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Case Report

Incidental Left Ventricular Myocardial Hydatid Cyst – A case report ☆,☆☆

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ABSTRACT

Hydatid disease is an indolent parasitic infection by a microorganism, echinococcosis granulosis. The disease can infect almost any human organ but is exceedingly rare involving the mediastinum and the heart. It can be lethal if complications occur. CT scan is the modality of choice for the diagnosis of the disease. The coverage of cardiac structures in the abdominal CT scan survey may be helpful for the detection of possible cardio-mediastinal hydatid disease. The authors present a case of hydatid cyst in the left ventricular wall alongside hepatic hydatid cysts. The definitive treatment includes surgery under cardiopulmonary bypass and needs to be treated as soon as it is diagnosed to prevent lethal complications.

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Introduction

Echinococcosis is a common parasitic infection in developing and developed countries, [1] endemic in sheep-raising areas [2,3]. Dogs [1,2,3,4] and cats [3,5] are the definitive hosts, while humans are affected accidentally [2,4]. Cardiac involvement by the hydatid disease is extremely rare and reported in 2% of cases [2,3]. Authors present a case of incidentally detected

left ventricular wall hydatid cyst. In addition, the patient had multiple hydatid cysts in the liver.

Case presentation

A 6-year-old female patient complaining of dyspnea and abdominal pain was referred to the radiology department for an

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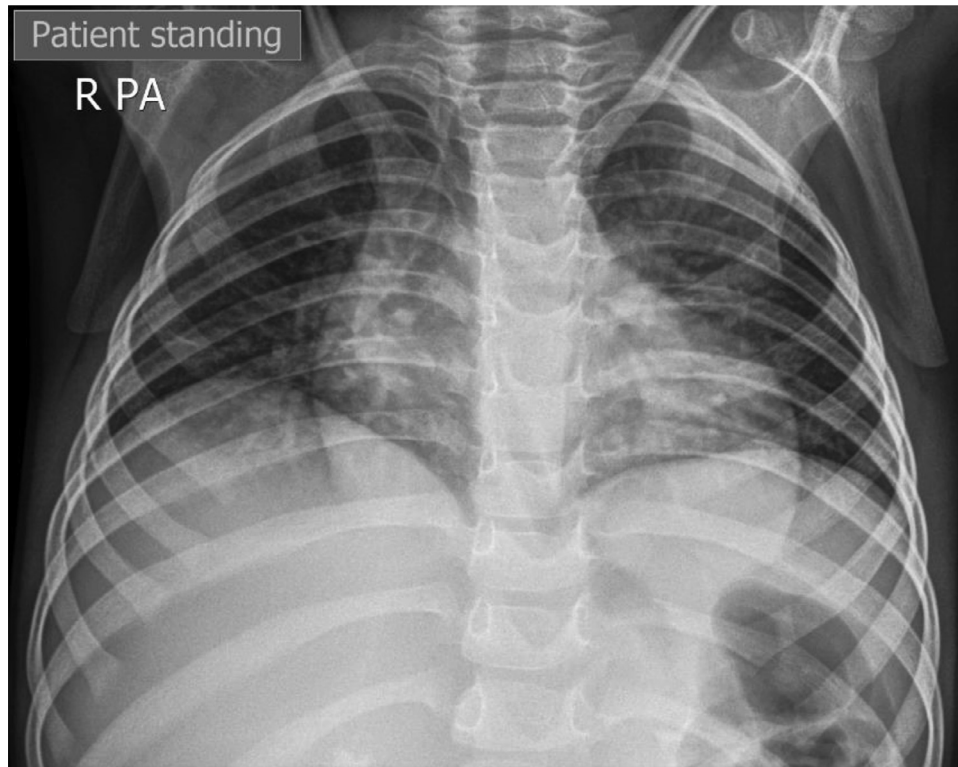


Fig. 1 – Front projection chest X-ray in standing position showed no significant abnormal finding.

