Available online at www.sciencedirect.com

ScienceDirect

journal homepage: http://Elsevier.com/locate/radcr

RCR RADIOLOGY CASE REPORTS

Cardiac

Left ventricular hydatid cyst mimicking acute coronary syndrome

Ali Fuat Tekin MD[a,*], *Mehmet Sedat Durmaz MD*[a], *Mustafa Dağli MD*[b], *Sahabettin Akbayrak MD*[a], *Pelin Akbayrak MD*[c], *Bekir Turgut MD*[a]

[a] *Departmant of Radiology, Konya Health Sciences University Teaching and Research Hospital, Necip Fazıl Mahallesi, Fatih Cad. No:4/1, Meram, Konya, 42090, Turkey*

[b] *Department of Cardiovascular Surgery, Konya Health Sciences University Teaching and Research Hospital, Konya, Turkey*

[c] *Departmant of Cardiology, Konya Health Sciences University Teaching and Research Hospital, Konya, Turkey*

ARTICLE INFO

Article history:
Received 27 January 2018
Accepted 24 March 2018
Available online

Keywords:
Cardiac
Hydatid cyst
CT
MRI
Interventional radiology

ABSTRACT

Hydatid disease is caused by the larvae of *Echinococcus granulosus*. Domestic dogs and cats are the primary carriers of echinococcal organisms. In some particular regions of the world, this parasitic infection is still endemic. Despite the fact that hydatid disease is most frequently located in the liver (50%-70% of cases) and the lungs (20%-30% of cases), it can occur in any organ or tissue. However, intracardiac localization of hydatid cyst is very rare and it is found in less than 2% of the cases. Cardiac involvement can be caused by systemic or pulmonary circulation or direct spread from adjacent structures. After the cardiac hydatid cyst remained asymptomatic for many years, the cyst opens into the pericardium, causes cardiac tamponade, and mimics acute coronary syndrome, or it may get into the circulation and cause anaphylactic shock, which happens rarely. Because clinical signs and symptoms of cardiac hydatid cyst are not specific and varied, it may be difficult to diagnose this disease. It is critical to diagnose cardiac involvement early and perform prompt surgical intervention. Imaging findings of a patient who had a left ventricular wall cardiac hydatid disease are presented here.

Introduction

Hydatid disease is caused by the larvae of *Echinococcus granulosus* [1]. Domestic dogs and cats are the primary carriers of echinococcal organisms [1]. Hydatid disease is most frequently located in the liver (50%-70% of cases) and the lungs (20%-30% of cases) [2]. However, intracardiac localization of hydatid cyst is very rare and it is found in less than 2% of the cases [2]. Cardiac hydatid cyst is mostly asymptomatic for years,

Competing Interests: The authors have declared that no competing interests exist.

* *Corresponding author.*
E-mail address: aftrad333@gmail.com (A.F. Tekin).

https://doi.org/10.1016/j.radcr.2018.03.019

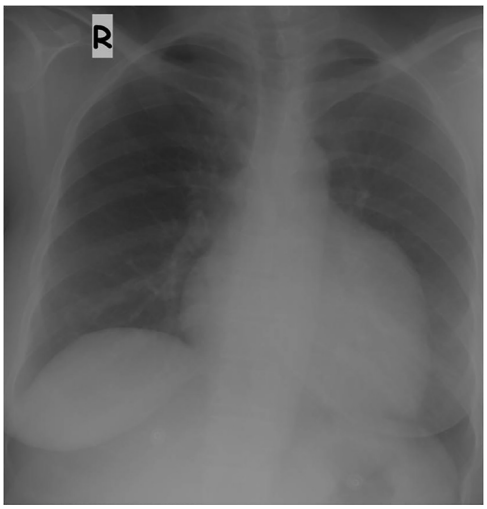

Fig. 1 – Postero-anterior radiograph; left ventricle and heart dimensions are increased.

but sometimes it can lead to life-threatening clinical conditions. In this study, we report a left ventricular hydatid cyst that lead to acute coronary syndrome.

