



# An Unusual Cause of Right Heart Failure: Hemorrhagic Pericardial Cyst Presenting as a Pericardial Mass and Constrictive Pericarditis

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## Abstract

Congenital pericardial cysts are very rare neoplasms of the middle mediastinum. We report a case of a young woman who was referred to the surgical department with abdominal pain. The ultrasound done showed moderate ascites and pleural effusion. Further evaluation with computed tomography (CT) chest revealed a calcified mass in the pericardium. Follow-up echocardiography showed an echogenic mass in the pericardium. Magnetic resonance imaging (MRI) revealed a hyperintense mass with a delayed enhancement of the contents with features of right heart failure. So, an emergency surgical resection was done that showed a large hemorrhagic mass with pultaceous material in the pericardial cavity. The pathological report confirmed the diagnosis of a hemorrhagic pericardial cyst with organized material.

## Keywords

- ▶ cardiac MRI
- ▶ hemorrhagic pericardial mass
- ▶ pericardial cyst

## Introduction

Here, we present a pericardial cyst that was incidentally detected during the workup for abdominal pain and ascites. Because the patient was in right heart failure, an emergency surgical excision was done that revealed a hemorrhagic mass with pultaceous material. This case demonstrates that although rare, a pericardial cyst can present as a medical emergency due to recurrent bleeding into the cyst that could result in inflammation and pericardial thickening.

## Case Report

A 28-year-old woman was admitted to our hospital with a 1-month history of abdominal pain and dyspnea on exertion. There was no history of orthopnea, paroxysmal nocturnal dyspnea, or palpitations. There was no history of fever,

cough, or any other constitutional symptoms. On examination, her vitals were stable. Cardiovascular examination revealed an elevated jugular venous pressure with bilateral pedal edema. Heart sounds were within normal limits with a normal chest radiograph. There was associated mild hepatomegaly.

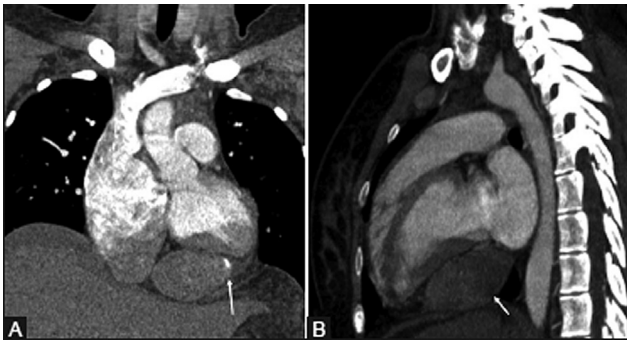
Because the patient presented with abdominal pain, an ultrasound scan abdomen was done that revealed gross ascites. For further evaluation, a contrast computed tomography (CT) chest and abdomen were done. In the CT chest, there was a high-density soft tissue mass with calcifications in the pericardium that showed mild enhancement in post-contrast scans [▶ Fig. 1]. The diagnosis given was a calcified pericardial mass in view of the enhancement within the cyst.

Two-dimensional echocardiography demonstrated a large cystic mass involving the pericardium anterior to the right ventricle and extending inferiorly and posteriorly toward the

