INTRODUCTION

Echinococcus disease is frequent in Mediterranean countries. The most common sites of hydatid cysts are the liver (50–70%), lungs (5–30%), muscles (5%), bones (3%), kidneys (2%), spleen (1%), and brain (1%) [1-2]. Isolated cardiac hydatid cysts are rare, accounting for 0.5–3% of all cases. We present a rare case of right ventricle (RV) hydatid cyst in a patient who presented with pulmonary embolism (PE).

CASE REPORT

A 54-year-old female, without significant past medical history, presented with dyspnea, cough, and pleuritic chest pain. Nodular opacities in the lower lobes of both lungs were detected on chest X-ray. Pulmonary CT angiogram showed multiple PEs and a cardiac mass in the RV (Fig. 1). Her blood pressure was 110/70 mm Hg, and the pulse was 75 beats per minute. She maintained good oxygen saturation (96% on room air). The patient received anticoagulation therapy, an echocardiography was ordered and a hypercoagulable workup was initiated. Venous Doppler ultrasound of lower limbs showed no thrombosis. Echocardiography showed normal left ventricular function with an ejection fraction of 70%. No major valvular abnormalities were identified. Echocardiography also revealed a lobulated, pedunculated, hyperechoic mass measuring 4.5×1.9 cm² with multi-hypoechoic central zones seen at the sub-tricuspid region attached to the RV free wall. In addition, multiple, hyperechoic, small, mobile masses were attached to it. The mass looked like a cyst with multiple intracystic trabeculations (Fig. 2). Therefore, echinococcus was suspected, and a cardiac MRI was ordered. CT of the abdomen and pelvis were negative for hydatid cysts. Cardiac MRI showed the following: multiple right atrial and RV circumscripted masses, (the largest measuring 5 cm), high T2 signal consistent with fluid, non-vascular on perfusion imaging, and without late gadolinium enhancement. Several well-circumscribed lesions, the largest measuring 2 cm in diameter, were noted in both lungs on post-gadolinium enhancement. The findings were most consistent with hydatid cyst with dissemination to the lungs. The MRI finding was compatible with hydatid cyst of the RV.

Albendazole was administered, and the cardiothoracic surgeon was consulted. The patient underwent surgical treatment to decrease the risk of PE and other complications. With the patient under general anesthesia, and after cannulation of the superior vena cava, the inferior vena cava and the aorta, right atrium was opened on the beating heart. The cyst was located on the RV wall. Here, the right atrium was excluded. After washing the cavity with hypertonic saline, we opened the cyst and evacuated the daughter cysts (Supplementary Video. 1 in the online-only Data Supplement). The right atrium was closed, and then RV closure was performed.

Pulmonary Embolism Secondary to Hydatid Cyst of the Right Ventricle: A Case Report

Souzan Tatari, Nabil Shasha, Said Al-Asmar, Osman Itani, Karol Serhal, Ahmad Dabbagh
Rafik Hariri University Hospital, Beirut, Lebanon

Cardiac hydatid cyst is a rare disease that accounts for 0.5-2% of all hydatid disease. It most commonly involves the left ventricle (60%), followed by the right ventricle (15%), interventricular septum (5–9%), and right atrium (3–4%). A 54-year-old female, who presented with dyspnea was diagnosed with pulmonary embolism and was found to have cardiac hydatid cyst of the right ventricle. The patient was successfully treated with surgery plus albendazole therapy pre- and post-surgery.

Key words: Hydatid cyst · Right ventricle · Pulmonary embolism · Diagnostic imaging · Surgery.
by application of U sutures between two tubes of Dacron, the “sandwich technique.” The patient tolerated the surgery very well. She was discharged on albendazole. The pathology report disclosed an uncomplicated hydatid cyst containing numerous daughter's cysts with parasitic bodies.

**DISCUSSION**

Hydatid disease is endemic in some countries. Cardiac hydatid cysts, however are rare. Patients with cardiac involvement can remain asymptomatic (90%) in the early stages, and only 10% have clinical symptoms like chest pain, dyspnea, palpitations and cough [3]. Cardiac hydatid disease may incidentally result in heart failure, cardiac tamponade, PE, stroke, atrioventricular block, paroxysmal supraventricular tachycardia, mitral regurgitation, pericardial effusion, coronary artery disease, anaphylaxis or death. Therefore, early diagnosis and treatment are crucial. The diagnosis is typically established by imaging in combination with serologic and antigen testing.

Echocardiography, the imaging method of choice for cardiac hydatidosis [4], shows the location of the cyst, its characteristics (single or multiple, uniloculated or multiloculated, thin or thickened wall), and communication with the cardiac chambers. CT and MRI provide more information about the extent and anatomic relationships of the cysts [1, 5]. Specific characteristics of hydatid cysts include calcification of the cyst wall, presence of daughter cells and membrane detachment. Wall calcification is best identified by CT whereas the cystic structures and their anatomic position are best identified by MRI. Intracardiac tumors and congenital cyst are in the differential diagnosis of cardiac hydatid cyst. However the multivesicular nature of the cystic mass and membrane detachment help in the correct diagnosis.

Serologic tests are falsely-negative in 50% of patients with cardiac cysts. Enzyme-linked immunosorbent assay is the most specific serologic test, and a positive result for echinococcus antibodies confirms the diagnosis [5]. Surgical resection is the treatment of choice to prevent complications. Furthermore, research and case series studies have demonstrated that albendazole therapy pre- and post-surgery decreases the size of the cysts and the recurrence rate [6]. Albendazole's main mechanism of action is reduction of parasitic growth by blocking the parasite's glucose uptake and depleting its glycogen stores.
The patient in the present case had multiple PEs. Hydatid cyst of the RV was highly suspected after echocardiography, and the diagnosis was confirmed by cardiac MRI. PEs were more likely secondary to rupture of RV hydatid cysts. CT and especially MRI show the cystic nature of the emboli and, therefore, can differentiate between PE secondary to hydatid cysts versus other causes. The treatment of choice for our patient was early complete surgical resection of the cyst to prevent further complications. The patient was treated with albendazole pre- and post-surgical resection of the hydatid cyst to decrease the recurrence rate.

Conclusion
Cardiac hydatid cysts are rare. Although they can be asymptomatic early in the disease course, cardiac hydatid cysts can lead to disastrous manifestations. Clinical suspicion and imagining are important for the diagnosis, and surgical resection plus albendazole are the mainstays of therapy.

Supplementary Video Legends
Video 1. The video shows the evacuation of the daughter cysts from the right ventricle during surgery on the beating heart.

Supplementary Materials
The online-only Data Supplement is available with this article at https://doi.org/10.22468/cvia.2021.00017.

Conflicts of Interest
The authors have no potential conflicts of interest to disclose.

REFERENCES