Case report

A 42-year-old female patient with typical chest pain was admitted to the cardiology department of our hospital. She had occasional chest pain, which had been aggravated for 1 month. The pain was more often during walking and stair climbing and it became less after resting. In PA radiography, left ventricle and heart dimensions were increased (Fig. 1). Creatine kinase was 325 U/L, CK-MB was 58 U/L, and Troponin I was 3.37 ng/mL and its electrocardiogram suggested acute coronary syndrome (aVL, V4, V5, and V6 ST elevations). Coronary angiography was performed in the patient and it was seen that her coronary arteries were patent, the first branches of the right coronary artery and left coronary artery were fistulated with pulmonary artery (Fig. 2). After digital subtraction coronary angiography (DSA), a 2-dimensional transthoracic echocardiography was performed. Echocardiography revealed a cystic lesion that originated from the left ventricular wall with floating membrane in it. The patient was examined with abdominal and thoracic scans for a primary focus of hydatid cyst. Echocardiographic diagnosis was confirmed by contrast-enhanced, not ECG-derived, thoracic computed tomography (CT) and conventional thoracic magnetic resonance imaging and a detailed structure of the cardiac cyst were obtained. Contrast-enhanced CT revealed free fluid in the pericardial area and a 63×62 mm unenhanced cystic lesion, originating from the left ventricular wall, with floating membranous structures in it and (Fig. 3). Cardiac magnetic resonance imaging (MRI) revealed a cystic lesion with floating membrane on the T2-weighted coronal and axial images, and also2 cystic lesions were monitored in the right lobe of the liver. One was 30 mm in segment 7, the other one was 46 mm in segment 6, and a cystic lesion 88×82 mm in diameter was observed in the inferior part of the spleen (Fig. 4). Abdominal cystic lesions were intervened with percutaneous aspiration, injection, and reaspiration (PAIR). The patient was sent to cardiac surgery in order to resect the cyst for a diagnosis. The cardiac cyst was removed with an operation (Fig. 5). Radiologic diagnosis of the hydatid cyst was confirmed by histopathologic examination findings. There was no complication during follow-ups.

Discussion

Cardiac localization of hydatid cyst, which represents 0.02%-2% of all patients with hydatidosis, is rare [1]. Cardiac involvement occur from the systemic or pulmonary circulation or by direct extension from adjacent structures [2]. Hydatid cyst can be seen in any part of the heart. The size, location, and integrity of the cyst are significant for manifestations. The

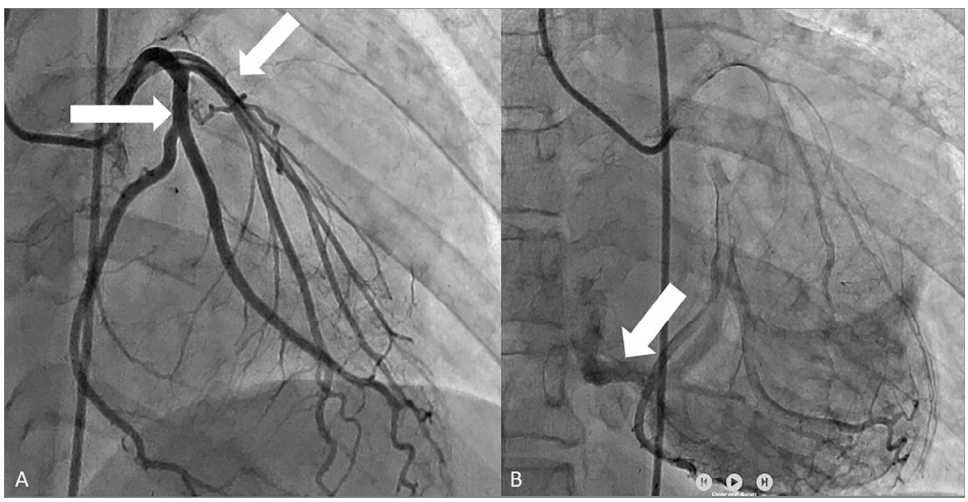

Fig. 2 – Digital subtraction coronary angiography; (A) branches of the right coronary artery and left coronary artery (B) were fistulated with pulmonary artery.

