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Ventricular Aneurysm Complicated by Hemorrhagic Pericardial Effusion Following Thymic Cyst: A Case Report

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Abstract

This study reports a case of a 70-year-old woman who developed a ventricular aneurysm and hemorrhagic pericardial effusion following thymic cyst surgery. A preoperative chest CT scan revealed an abnormal mediastinal shadow measuring approximately 31 × 20 × 52 mm, which was confirmed postoperatively as a thymic cyst by pathological examination. One month after surgery, the patient experienced chest tightness. A follow-up CT scan showed an increase in cystic and pericardial effusion, now measuring 58 × 43 × 76 mm. Pericardiocentesis drained approximately 1300 ml of dark red, non-clotting blood. Echocardiography revealed an aneurysm at the apex of the interventricular septum, while coronary CT showed no abnormalities. Four months later, the patient developed increased right-sided pleural effusion, and approximately 800 ml of light red fluid was drained via ultrasound-guided thoracentesis. Based on the patient's clinical course and echocardiographic findings, the hemorrhagic effusion associated with the ventricular aneurysm is likely secondary to the thymic cyst surgery.

Keywords Thymic cyst; Ventricular aneurysm; Hemorrhagic pericardial effusion.
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1 Introduction

Thymic cysts are rare mediastinal lesions, accounting for 1 3% of all mediastinal tumors and cysts. Unilocular thymic cysts are typically not associated with autoimmune diseases, whereas

multilocular thymic cysts have been linked to conditions such as rheumatoid arthritis and myasthenia gravis. This association suggests that multilocular thymic cysts may represent localized thymic manifestations of autoimmune disorders [1-2]. In patients with coronary heart disease, extensive myocardial infarction can result in ventricular wall dilation and the subsequent formation of a ventricular aneurysm. To date, no cases have been reported involving thymic cysts complicated by ventricular aneurysm. Here, we report a case of a 70-year-old woman who developed a ventricular aneurysm and hemorrhagic pericardial effusion following thymic cyst surgery.

2 Case Presentation

A 70-year-old female patient was found to have an abnormal mediastinal shadow on a chest CT scan performed on September 12, 2023. The mass, measuring 31 × 20 × 52 mm with a CT attenuation value of 16 HU, was located adjacent to the ascending aorta. On September 19, 2023, the patient underwent successful resection of the anterior superior mediastinal mass via subxiphoid thoracoscopy, with an estimated intraoperative blood loss of approximately 10 mL. Postoperative pathological examination revealed no malignant features and confirmed the diagnosis of a thymic cyst (Figure 1).

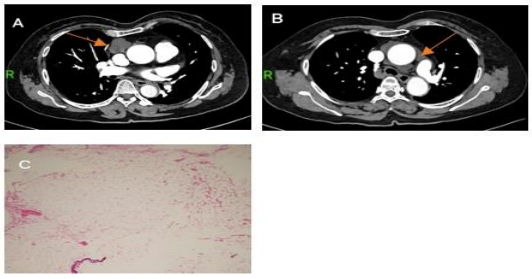

FIG 1
A: Mediastinal mass
B: Circumaortic
C: Pathology

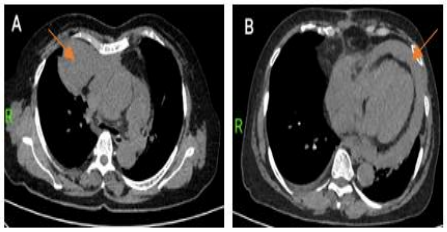

FIG 2
A: 1 month after surgery: encapsulated effusion in the operative area
B: Pericardial effusion

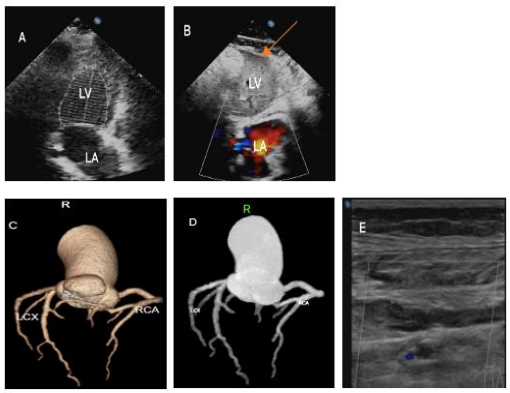

FIG 3
A and B: Ventricular aneurysm
C and D: Coronary artery
E: Thrombus in left lower limb vein