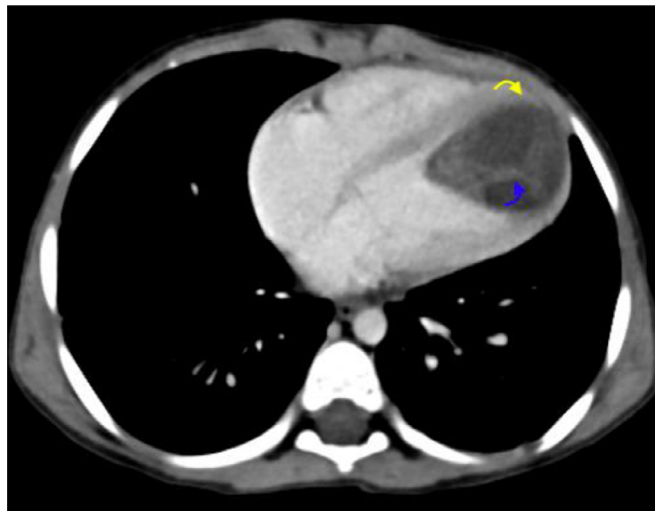


Fig. 2 – (A-C) Selected axial contrast-enhanced abdomen CT scan soft tissue window images demonstrating a hydatid cyst in the left ventricular wall (straight and curved yellow arrows) near the apex with sloughed membranes (straight and curved blue arrows), hydatid cysts in the right and left hepatic lobes (straight and curved red arrows). No features of complication (Color version of the figure is available online.)

abdomen CT scan. The patient was living in a sheep raising region of the country. No abnormal findings were detected in physical examination. There was no pertinent prior medical, family, and psycho-social history including any genetic predisposition. The chest X-ray of the patient showed no gross abnormal findings (Fig. 1). Abdomen CT scan demonstrated

unilocular ovoid fluid attenuating cystic lesion in the left ventricular wall, near the cardiac apex. The lesion was showing internal detached membranes, a water lily sign. The imaging features demonstrated characteristic findings of hydatid cysts (Figs. 2, 3, and 4). Additionally, hydatid cysts were visualized in the right and left hepatic lobes, characterized by

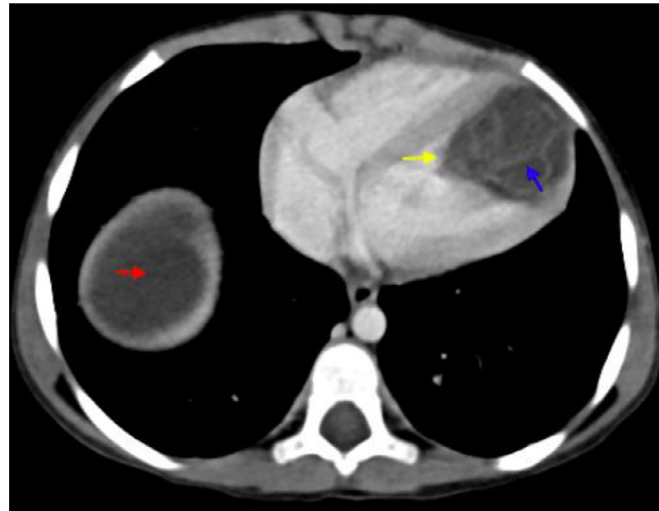


Fig. 2 – Continued

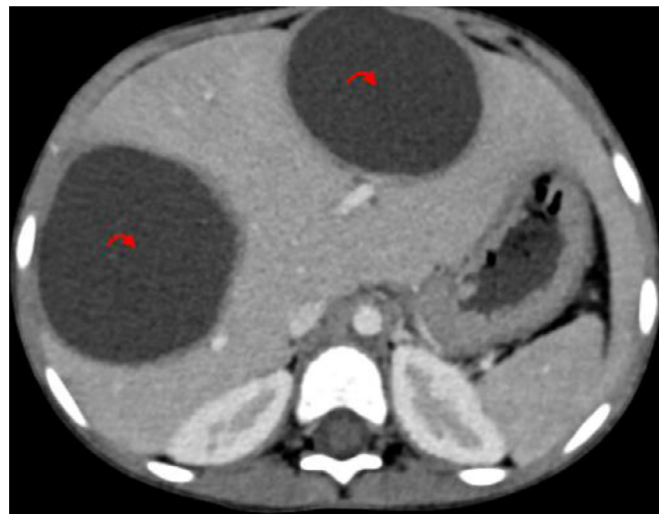


Fig. 2 – Continued

variable-sized fluid-filled cystic lesions lacking calcifications, and internal membranes (Figs. 2, 3, and 4). The lesions have caused gross hepatomegaly. The rest of the abdominal organs appeared unremarkable. No gross invasion of the left hemidiaphragm to suggest secondary involvement of the cardiac cysts. The imaged lungs both appeared normal. The patient was lost to follow up after imaging diagnosis.