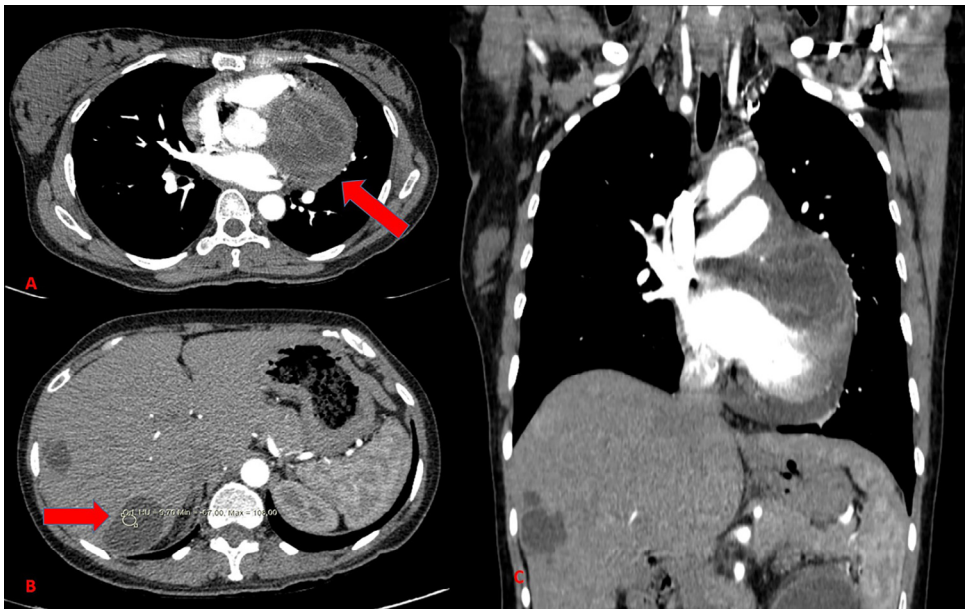

Fig. 3 – (A) Axial thoracic computed tomography reveals hypodense cystic lesion pressuring the left ventricle in cystic density, in which septal structures are observed on the left ventricular wall. (B) Coronal and (C) axial-abdominal tomographic images reveal hypodense cystic lesions in the liver and the spine in approximately 10 HU density.