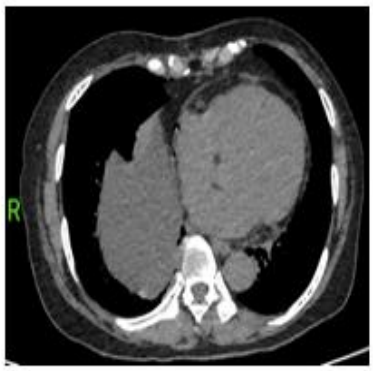

FIG 4
Pleural effusion (4 months after surgery)

One month after surgery, the patient developed symptoms of chest tightness. A follow-up chest CT scan on November 5, 2023, revealed increased pericardial effusion measuring 58 × 43 × 76 mm (Figure 2). Pericardiocentesis drained approximately 1300 mL of dark red, non-clotting

fluid. Cardiac ultrasound showed an apical interventricular septal aneurysm without evidence of thrombosis. Electrocardiogram (ECG), myocardial enzyme levels, D-dimer, and coronary CT findings were unremarkable. However, venous ultrasonography of the lower extremities revealed thrombosis in the left intermuscular calf vein, fibular vein, and posterior tibial vein (Figure 3). With appropriate management including blood pressure control, heart rate regulation, and anticoagulant therapy, the patient's chest tightness improved significantly. Four months later, on January 8, 2024, a chest CT scan revealed right-sided pleural effusion communicating with the previous surgical site. Ultrasound-guided thoracentesis drained approximately 800 mL of light red fluid (Figure 4). No recurrence of pericardial or pleural effusion was observed during the subsequent six-month follow-up period.

3 Discussion

With the increased use of chest CT scans, the detection rate of thymic cysts has risen correspondingly[3]. Studies have shown that 38% to 83% of thymic cysts exhibit CT attenuation values exceeding 20 HU, with the highest reported value reaching 97 HU[4]. In this case, the CT value of the mediastinal cyst was 16 HU. The diagnosis of a thymic cyst was established based on these imaging findings and confirmed by postoperative pathological examination.

The patient developed a hemorrhagic pericardial effusion one month after surgery. Initially, we hypothesized that cyst recurrence might be attributable to a residual cyst wall. Kozu et al. reported 108 cases of primary mediastinal cysts with an average follow-up of 41 ± 26 months after complete resection, observing no recurrences. This finding suggests that the pleura may absorb fluid produced by any remaining cyst wall, potentially preventing recurrence[5]. In contrast, Metersky[6] and Hasegawa[7] emphasized that complete resection is crucial to prevent recurrence, although in their cases, recurrence occurred 10 20 years later. Following pericardiocentesis, approximately 1300 mL of dark red fluid was drained, and the patient' s hemoglobin level was lower than the preoperative level, indicating bleeding. A subsequent echocardiogram revealed a ventricular aneurysm.

Greenfield (1959) reported a correlation between ventricular aneurysm and hemopericardium following myocardial infarction[8], while Willett et al. described the diagnostic and treatment processes related to these conditions[9]. However, coronary CT, electrocardiogram (ECG), and myocardial enzyme tests revealed no abnormalities. This suggests that the patient's ventricular aneurysm may not have resulted from a myocardial infarction, but rather from cardiac injury sustained during surgery. Previous reports have indicated that cardiac trauma can also lead to the formation of a ventricular aneurysm[10].

Four months after surgery, the patient again developed effusion in the right thoracic cavity. Chest CT revealed that the effusion was connected to the pericardium at the surgical site. Concurrently, lower limb venous thrombosis was identified, and the patient was prescribed oral rivaroxaban (10 mg daily for 3 months). Thoracentesis of the right pleural effusion yielded light red fluid, in contrast to the dark red fluid previously observed. This difference suggests that rivaroxaban may have contributed to the lighter coloration of the fluid. Continuous drainage removed approximately 800 mL of fluid. Follow-up at six months revealed no evidence of recurrent mediastinal, pericardial, or pleural effusion.

The initial bloody pericardial effusion may have resulted from cardiac injury sustained during

thymic cyst surgery, which subsequently led to the formation of a ventricular aneurysm and associated bleeding. The later occurrence of bloody effusion may have been related to the use of rivaroxaban.

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Conflicts of Interest All authors certify that they have no affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge or beliefs) in the subject matter or materials discussed in this manuscript.

Patient informed consent The patient's consent has been obtained.

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