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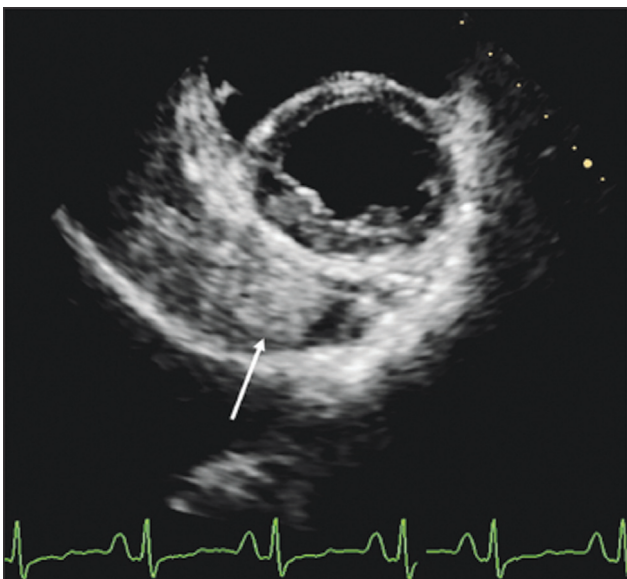
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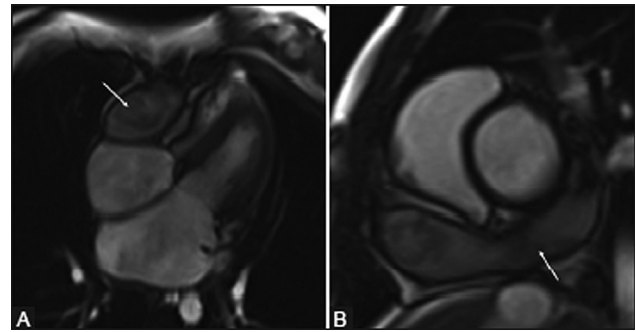
**Fig. 1** (A and B) Contrast-enhanced CT image showing a well-defined cystic lesion in the pericardium (white arrow in Figure 1 (A) and (B) with areas of calcification in figure (A): Coronal view (A) and sagittal view (B).

left. The cystic pericardial mass had internal echoes with hyperechoic areas within it [►Fig. 2]. A differential diagnosis of pericardial mass/cyst was given in the echocardiogram.

The patient was sent for cardiac magnetic resonance imaging (MRI). The MRI revealed cardiomegaly with a dilated right atrium with the rest of the chambers were in normal dimensions. Within the pericardium, an elongated cystic lesion measuring 10 (craniocaudal) × 4.8 (transverse) cm was seen involving the pericardium along the right lateral wall, inferior wall of RV with extension along the atrioventricular groove to inferolateral wall of the left ventricle [►Fig. 3]. The cystic mass was hyperintense in T1WI and mildly hyperintense in T2WI. In fat (FAT)-suppressed T2WI, the lesion was heterogenous with hyperintense areas. Within the cystic mass, there was an oval polypoidal lesion (3.8 × 6.8 cm) seen projecting into the mass. This polypoidal mass appeared mildly hyperintense in T2WI and Short Tau Inversion Recovery (STIR) and showed delayed enhancement [►Fig. 4]. In gradient sequence, a few hypointense areas were seen in the wall of the cyst and within the lesion suggestive of



**Fig. 2** A subcostal short-axis echocardiogram view showing a cystic mass in the pericardium with an echogenic lesion (white arrow).



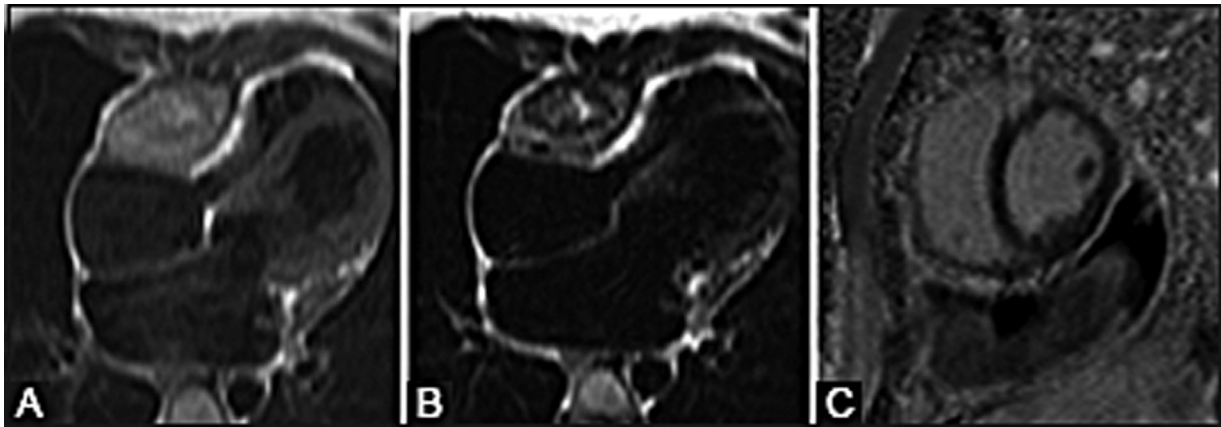
**Fig. 3** (A and B) Cardiac MRI CINE four-chamber (A) and short-axis views (B). There is a hyperintense lesion in the pericardial sac anterior to the right ventricle compressing the right ventricle (white arrow in A) and extending inferiorly (B).

