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Case Report

Pericardial hydatid cyst: A comprehensive case report on diagnosis and multidisciplinary intervention in a young patient☆,☆☆,★,★★

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ABSTRACT

Pericardial hydatid cysts, although rare, present unique diagnostic challenges and require a multidisciplinary approach for effective management. This parasitic infection, caused by *Echinococcus granulosus* larvae, typically affects the liver and lungs but can manifest in the pericardium, leading to potentially life-threatening complications if untreated. The 22-year-old female's escalating dyspnea posed diagnostic challenges despite inconclusive echocardiography. Employing a multidisciplinary strategy, including preoperative albendazole therapy and surgical excision, effectively managed the condition. This case highlights the intricate diagnostic nature of pericardial hydatid cysts, emphasizing the importance of heightened clinical awareness, especially in endemic regions. The detailed clinical trajectory, imaging methodologies, and therapeutic interventions contribute significant insights to the medical community. The study aims to deepen comprehension and guide clinicians in refined diagnostic and treatment approaches for pericardial hydatid cysts, ultimately improving patient outcomes. It underscores the imperative for continued research in this niche to enhance medical understanding and optimize clinical practices.

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Introduction and importance

A hydatid cyst is a parasitic infection that is caused by the larval stage of *Echinococcus granulosus* [1]. Pericardial hydatid cyst is rare comprising about 0.5%-2% of all the cases of hydatid cysts and 2%-10% of all cardiac hydatidosis cases. It is uncommon due to myocardial contractions [2]. The most common site of cardiac involvement of hydatid cyst is the left ventricle (60%), followed by the right ventricle (15%), interventricular septum (9%), left atrium (8%), and right atrium (4%) [3]. An isolated pericardial hydatid cyst without myocardial involvement is rare [4]. Surprisingly, cardiac hydatid cysts may present in the absence of a previous medical history of hydatid disease, particularly in regions endemic to the infection [5]. Pericardial cysts are extremely uncommon in the younger population, with the majority of cases seen post the third decade of life [6]. Patients harboring cardiac hydatid cysts can remain asymptomatic over extended periods or display mild, nonspecific symptoms.

Nevertheless, literature reports document severe complications, including cardiac compression, atrial fibrillation, and cyst rupture culminating in cardiac tamponade, anaphylaxis, or fatality [7]. Transthoracic echocardiography serves as the primary diagnostic modality, owing to its noninvasive nature. However, when the findings of Echocardiography are inconclusive, the role of contrast-enhanced computed tomography (CECT) and magnetic resonance imaging (MRI) comes into play to differentiate cystic masses from solid tumors [8].

Case details

A 22-year-old woman presented to the emergency department with chief complaints of increasing shortness of breath for the last 5 days. There was no history of fever, abdominal pain, cough, trauma, yellowish discoloration of eyes, or contact with animals. There was no significant past medical or family history. There was no history of any drug allergy and significant surgical intervention in the past. On examination, blood pressure was 110/70 mm of Hg, pulse rate was 88 beats per minute, temperature was 38 degrees centigrade, and oxygen saturation was 98% in room air. On auscultation, chest sounds were clear except for decreased breath sounds in bilateral lower lung fields. Heart sounds were also decreased in the tricuspid and the mitral area. There was no notable cardiac murmur. Lab parameters were within normal limits except for increased eosinophil count. Chest X-ray showed an enlarged cardiac silhouette with water-bottle configuration—findings consistent with pericardial effusion. There was also opacity noted in bilateral lower zones of the lungs with inferolateral predominance and haziness of bilateral costophrenic angles—findings consistent with bilateral pleural effusion (Fig. 1). ECG revealed normal findings. Echocardiography was ordered the findings were inconclusive. Chest US showed a thin-walled, round cystic structure within the pericardial fluid collection with debris/hydatid sand in the dependent portion of the pericardial fluid collection (Fig. 2). Computed tomography (CT) was ordered which showed features of the pericardial and pleural

