



A rare case of hydatid cyst in the chordae tendineae of papillary muscle of the right ventricle

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Received 5 Sep. 2022

Accepted 16 Nov. 2023

Published 29 Jan. 2024

Keywords: Cardiac surgery, Hydatid cyst, Right ventricle, Chordae tendineae

Abstract

Hydatid cyst inside the cardiac chambers, especially the right ventricle, is a rare manifestation of the *Echinococcus granulosus* infection. We present a rare case of a mobile hydatid cyst on the chordae tendineae of the right ventricular papillary muscle. An 11-year-old male patient presented with multiple cysts in the body (numerous ones in the lung and liver) who had undergone left lung lobectomy due to a hydatid cyst prone to rupture. In the subsequent echocardiography, a fully mobile cyst measuring 2×1.5 cm was noticed in the right ventricle. Although the child had no cardiac presentation, due to the risk posed by its location and the high probability of sudden death or embolism, he underwent a successful cardiac and pulmonary bypass operation, and the cyst was completely excised. It was located on the chordae tendineae of the papillary muscle. In agricultural and rural countries and regions, cardiac hydatid cysts should be considered at any age. Due to the high risk of complications and mortality in cardiac hydatid cysts, regardless of the symptoms, inpatients with a positive history, cardiac examination with echocardiography must be included in diagnostic protocols. These cysts should be surgically removed as soon as possible on diagnosis, regardless of the symptoms.

Citation: Hekmat M, Ghaderi H, Ansari Aval Z, Mirjafari SA, Tirdad R. A rare case of hydatid cyst in the chordae tendineae of papillary muscle of the right ventricle. Immunopathol Persa. 2024;x(x):e40598. DOI:10.34172/ipp.2023.40598.

Introduction

Hydatid cysts can be detected anywhere in the body, and cardiac involvement is seen in 0.5–2% of cases(1,2). Cardiac involvement is not common; the most common cardiac sites are the free wall ventricle and intraventricular septum due to the high blood supply and the bulk of muscle(2, 3). These cysts are rarely present in the pericardium (4) and intra-atrial septum (2, 4–7).

Few cases of papillary muscle involvement have been recorded (8), but to our knowledge, chordae tendineae involvement in the right ventricle has never been reported.

Intracardiac cysts must be surgically removed due to the risk of rupture into cavities and the spread of the infection throughout the body with the consequence of anaphylactic shock and death, which can lead to death in approximately 3% of untreated cases (1, 9).

Case Presentation

An 11-year-old Iranian boy, whose family were cattle farmers, was admitted and treated for multiple cysts in both lungs and liver. One of the large prone-to-rupture pulmonary cysts in the left lung, was surgically removed by

Key point

Cardiac hydatid cysts should be considered at any age. Due to the high risk of complications and mortality in cardiac hydatid cysts, cardiac examination with echocardiography must be included in diagnostic protocols. Cardiac hydatid cysts should be surgically removed as soon as possible on diagnosis, regardless of the symptoms.

lobectomy, and a chest tube was inserted. In further investigations by echocardiography, a 2×1.5 cm cyst was noticed in the right ventricle, which was connected to the papillary muscle, which was completely mobile in the right ventricle with a high risk of rupture (considering its movement in every heartbeat), or imminent detachment from the papillary muscle and pulmonary embolism. Subsequently, for heart surgery, he was referred to the heart surgery center of Shahid Beheshti University of Medicine, Tehran, the third referral level referral center.

On his arrival at the heart surgery center, there was a chest tube on the left side from two weeks ago when he had undergone lobectomy surgery, and the patient was



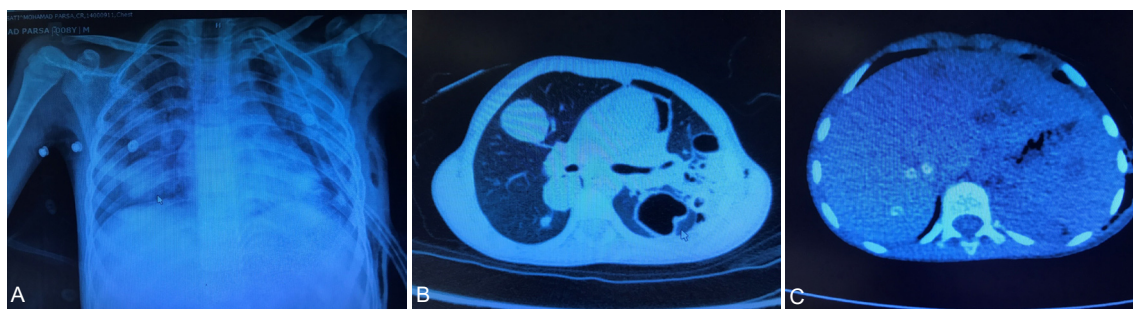


Figure 1. (A) Pulmonary hydatid cysts in the chest X-ray of the patient. (B) Multiple lung cysts in the CT scan of the patient. (C) Multiple liver cysts in the CT scan of the patient.

taking albendazole tablets. Besides being ill and weak in the examinations, there were no significant findings in the examinations. In electrocardiogram (ECG), there was a sinus rhythm with no evidence of ischemia. The chest x-ray revealed lung cysts in both lungs (Figure 1A), and the chest and abdominal computed tomography (CT) scan revealed multiple lung and liver cysts (Figures 1B and 1C).