calcification. There was a mass effect with compression of the right ventricle, Right Ventricular Outflow Treat (RVOT), and also inferolateral wall of LV. There was no infiltration of the adjacent myometrium. The rest of the pericardium was thickened and showed enhancement. The Inferior Vena Cava (IVC) was also dilated. There was no left ventricular wall hypokinesia and the left ventricular function was within normal limits. The right ventricular function was mildly reduced. The diagnosis given in MRI was complex hemorrhagic pericardial mass with cystic and solid components as there was delayed enhancement of the polypoidal lesion.

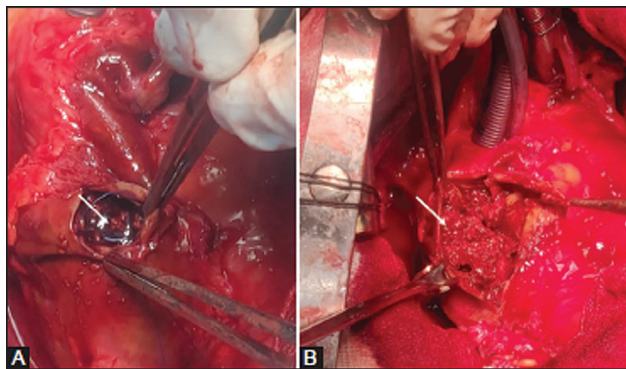
Because the patient presented with features of right heart failure emergency, surgical excision of the mass was done. At surgery, a firm mass with a thick capsule containing hemorrhagic material and altered blood was seen adherent to the myocardium compressing the right ventricle [►Fig. 5]. As the cyst was tightly attached to the right atrium and ventricle, only a part of the mass was removed and sent for biopsy. The presence of a stiff and thickened right-sided pericardium was suggestive of constrictive pericarditis. Hence, a partial pericardiectomy was performed. Pathologic evaluation of the mass confirmed the diagnosis of a pericardial cyst with areas of organizing hemorrhage and calcification. The wall showed infiltration with polymorphs and inflammatory cells. Gram stain and culture for bacteria and acid-fast bacillus were negative. The post-surgical period was uneventful, and the patient was discharged after 7 days.

## Discussion

Pericardial cysts are rare mediastinal cystic lesions usually seen in the right cardio phrenic angle. They also occur in the left cardio phrenic angle (22–38%) or superior mediastinum (8–11%) in the paratracheal area.<sup>1,2</sup> They occur due to abnormal mesenchymal development causing separation of a part of the parietal pericardium that develops into a cyst. Pericardial cysts are detected incidentally in the chest radiograph of patients during the workup for some minor complaints such as chest pain, dyspnea, and abdominal pain. The complications that are described include enlargement of the cyst, airway obstruction, erosion of myocardium and vascular structures, atrial fibrillation, and sudden death.<sup>3–5</sup>



**Fig. 4** (A–C) Hyperintense mass seen in axial T1WI (A), with an enhancement of the mass and pericardium in post-contrast subtraction T1WI (B) and delayed gadolinium-enhanced PSIR sequence (C).



**Fig. 5** (A and B) Intraoperative images showing blood-containing pericardial cyst (arrow) attached to the right atrium and ventricle with hemorrhagic material inside.

Hemorrhagic pericardial cyst causing compression of the right ventricle and causing right heart failure are rare in the literature.<sup>6–8</sup> The treatment of all complicated cysts is surgical excision. Other cystic lesions in the pericardium include cystic lymphangioma, teratogenic cyst, bronchogenic cyst, and cystic metastases.<sup>9</sup>

Cystic lymphangioma usually presents as a non-enhancing cystic lesion with septations in the pericardium, unless it is infected. A teratogenic cyst may show elements of fat, soft tissue, and calcification. A bronchogenic cyst is classically seen in the subcarinal region although cardiophrenic angle location is also described in the literature, in which case only histopathological examination can confirm the diagnosis.

