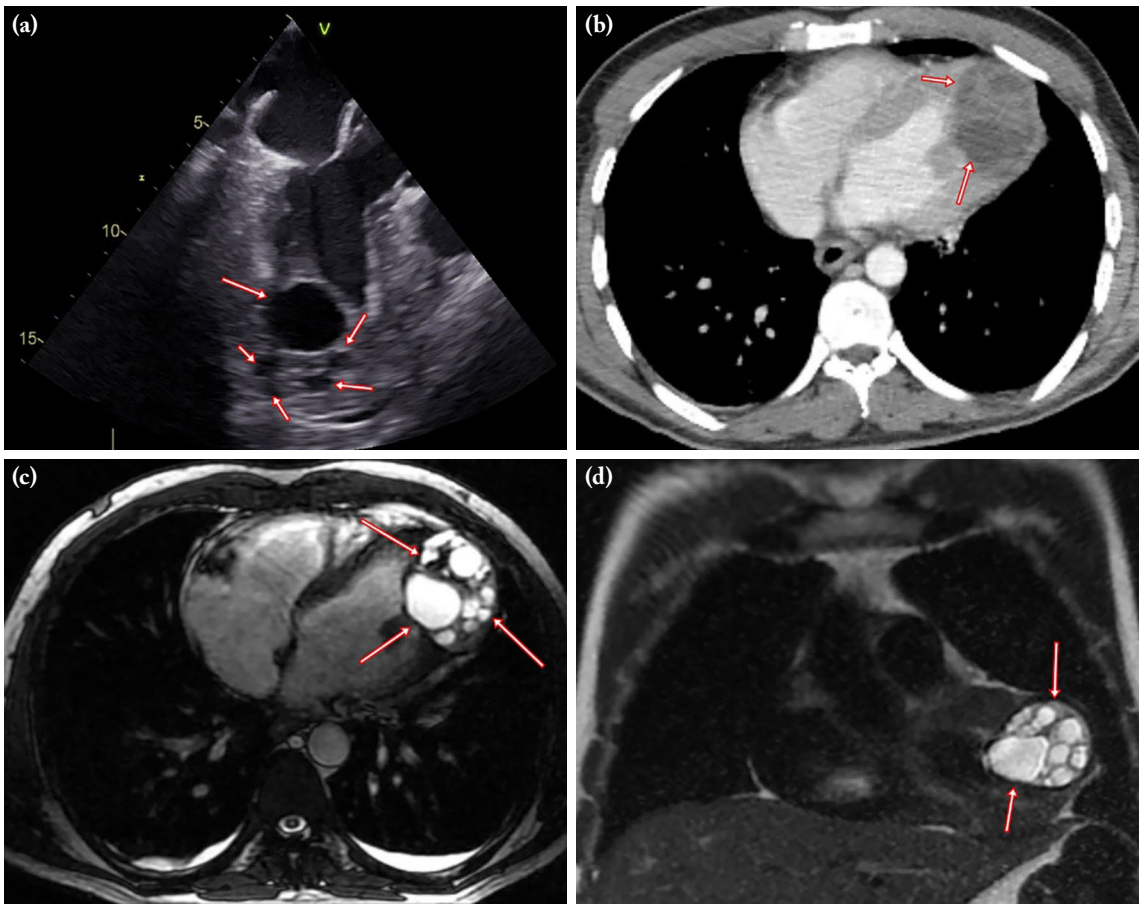

Figure 1. Transesophageal echocardiographic appearance and radiological images of cardiac hydatid cyst **(a)** Intraoperative transesophageal echocardiographic view demonstrating a large mass occupying the left ventricle cavity. Different sized "daughter cysts" may be seen within the larger cyst (red arrow), **(b)** Hypodense cyst view in the left ventricle on computed tomograph axial section (red arrow), **(c)** Hyperintense daughter cysts and septation appearance in the left ventricle on axial FIESTA magnetic resonance imaging (red arrow), **(d)** On magnetic resonance imaging, hydatid cysts appear as a high signal intensity on the coronal T2-weighted images (red arrow).

FIESTA: Fast Imaging Employing Steady-state Acquisition.