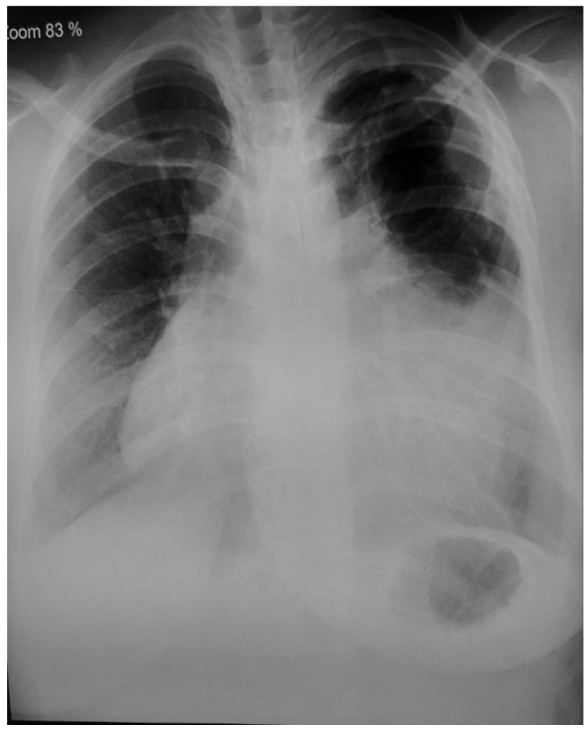

Fig. 1 – Chest X-ray posteroanterior view showing the enlarged cardiac silhouette giving water bottle configuration with opacity of bilateral costophrenic angle region.

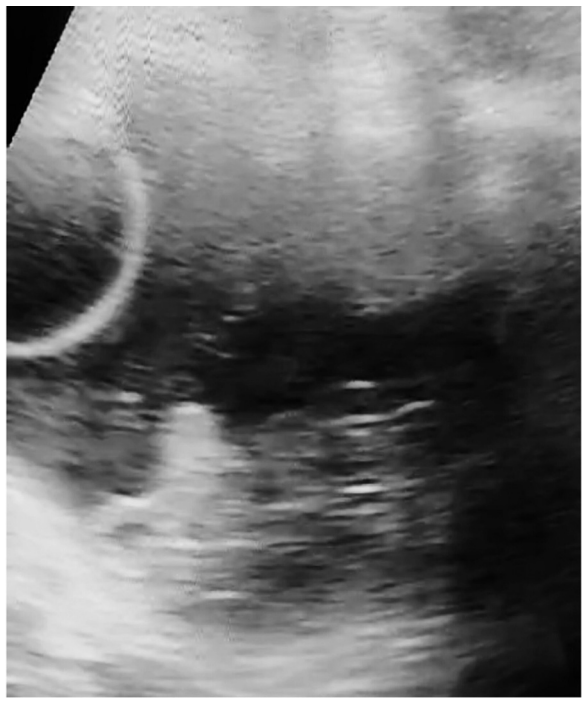

Fig. 2 – Greyscale ultrasound image showing the round cystic structure in pericardial collection with debris or sand in the dependent aspect.

fluid collection with eccentric thin-walled round cystic structures on the noncontrast scan (Fig. 3A). CECT scan showed enhancement of the pericardial lining with a few small daughter cysts within the pericardial fluid collection. A filling defect was also seen in the right descending pulmonary artery, and right brachiocephalic vein- features consistent with the presence of a thrombus (Figs. 3A-C). The initial provisional diagnosis of a pericardial hydatid cyst was made, and the patient underwent planned surgical excision through a left anterolateral thoracotomy. The procedure involved total excision of the pericardial cysts and associated debris. Macroscopic examination revealed multiple well-defined thin cystic lesions of varying sizes. Histological and parasitological examinations confirmed the hydatid nature of the cyst (Fig. 4). The postoperative course was favorable. The patient received medical therapy with albendazole at a dose of 10 mg/kg/day for 3 months before the surgery, and albendazole therapy was continued post-surgery. The patient experienced no complications during the recovery period. Monitoring for 2 years revealed no signs of complications during this follow-up period.