Discussion

William reported the first case of cardiac hydatid cyst in 1936 [2]. Hydatid disease is a parasitic infection by a microorganism, *Echinococcus granulosus* [1,2,3,5,6]. It is commonly present in countries with sheep raising and is an endemic disease. The primary carriers of the *Echinococcus* parasites are domestic dogs [1,2,3,4] and cats [3,5]. Humans are accidentally

infected [4] when they ingest parasitic ova in contaminated water and vegetables [1,2,3,5]. After ingestion, the echinococcal organism gains access to the portal vein. The infection develops as cysts, known as hydatid cysts. The hydatid cyst is covered by 2 layers, the pericyst that is made by the reaction of the host tissue, and the endocyst which has the potential to germinate into offspring [1,3]. Afterwards, small vesicles may develop within the cyst, referred to as the daughter cysts which contain protoscolices. After the vesicles rupture, the scolices form white sediment, the so-called hydatid sand [1].

Liver (50%-70%) and lungs (20%-30%) are commonly involved in hydatid disease [3,6,7] but the involvement of the heart (0.5%-2%) is a rare finding [3,4,6,7]. Almost any organ can be involved with hydatid disease [7], except hair, teeth, and fingernails [6]. The cardiac structures in hydatid disease in descending order are left ventricle [60%] [2,3,5], right ventricle (10%), pericardium (7%), [3,6], pulmonary artery (6%), left atrial appendage (6%), and interventricular septum (4%) [3].

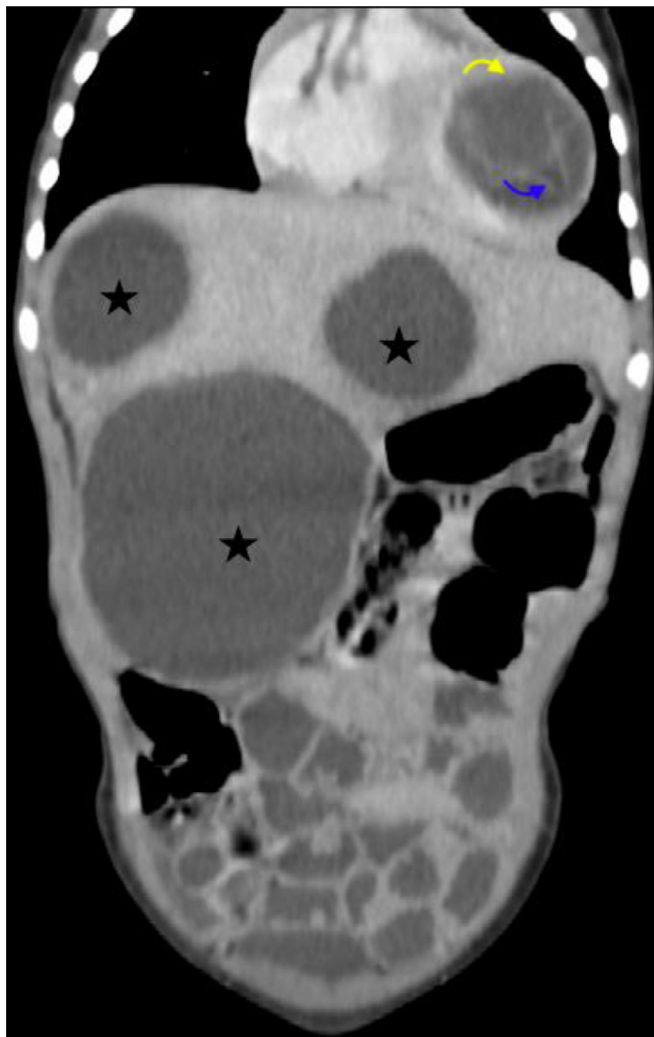


Fig. 3 – Selected coronal contrast-enhanced abdomen CT scan demonstrating a hydatid cyst in the left ventricular wall, near the apex (curved yellow arrow), showing internal membranes (curved blue arrow). Multiple hydatid cysts are also seen in the right and left hepatic lobes, (black asterisks). There is no evidence of the hepatic extension of hydatid cysts into cardiac structures (Color version of the figure is available online.)