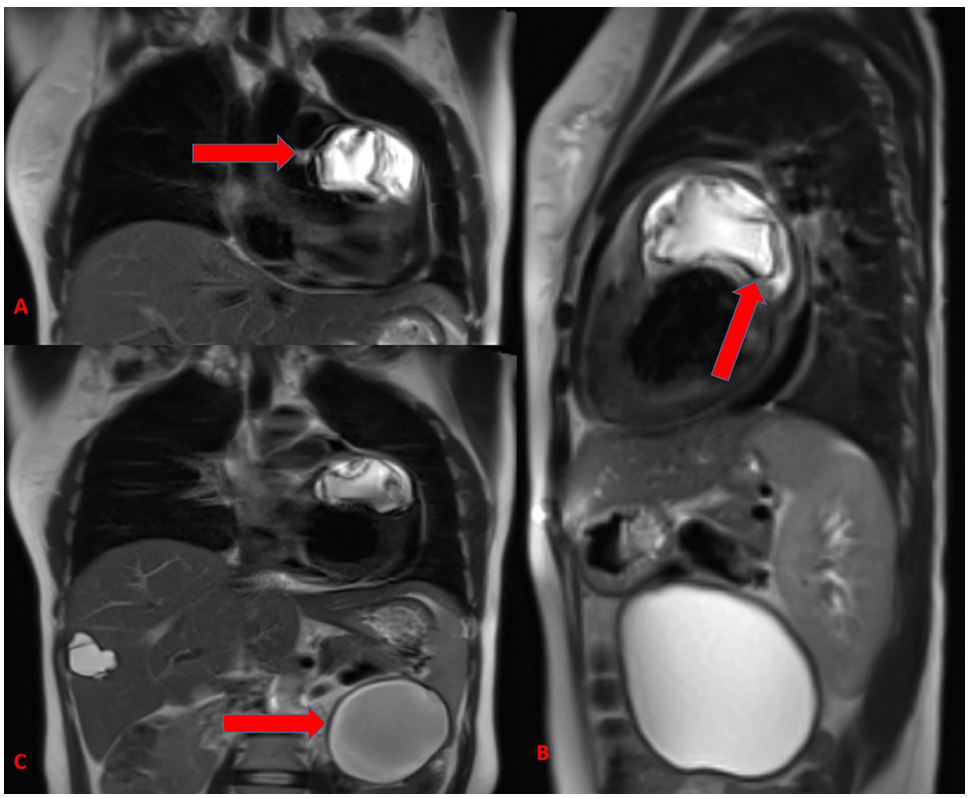

Fig. 4 – (A) Coronal and (B) sagittal T2-weighted magnetic resonance images reveal hyperintense hydatid cyst lesion with thin hypointense rim in its periphery in the left ventricle with hypointense floating membranous structure in it. In addition, (C) coronal T2-weighted magnetic resonance images reveal hyperintense cyst hydatid lesion in the spleen.

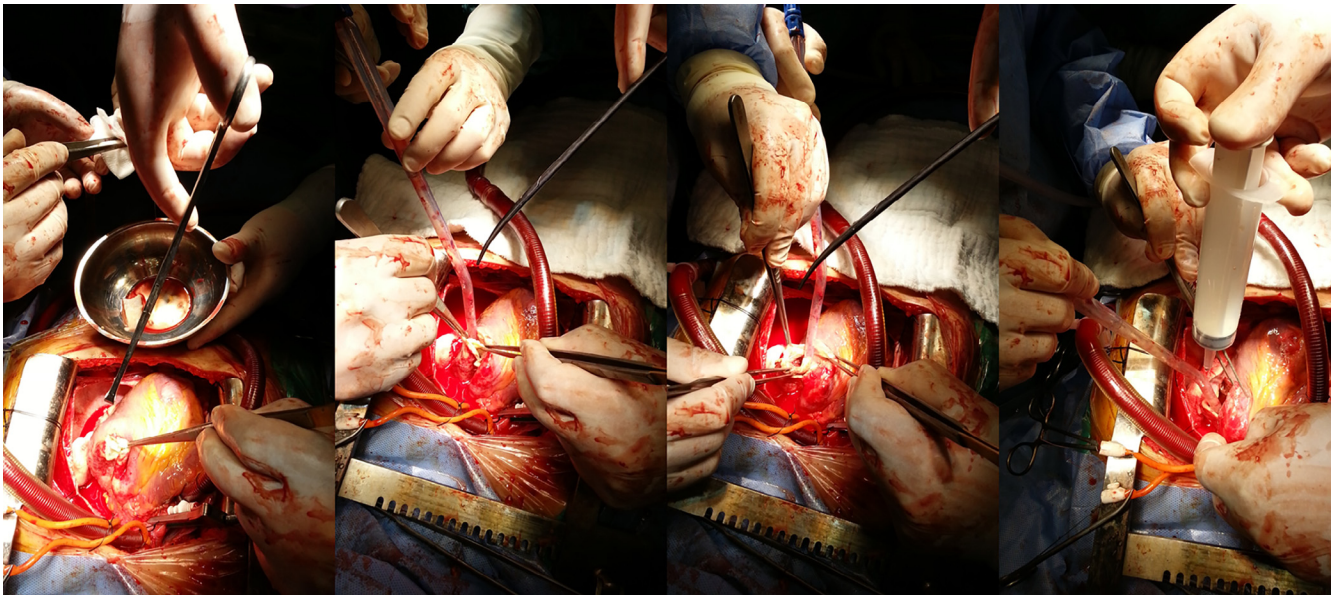

Fig. 5 – Intraoperative images reveal desensitization of the hydatid cyst lesion by aspiration of the cyst content.