Clinical discussion

Hydatid cyst is a parasitic disease caused by tapeworms of the genus *E granulosus* [9]. Humans get infected via the fecal-oral route, especially by consuming contaminated food and water or through contact with infected animals. Once the parasite gains entry to the human body, it harbors itself within the vital organs, forming cysts that most commonly manifest in the liver (70%-75%) and lungs (25%-15%). However, it can affect virtually any anatomical location [10]. Cardiac hydatidosis occurs in 2%-10% of cases of all hydatidosis, with pericardial location comprising about 0.5%-2% of cases of all hydatid cysts [2]. An isolated pericardial hydatid cyst without cardiac involvement is exceedingly rare. Our study revealed pericardial involvement without affecting the cardiac chambers or the myocardial wall. In an 18 years long retrospective study of all cases of cardiothoracic hydatid cysts, isolated pericardial cysts are found in only 11 (1.4%) cases, demonstrating the rarity of this condition [11]. Cardiac involvement occurs primarily by myocardial infiltration from the coronary arteries [12]. It is also known to result from the fissuring of hydatid cysts from the liver or lung, trans-diaphragmatic dissemination, or lymphatic circulation [2]. The clinical presentations of cardiac hydatid cysts depend on the size and location of the cyst. It may be asymptomatic and may be discovered incidentally in the early stages of the disease. However, it may manifest with symptoms such as chest pain, dyspnea, persistent cough, palpitations, arrhythmias, and heart failure [4]. The most serious complication of pericardial cysts is perforation [13]. Pericardial hydatid cysts usually remain asymptomatic unless they produce pressure effects on the heart muscle from an expanding and ruptured cyst. The rupture of a hydatid cyst into the pericardial space can cause pericarditis with effusion, cardiac tamponade, and secondary cyst formation [14]. Cyst rupture into the bloodstream may lead to anaphylactic shock. However, other complications may also be seen like systemic or pulmonary hydatic embolism,

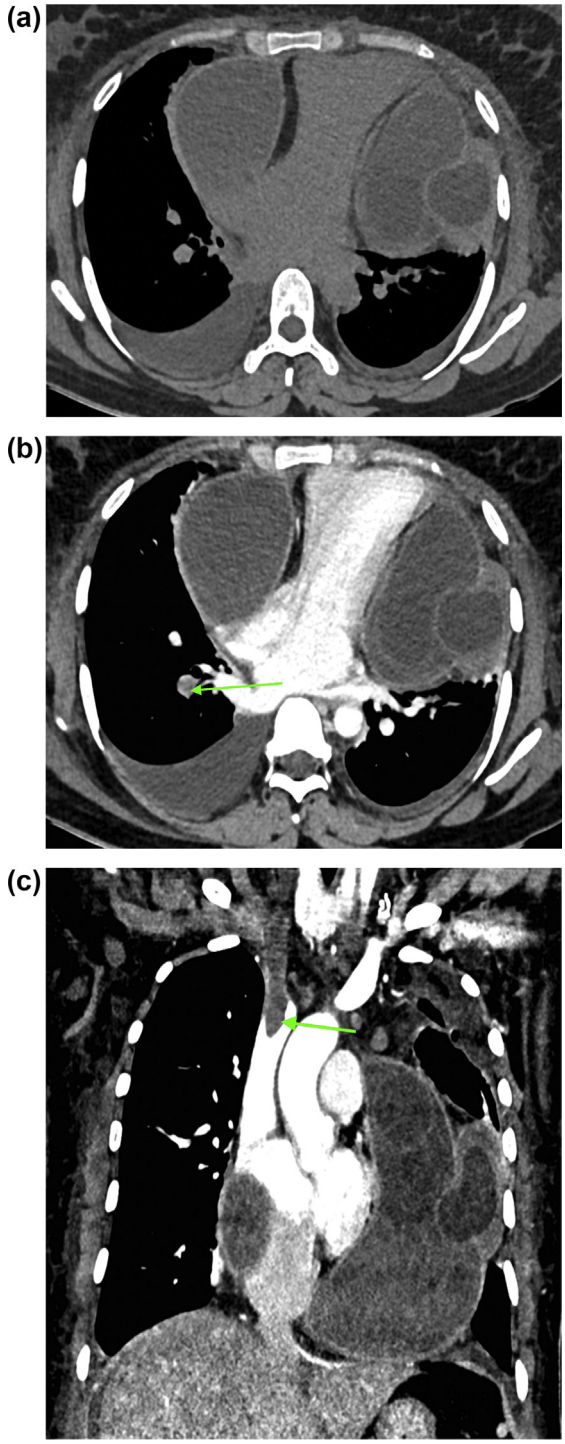

Fig. 3 – (A) Non-contrast axial computed tomography image showing the eccentric thin-walled round cystic structures along the left pericardial collection. Bilateral pleural fluid collection is also noted. (B) Contrast-enhanced axial computed tomography image showing the enhancement of pericardial lining with daughter cyst with hypodense filling defect in the right descending pulmonary artery. (C) Contrast-enhanced coronal computed tomography image showing the enhancing pericardial lining with multiple daughter cysts in collection and hypodense filling defect in the right brachiocephalic vein.