The coronary artery plays a major role in the infestation of the myocardium. The pulmonary vein is the second possible route for cardiac infection after the hydatid cysts rupture [2,3,5,7]. Cardiac infestation of hydatid cysts is also possible through intestinal lymphatic vessels, superior and inferior vena cava, and hemorrhoidal veins of large bowel loops [2]. The dominance of the left coronary artery [3], the bulk of the left ventricular wall [4], and ventricular high pressure are thought to be the factors that cause the left ventricle to be more involved [7].

The development characteristics of hydatid cysts of the right heart are quite different from the left heart. Intracavitary and subendocardial expansion of hydatid cysts more occur on the right side [3,4,5], as well as the right ventricular cysts tend to rupture, which may lead to pulmonary embolism, anaphylaxis, and sudden death [3,4]. In contrast, subepicardial growth of the hydatid cysts is more observed in the left heart [3,4,5]. Possible rupture of the hydatid cysts into the pericar-

dial cavity may lead to pericarditis, pericardial effusion, and cardiac tamponade [3,5]. The liver and lungs can serve as a secondary source of direct extension into the heart [3,4,5]. Our case showed no evidence of extension from hepatic or lungs to the heart. Hydatid cysts of the heart may rupture, leading to the dissemination of the germinative membranes and resulting in embolism [3,5]. Pericardial involvement of hydatid cysts is rare, but if it occurs, it is thought to be secondary to the rupture of the cardiac wall cysts [3,5]. The hydatid cysts of the interventricular septum may lead to conduction disturbances and atrioventricular block [7].

Due to the indolent nature of cardiac hydatid cysts, the patients usually remain asymptomatic [2,3,4,7]. Most of the patients (90%) remain symptomless until lesions reach a maximal size to cause CVS symptoms. The remaining 10% of patients with larger cardiac hydatid cysts can present with precordial chest pain [4], arrhythmias, and dyspnea, which can make it difficult to differentiate it from other cardiac entities