most common involved site is left ventricle (75%), followed by right ventricle (15%), interventricular septum (5%-9%), left atrium (8%), pericardium (8%), pulmonary artery (7%), and right atrium (3%-4%) [2]. Hydatid cyst distribution within the heart is in connection with the vascular supply of the different myocardial areas (left coronary artery is dominant) and myocardial mass (the greater myocardial mass is in the left ventricle) with a higher incidence in the left ventricle [3]. Cysts can be pericardial, endocardial, or, very rarely, intramural. Right-sided hydatid cysts tend to expand intracavitarily and subendocardially [4]. Cardiac hydatid cyst was located intramurally in the left ventricle in our case. Cardiac echinococcosis can keep clinically silent for years; however, it is associated with an increased risk of lethal complications if it is not diagnosed and not treated on time [5]. Diagnosis of the disease is usually late if a cyst is not located in a critical anatomic site [1]. The clinical manifestation of cardiac hydatid cysts varies a lot and depends on the location and the size of the cysts directly. The most common symptom is precordial pain; however, it is mostly vague and does not resemble angina pectoris. Rupture into the pericardial sac that causes cardiac tamponade, anaphylactic shock, or pericarditis is the major complication of cardiac hydatid cyst. Massive pulmonary or systemic embolism, pulmonary hypertension, arrhythmia, compression of coronary vessels with subsequent myocardial ischemia, valvular dysfunction, obstruction of the ventricular outflow tract, and pulmonary hypertension may also be caused by cardiac echinococcosis [6–8]. Because right ventricular cysts rupture is more frequent, they cause pulmonary embolus, anaphylaxis, or sudden death; whereas, left-sided cysts have tendency to grow subepicardially [4].

Serologic tests, cardiac imaging by echocardiography, CT, and MR imaging are the main valuable preoperative diagnostic tools. DSA was used to eliminate the possibility of coronary artery disease. In our case, coronary arteries were patent in coronary angiography. After it was monitored that the first branches of the right coronary artery and left coronary artery were fistulated to pulmonary artery. We did not find togetherness of the coronary pulmonary arterial fistula and the cardiac hydatid disease in the literature. We thought that it is a developmental anomaly and it can be one of the causes of cardiac chest pain. The most useful technique is echocardiography because it is a cheap, noninvasive real-time imaging that does not emit radiation. Echolucent masses with smooth contours can be easily seen with this noninvasive method. However, it cannot determine the specific diagnosis of echinococcosis. The hypoechoic nature of echinococcal lesions may be absent in some cases. Restricting the enlargement, the kinetic pressure of the heart sometimes increases the tension around the cyst, so it contains less liquid and more scolexes that gives a solid mass image [3]. Because of this reason, echinococcal infection should be regarded for the differential diagnosis of tumoral lesions of the heart in the appropriate clinical settings. Echocardiography could not establish differential diagnosis. In our case, echocardiography revealed a cystic lesion with membrane detachment on the left ventricular wall so cardiac hydatid cyst was first considered.

The cystic nature of the mass and its relation with the cardiac chambers can be revealed by CT; however, hydatid cysts cannot be differentiated from congenital pericardial cysts. Wall calcification can be best shown by CT [4].

MRI imaging is helpful for the preoperative diagnosis of cardiac hydatid disease [5]. Global view of the preoperative cardiac anatomy with high contrast between flowing blood and soft tissue was shown by cardiac MRI and it helps evaluate obese patients or patients with a chest deformity [3]. Full anatomic extent and position of the mass and its relation to the cardiac chambers are shown by MRI in great detail. Hydatid cyst usually appears on MRI as a characteristic oval lesion that is hypointense on T1-weighted images and hyperintense on T2-weighted images [9]. A typical finding on T2-weighted images is a hypointense peripheral ring representing the pericyst (a dense fibrous capsule from the reactive host tissue) [9]. Thus, cardiac MRI findings especially diagnosed cardiac hydatid cyst. Cardiac MRI imaging was an effective technique while diagnosing cardiac hydatid cyst in the patient [3].