Under general anesthesia, a median sternotomy was performed. Aortic arterial and bicaval venous cannulation were established, and a venting cannula was placed in the right upper pulmonary vein. After cross-clamping, the heart was arrested antegradely using a modified cold (10°C) del Nido solution. Cardiopulmonary bypass was performed at a flow rate of 2.2 to 2.4 L/min/m^2 under mild hypothermia (30 to 32°C). A cyst measuring approximately 6×5 cm was observed in the anterolateral wall of the left ventricle (Figure 2a). Compressors soaked in 1% povidone-iodine and 20% hypertonic saline were used to isolate the cyst from the surgical field. The cyst cavity was sterilized by injecting 20%

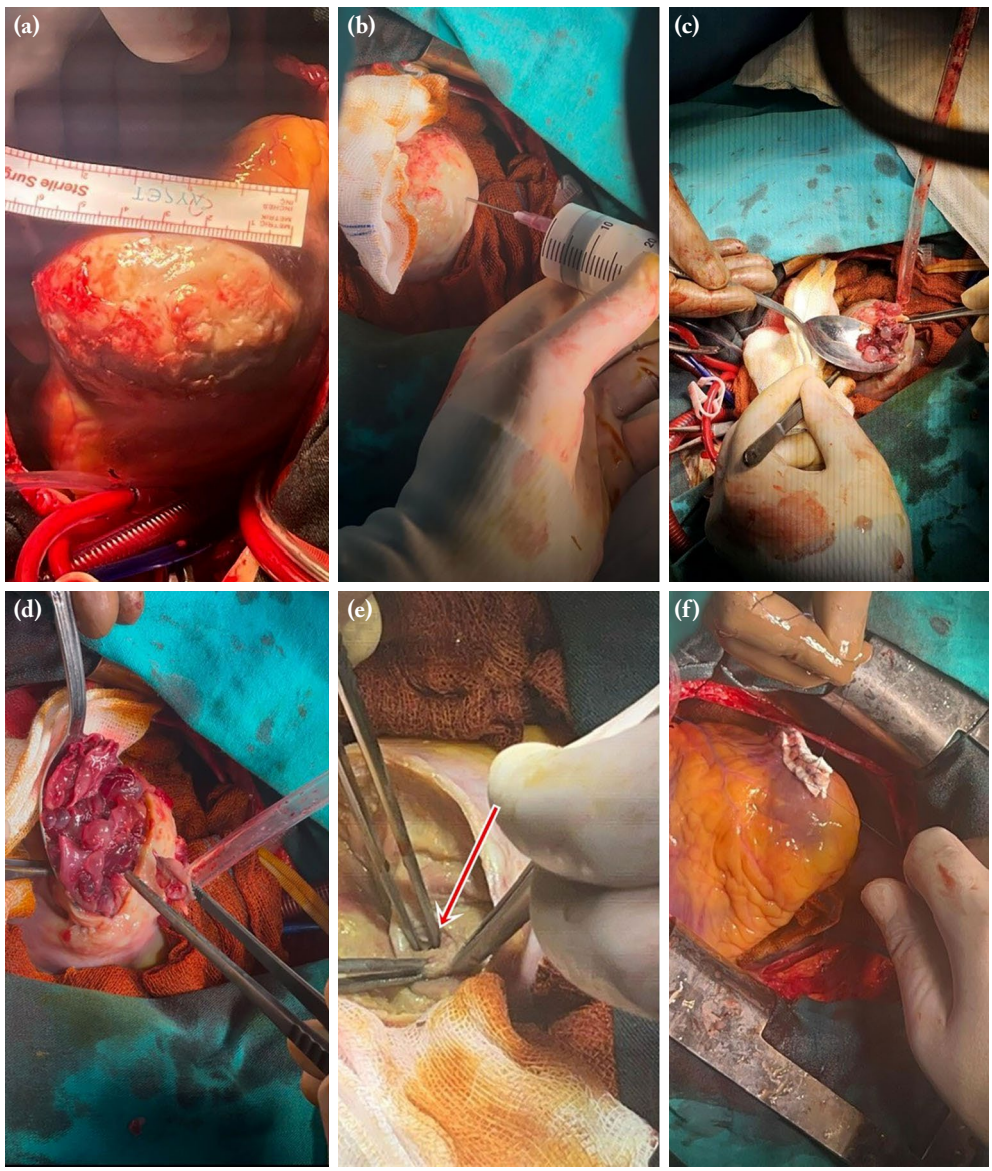

Figure 2. Surgical exploration of the giant left ventricle hydatic cyst. **(a)** Pericyst capsule of the hydatic cyst (outside view), **(b)** Intraoperative view of aspiration of cystic fluid and 20% hypertonic saline injected, **(c, d)** Intraoperative view of the left ventricular cyst showing the multiple daughter cysts and removal of cyst material, **(e)** Tunnel-shaped defect between the cyst cavity and the left ventricle (red arrow), **(f)** In the surgical view, repair of the left ventricle defect with the capitonnage similar to ventricular aneurysm repair.

hypertonic saline (Figure 2b). The pericystic layer was longitudinally opened, and the cyst contents were aspirated and evacuated.