This case is unique in the sense that the patient presented with abdominal pain and the pericardial cyst and right heart failure were detected following the workup of the cyst detected in echocardiography. Also, there was associated constrictive pericarditis (CP) and suspicion of a cardiac mass in the present case. CP can be idiopathic or follow any infection such as tuberculosis, viral infections, connective tissue disorders, uremia, postsurgery, or radiation therapy. Our patient had no history of recent infections, tuberculosis, or any surgery. CP may have been developed secondary to recurrent hemorrhage into the

cyst, which must have got organized and presented as a pericardial mass. Moreover, the lesion was enhanced in both CT scan MRI. The enhancement can rarely be seen in organized thrombus that can undergo vascularization producing delayed enhancement.<sup>10–12</sup> Hence, for any delayed enhancing lesion in the pericardium, a pericardial cyst with chronic organized hemorrhage should also be considered in the differential diagnosis. The present case demonstrates that the pericardial cysts, in a patient with no previous cardiac illness, have the potential of sliding into a potentially serious condition, necessitating rapid diagnostic and therapeutic measures, and can be dangerous to the patient if appropriate measures are not taken.

#### Ethical Standards

We declare that present study has been approved by the Institutional Ethics Committee and has therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. We declare that the patient gave informed consent prior to the study.

#### Declaration of Patient Consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

#### Funding

None.

#### Conflicts of Interest

None declared.

#### References

- 1 Feigin DS, Fenoglio JJ, McAllister HA, Madewell JE. Pericardial cysts. a radiologic-pathologic correlation and review. *Radiology* 1977;125(01):15–20

- 2 Koshy T, Sinha PK, Misra S, Unnikrishnan M. Pericardial cyst. *Ann Card Anaesth* 2008;11(02):129–130
- 3 Vlay SC, Hartman AR. Mechanical treatment of atrial fibrillation: removal of pericardial cyst by thoracoscopy. *Am Heart J* 1995;129(03):616–618
- 4 Fredman CS, Parsons SR, Aquino TI, Hamilton WP. Sudden death after a stress test in a patient with a large pericardial cyst. *Am Heart J* 1994;127(4 Pt 1):946–950
- 5 Chopra PS, Duke DJ, Pellett JR, Rahko PS. Pericardial cyst with partial erosion of the right ventricular wall. *Ann Thorac Surg* 1991;51(05):840–841
- 6 Temizkan V, Onan B, Inan K, Ucak A, Yilmaz AT. Hemorrhage into a pericardial cyst and associated right ventricular compression after blunt chest trauma. *Ann Thorac Surg* 2010;89(04):1292–1295
- 7 Mwitwa JC, Chipeta P, Mutagaywa R, Rugwizangoga B, Ussiri E. Pericardial cyst with right ventricular compression. *Pan Afr Med J* 2012;12:60
- 8 Shiraishi I, Yamagishi M, Kawakita A, Yamamoto Y, Hamaoka K. Acute cardiac tamponade caused by massive hemorrhage from pericardial cyst. *Circulation* 2000;101(19):E196–E197
- 9 Losanoff JE, Richman BW, Curtis JJ, Jones JW. Cystic lesions of the pericardium. Review of the literature and classification. *J Cardiovasc Surg (Torino)* 2003;44(05):569–576
- 10 Maini R, Gadiraju TV, Jabbar A, Danrad R, Sweeney A. Cardiac MRI as a useful tool to differentiate tumor and thrombus. *Int J Cardiovasc Imaging* 2017;33(11):1795–1796
- 11 Johnson EM, Gage KL, Feuerlein S, Jeong D. Cardiac magnetic resonance for the evaluation of suspected cardiac thrombus: Conventional and emerging techniques. *J Vis Exp* 2019;•••(148): . Doi: 10.3791/58808
- 12 Rinuncini M, Zuin M, Scaranello F, et al. Differentiation of cardiac thrombus from cardiac tumor combining cardiac MRI and 18F-FDG-PET/CT Imaging. *Int J Cardiol* 2016;212:94–96