Although hydatid positive serology is found in 50% of cardiac locations, diagnosis of cardiac echinococcosis is not definitely based on clinical and laboratory examinations. The presence of hydatidosis cannot be excluded by negative serologic tests and missing eosinophilia. Because the cardiac manifestation of a hydatid cyst is usually a secondary cyst, it causes difficulty in differential diagnosis [10]. When the history of the patient shows manifestations in several other organs, diagnosis of a cardiac cyst as echinococcosis is much easier. The presence of lesions compatible with hydatid cysts in the liver and spleen, membrane detachment in the cystic lesion in the heart, and peripheral hypointense rim on cardiac MRI supported cardiac hydatid involvement.

In conclusion, we must consider a variety of tumors in the heart and congenital pericardial cyst in the differential diagnosis. It can be difficult to differentiate solid mass from heart tumors. Cardiac cyst hydatid is indicated by multivesicular nature of the cystic mass and membrane separation. Cysts may be uniloculated or multiloculated, single or multiple, and thin or thick-walled. Calcification of the cyst wall, presence of daughter cysts, and membrane detachment are more specific signs [6].

Surgical resections implemented with medical therapy are the treatment choice that has favorable results, because cardiac hydatid cyst has fatal complications such as rupture and embolization. The first successful surgery was performed in 1932. After the first successful surgical treatment performed by Long and his colleagues, 190 successful surgeries have been performed so far in the literature [10]. In our case, cyst hydatid observed in the left ventricular wall was removed by surgical resection, and the fistula between the coronary artery and the pulmonary artery was repaired. The patient was discharged on the 15th day because there was no postoperative complication.

Patients with cardiac hydatid cyst may show a variety of clinical manifestations including typical angina pectoris. In endemic countries, cardiac cysts must be evaluated especially for suspicious hydatid cyst. Fistula between the coronary and pulmonary arteries may be rarely caused by cardiac hydatid cyst disease. DSA can demonstrate fistula caused by cardiac hydatid cyst. In the preoperative diagnosis of hydatid disease of the heart, cardiac imaging by echocardiography, CT, and especially cardiac MRI are useful. Exact anatomic location and nature of the internal and external structures are depicted by MRI.

REFERENCES

[1] Alehan D, Celiker A, Aydıngoz U. Cardiac hydatid cyst in a child: diagnostic value of echocardiography and magnetic resonance imaging. Pediatr Int 1995;37(5):645–7. PMID:8533597.

[2] Murat V, Qian Z, Guo S. Cardiac and pericardial echinococcosis: report of 15 cases. Asian Cardiovasc Thorac Ann 2007;15(4):278–9. PMID:17664197.

[3] Sakarya ME, Etlik O, Sakarya N. MR findings in cardiac hydatid cyst. Clin Imaging 2002;26(3):170–2. PMID:11983468.

[4] Abhishek V, Avinash V. Cardiac hydatid disease: literature review. Asian Cardiovasc Thorac Ann 2012;20(6):747–50. PMID:23284134.

[5] Katewa A, Vaideeswar P, Khandekar JV. Isolated pericardial and intracardiac hydatidosis: presentation as congestive cardiac failure and fatal pulmonary embolism. Cardiovasc Pathol 2009;18(2):114–18. PMID:18402821.

[6] Soleimani A, Sahebjam M, Marzban M. Hydatid cyst of the right ventricle in early pregnancy. Echocardiography 2008;25(7):778–80. PMID:18754937.

[7] Ben-Hamda K, Maatouk F, Ben-Farhat M. Eighteen-year experience with echinococcosus of the heart: clinical and echocardiographic features in 14 patients. Int J Cardiol 2003;91(2):145–51. PMID:14559124.

[8] Kotoulas GK, Magoufis GL, Gouliamos AD. Evaluation of hydatid disease of the heart with magnetic resonance imaging. Cardiovasc Intervent Radiol 1996;19(3):187–9. PMID:8661648.

[9] Yagüe D, Lozano MP, Lample C. Bilateral hydatid cyst of pulmonary arteries: MR and CT findings. Eur Radiol 1998;8(7):1170–2. PMID:9724432.

[10] Dursun M, Terzibasioglu E, Yilmaz R. Cardiac hydatid disease: CT and MRI findings. Am J Roentgenol 2008;190(1):226–32. PMID:18094316.