Fig. 4 – Multiple variable-sized thin-walled cysts extracted from the pericardial cavity.

mitral regurgitation secondary to papillary muscle involvement, valve obstruction, atrioventricular conduction abnormalities, and arrhythmias [14]. In our study, the patient presented with complaints of increasing shortness of breath for 5 days. The differential diagnosis of pericardial hydatid cysts includes thrombus, myxoma, cardiac tumors, and, rarely, intracardiac sarcomas [15]. Diagnosis of pericardial hydatid cyst can be done through a range of investigations which include echocardiography, CT, and magnetic resonance imaging, in addition to serological tests [16]. Transthoracic echocardiography (TTE) exhibits widespread availability, noninvasiveness, ease of execution, and notable sensitivity for the detection of intracardiac hydatid cysts. Furthermore, it plays a crucial role in strategizing surgical interventions for this condition [17]. The specific findings of hydatid cysts include calcification of the cyst wall, the presence of daughter cysts, and membrane detachment. However, initial echocardiography missed the cysts in our case, probably due to moderate pericardial effusion displacing the cysts superolaterally. While CT has been identified as the optimal imaging modality for delineating wall calcification, MRI exhibits superior efficacy in portraying the anatomical proximity of hydatid cysts, detailing the state of the cyst structure, and accurately depicting the precise anatomic location [18]. In our case, both plain and contrast-enhanced CT scans were performed, revealing an enhanced pericardial lining with pericardial collection. Additionally, a hypodense defect was observed in the brachiocephalic vein and right descending pulmonary artery, suggestive of a likely thrombus. Characteristics such as cardiomegaly with a unilobed or bilobed deformation of the cardiac silhouette and arcuate calcifications may be observed on chest X-rays. However, the findings are not contributory to the diagnosis [19]. In our study, the chest X-ray revealed an enlarged cardiac silhouette with a water bottle configuration and haziness in bilateral costophrenic recesses. Hyper-eosinophilia may be found in only 20%-30% of the cases, in case of invasion or rupture of the cyst [20]. Serological tests like the Casoni test are not very reliable. However, ELISA tests have higher sensitivity and specificity [4]. Hyper-eosinophilia was also observed in our case. Surgical excision of cardiac hydatid cysts is the recommended therapeutic approach, irrespective of patient symptomatology. This strategy aims to mitigate potential severe complications, including cyst rupture and the risk of sudden death [14]. Preoperative initiation of albendazole occurs within the timeframe of 3 months to 1 day before surgery, with a subsequent extension of post-treatment ranging from 1 to 3 months. The World Health Organization recommends surgical intervention for asymptomatic individuals with operable disease, followed by a prescribed minimum of 2 years of medical therapy. Prolonged albendazole administration mandates meticulous monitoring of liver enzymes. A thorough 5-year postoperative protocol includes serological and echocardiographic evaluations to confirm the absence of recurrence [4]. The surgical approach includes the excision of the cyst and pericardial drainage if the effusion is present [21]. The primary approach involves a vertical mid-sternotomy, facilitating access to all anatomical locations. In specific circumstances, a lateral thoracotomy at the fourth internal costal space proves practicable. Notably, superficial cysts can be excised with a beating heart, as demonstrated in our patient's case. Employing resection under cardiopulmonary bypass has demonstrated significant utility in conducting comprehensive assessments of both myocardial and pericardial conditions [20]. In our study, the patient received albendazole therapy 3 months before the surgery. Subsequently, surgery was performed using the left anterolateral approach, involving the excision of the cyst and removal of debris, followed by the continuation of albendazole therapy. Postoperative follow-up revealed an improvement in the patient's condition.

Conclusion

In conclusion, this case highlights the rare occurrence and diagnostic challenges of pericardial hydatid cysts. The successful management, involving Albendazole therapy and planned surgical excision, underscores the importance of a multidisciplinary approach. Vigilance in regions endemic to hydatid disease and a thorough investigation of suggestive symptoms are crucial for early detection and intervention, ultimately improving patient outcomes. This case contributes to our understanding of this rare condition and emphasizes the need for continued research and collaborative efforts in the medical community.

Author contributions

Sundar Suwal: Conceptualization, as mentor and reviewer for this case report and for data interpretation. **Shailendra Katwal:** Contributed in performing literature review and editing.

Suman Lamichhane: Contributed in performing literature review and editing. **Dinesh Chataut:** Contributed in writing the paper and reviewer for this case. **Amrit Bhusal:** Contributed in writing the paper. **Akriti Sharma:** Contributed in writing the paper.

Registration of research studies

Not applicable.

Guarantor

Shailendra Katwal.

Provinence and peer review

Not commissioned, externally peer reviewed.

Patient consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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