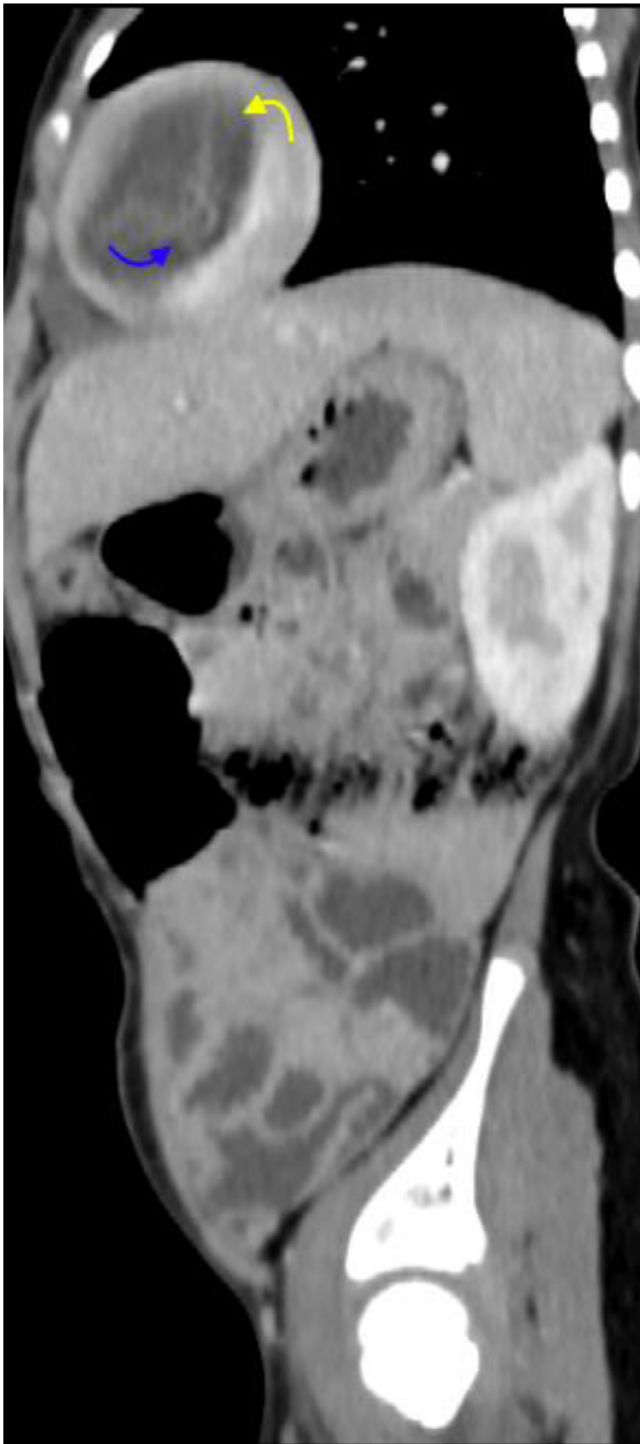


Fig. 4 – (A-B) Selected sagittal contrast-enhanced abdomen CT scan images demonstrating solitary incidental hydatid cyst near the apex of the left ventricle (curved yellow arrows) with hydatid membranes (curved blue arrows). In addition, a hydatid cyst in the liver (black asterisk) (Color version of the figure is available online.)



Fig. 4 – Continued

[7]. More often the diagnosis is delayed unless the cysts are located in critical sites. The size and location of cardiac hydatid cysts are the defining factors of variable signs and symptoms. Ruptured pericardial hydatid cysts can cause life-threatening complications, such as acute pericarditis, cardiac tamponade, acute pulmonary hypertension, systemic arterial embolization, and severe anaphylactic shock [3].

Radiologic examinations are the root for the diagnosis of cardiac hydatid cysts [7]. The imaging modalities used in the diagnosis of cardiac hydatid cysts are echocardiography, CT scan, and MRI [3,4]. Transthoracic echocardiography can be

used to diagnose; however, it cannot evaluate the adjacent structures [6]. On CT scan, the cysts would demonstrate fluid attenuating cystic structures which may have internal septations, daughter cysts, and calcifications [1,7]. Calcification is best illustrated in a CT scan [1,3,4]. The wall of the hydatid cyst is demonstrating higher attenuation on non-enhanced CT with unexplained cause. [1] For the follow-up after treatment, MRI is often used [3,4]. The MRI findings included oval-shaped cystic lesions that return low T1 and high T2 signal intensities. The characteristic finding is also the visualization of the low signal intensity peripheral ring, a pericyst (dense fibrous tissue made by host reaction) [1,3,4,5,7]. Various cardiac tumors and the congenital pericardial cyst should be in a differential list, however, the multivesicular nature of the cystic masses, and sloughed membranes are indicative of hydatid cysts [3]. The hydatid cysts can be single, multiple, unilocular, multilocular, thin, or thick-walled. The specific findings favoring hydatid cysts are the presence of daughter cysts, mural calcifications, and membrane detachment [3,4,5]. On occasions, the hydatid cysts may degenerate to solid forms, rendering it difficult to differentiate from cardiac tumors [3]. MRI is considered the best for the evaluation of complications. Protruded cysts into the cardiac cavity may be a sign of impending rupture. Bright blood sequences are helpful in such occasions as the lesional contents would represent filling defects within the cardiac cavity. Post-contrast MRI is helpful in the diagnosis of pericarditis secondary to the rupture of hydatid cysts. The findings include enhancement and thickening of the pericardial membrane [7]. The definite treatment is surgery [2] and extirpation under cardiopulmonary bypass [3,7] despite the usage of pre-op and post-op antihelminthic drugs [4].

Hydatid disease is an indolent parasitic infectious disease, where any organ can be involved. In the abdomen CT scan for hydatid cysts, if suspicious, cardio-mediastinal structures should be covered, to find out possible involvement. Cardiac hydatid cysts need to be treated as soon as it is diagnosed to prevent lethal complications.

Declarations

Ethics approval and consent to participate

The manuscript has got ethical review exemption from the Ethical Review Committee (ERC) of the authors' institution (Wyagal Radiology Center – [WRC]) as case reports are exempted from review according to the institutional ethical review committee's policy. Written consent is obtained from the participants for publishing the case.

Patient consent

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

Availability of data and materials

Data sharing is not applicable to this article as no datasets were generated or analyzed during the current study (as this is a case report).

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Authors' contributions

All of the authors have participated sufficiently in the submission and take public responsibility for its content. NF: writing and editing the manuscript, selecting the case and images, as well as corresponding with the journal. MMSH, MTA, FF and MSR: Revising the manuscript. All of the authors have read and approved the final manuscript.

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