In the repeated transthoracic echocardiography, a 1.5×2.5 cm completely mobile cyst connected to the right ventricle papillary muscle was visualized, which was easily moving in the heart cavity with every stroke. The function of the heart valves was normal. Neurological tests were positive for hydatid cysts. Albendazole tablets were commenced three weeks before the heart surgery.

Cardiac surgery was performed through a mid-sternotomy incision; the pericardium was opened, and no abnormal findings were observed in the pericardial cavity and the heart surface. The cannulation was performed via the superior vena cava, bicaval, and inferior vena cava, and a cardiopulmonary bypass was formed. The aorta was cross-clamped, cardioplegia was induced, and cardiac arrest was established. Then the right atrium was opened, and the hydatid cyst, which was 2×1.5 cm and connected to the chordae tendineae in the right ventricle was removed through the tricuspid valve. To prevent hydatid cyst disruption, the papillary muscle tip was also removed. The cyst was removed completely and without rupture. Then the atrium and right ventricle were washed with hypertonic saline. After removing the papillary muscle tip, it was reattached to the tricuspid valve with a polyester suture with a pledget of PTFE felt. De Vega



Figure 2. Hydatid cyst removed from the right ventricle cavity.

repair was performed to repair the tricuspid valve. Then the right atrium was sutured and restored with Prolen 5-0, and after CPB wean off, sinus rhythm was established without pace or inotrope drug support. The surgery was completed without incident, and the patient was extubated the day after the surgery. The histopathology examination after the operation confirmed the hydatid cyst diagnosis (Figure 2).

Seven days after the surgery, the patient was again sent to the pediatric center to continue the liver and lung treatments with oral albendazole.

Discussion

Hydatid cysts can be detected anywhere in the body (10). The prevalence of hydatid cysts is 65% in the liver, 25% in the lung, and 2-5% in the heart (2). Cardiac hydatid cysts may lead to rupture and anaphylactic shock, and if treatment is delayed, sudden death can occur in about 0.30-23.47% of cases (9, 10). Therefore, cardiac hydatid cysts need heart surgery.

Echinococcus granulosus, the hydatid cyst infective agent, is endemic in rural and pastoral areas in developing or underdeveloped countries (6). Hydatid cyst is common in children (11). Although rare (12), several cardiac cases have been reported even after 11 years (4). Therefore, surgeons must be very careful not to tear the cyst in its removal. Excision of cardiac cysts should be performed under CPB and arrest to ensure their complete removal without rupture, as if the cyst accidentally ruptures, it may spread through blood with the consequence of anaphylactic shock or pulmonary hypertension (3, 13).

During the surgery, the utmost care should be taken to ensure that the cyst does not rupture. If the cyst cannot be removed completely, for example, when in the pericardium with significant adhesion (4), the leakage of the cyst contents should be prevented as if it ruptures into the heart cavities metastasis and its spread may ensue. To prevent this condition, scolicalid agents such as hypertonic saline (10-20%), chlorhexidine, alcohol (80%), silver nitrate (50%), and iodine (10%) are all used, but it is not known how effective they are (1, 14).

In the heart, the distribution of *echinococcus granulosus* larvae depends on the blood supply. Most

parasite larvae reach the heart through the coronary blood supply and reside in the muscles of the left ventricle and intra-ventricular septum in 65-60%, the wall of the right ventricle in 10%, the pericardium in 7%, left atrium in 6%, and in the right atrium in 3-4% of cases (4). However, in the presented patient, as the chordae tendineae does not receive blood through the coronary arteries, the chordae tendineae infection must have been directly caused by the parasite larvae in the intracardiac cavities. This indicates a high blood parasite load (which vastly inflicted the lungs and liver with numerous cysts).

It is recommended that all patients with hydatid cysts should be evaluated for hydatid cysts in other body regions (9). For the evaluation of the heart, echocardiography, a CT scan, and, if necessary cardiac MRI is recommended (15).

Conclusion

In agricultural and animal farming countries, cardiac hydatid cysts should be suspected at any age. In patients with a history of hydatid cysts, heart examination with echocardiography must be included in diagnostic protocols. Hydatid cysts can be seen anywhere, even the chordae tendineae of the heart, which lacks an independent blood supply. Surgical removal of cardiac hydatid cysts is recommended until an effective medication is developed.

Acknowledgments

The authors would like to thank Modarres Hospital staff

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Conflicts of interest

The authors declare that they have no competing interests.

Ethical issues

The case report adhered to the World Medical Association Declaration of Helsinki and the patient provided written informed consent for publication. Ethical considerations such as avoiding plagiarism, data fabrication, and double publication were also observed.

Funding/Support

The authors declare that they did not receive any funding to complete this study.

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