The germinal membrane was excised, revealing numerous daughter cysts of varying sizes (Figure 2c, d). These cysts were meticulously removed without rupture. The cyst cavity was irrigated with both 1% povidone-iodine and 20% hypertonic saline. A tunnel-shaped defect of approximately 5×5 mm was identified connecting the cyst cavity with a blind end through the left ventricular septum (Figure 2e). The defect was repaired primarily with 4/0 polypropylene sutures. The cyst's free walls were resected down to healthy tissue. The left ventricular wall was closed with continuous Fontan sutures using two 4/0 polypropylene sutures, reinforced bilaterally with Teflon felt and closed linearly, similar to aneurysm repair techniques (Figure 2f). Intraoperative transesophageal echocardiogram (TEE) confirmed that there was no residual cyst structure. Histopathological examination of the excised material confirmed multivesicular hydatid cyst. The postoperative period was uneventful, and the patient was discharged on postoperative Day 7 with albendazole prescribed to prevent recurrence. At one-month of follow-up, TTE showed no cardiac abnormalities. A follow-up MRI was scheduled after three months of medical treatment. A written informed consent was obtained from the patient.

DISCUSSION

Cardiac involvement in hydatid disease caused by *Echinococcus granulosus* larvae is extremely rare, with a prevalence of less than 2%.[2] The left ventricle is the most commonly affected site in approximately 55 to 60% of cardiac cases.[3] Larvae are transported to the myocardium via the coronary arteries and the formation of cysts can take one to five years.[1] It has been reported that pulmonary veins may also play a role in the transport of larvae in the myocardium.[3] In most cases, cysts in the left ventricle are subepicardially located and rarely rupture into the pericardium, potentially leading to tamponade, pericarditis, anaphylactoid reactions, or asymptomatic presentations.[1] In our case, the patient presented to the Emergency Department years after liver hydatid cyst surgery with anaphylactoid reactions, but no cyst rupture.

Surgical excision is the primary treatment option for cardiac echinococcosis, even in asymptomatic and unruptured cases, due to potential complications. Median sternotomy is preferred for optimal visualization, although anterolateral thoracotomy can be performed in select cases.[4] Cardiopulmonary bypass and cross-clamping of the aorta is the most preferred method for excision of myocardial cysts and the most reliable method for prevention of systemic embolization. In excision of cysts located in the right heart, clamping of the pulmonary arteries is also recommended to prevent dissemination via the pulmonary artery.[5] Resection of epicardial cysts can be performed without the necessity of cardiopulmonary bypass. To prevent direct regional dissemination in the surgical field, site control should be performed with gauzes impregnated with scolicidal solutions such as 20% NaCl solution and hydrogen peroxide.[4]

Surgical techniques include cyst puncture, aspiration of its contents, resection of the germinal membrane, and cystectomy. Following excision, the cavity is irrigated with scolicidal solutions and either closed via capitonnage or left open for secondary healing, depending on its location.[4] Various complications may occur after surgery depending on the surgical techniques used. Some of these complications include atrioventricular block leading to the need for permanent pacemaker, myocardial rupture and ventricular arrhythmias due to ventricular scar which may lead to sudden death.[1] Albendazole therapy should continue postoperatively to reduce recurrence risk, as hydatid cysts have a 10% recurrence rate.[6]

In conclusion, cardiac hydatid cysts are quite rare. As demonstrated in this case presentation, cardiac hydatid cysts should be considered in the differential diagnosis of patients with unexplained cardiac symptoms. Surgery is the definitive treatment and should not be delayed, as medical treatment alone does not guarantee against life-threatening complications in the event of cyst rupture or, as in our case, even without cyst rupture. Combined surgical and medical therapy is essential to reduce recurrence and dissemination risk.

Data Sharing Statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

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