

Pericardial effusion with right atrial angiosarcoma differentiated from aortic dissection: a case report

Haoyuan Yang^{1#}, Fusheng Zhang^{2#}, Xusheng Zhang^{1#}, Zexu Chen^{3#}, Zhenqiang Xu^{1*}, Gang Zhang^{1*}

¹ Department of Cardiovascular Surgery, Shandong Provincial Hospital Affiliated to Shandong First Medical University, Jinan, China

² Department of Neurology, Shandong Provincial Hospital Affiliated to Shandong First Medical University, Jinan, China

³ Department of Cardiovascular Surgery, Qilu Hospital of Shandong University, Jinan, China

* Corresponding authors: imxqz@163.com, surgeonzg@outlook.com

Equal contribution

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Case presentation

A 62-year-old male presented to Shandong Provincial Hospital in China in October 2024 with chest pain. Physical examination was unremarkable, and electrocardiography showed normal sinus rhythm with no ST-segment depression or elevation. The patient had a 5-year history of hypertension, with a maximum systolic blood pressure of 170 mm Hg. Transthoracic echocardiography revealed a small pericardial effusion but no significant structural cardiac abnormalities (Fig a). The patient was transferred to the cardiac intensive care unit for pain management and symptomatic treatment. On admission, his systolic blood pressure gradually decreased to around 50 mm Hg, and his heart rate increased, with clear signs of pericardial tamponade. Following treatment with vasopressors and fluid resuscitation, his systolic blood pressure rose to 90 to 100 mm Hg and gradually stabilised. Follow-up transthoracic echocardiography revealed a significant increase in pericardial effusion, prompting pericardiocentesis that drained approximately 700 mL of haemorrhagic fluid. Microbial cultures and cytological examination were negative. A subsequent echocardiogram confirmed no recurrence of the pericardial effusion.

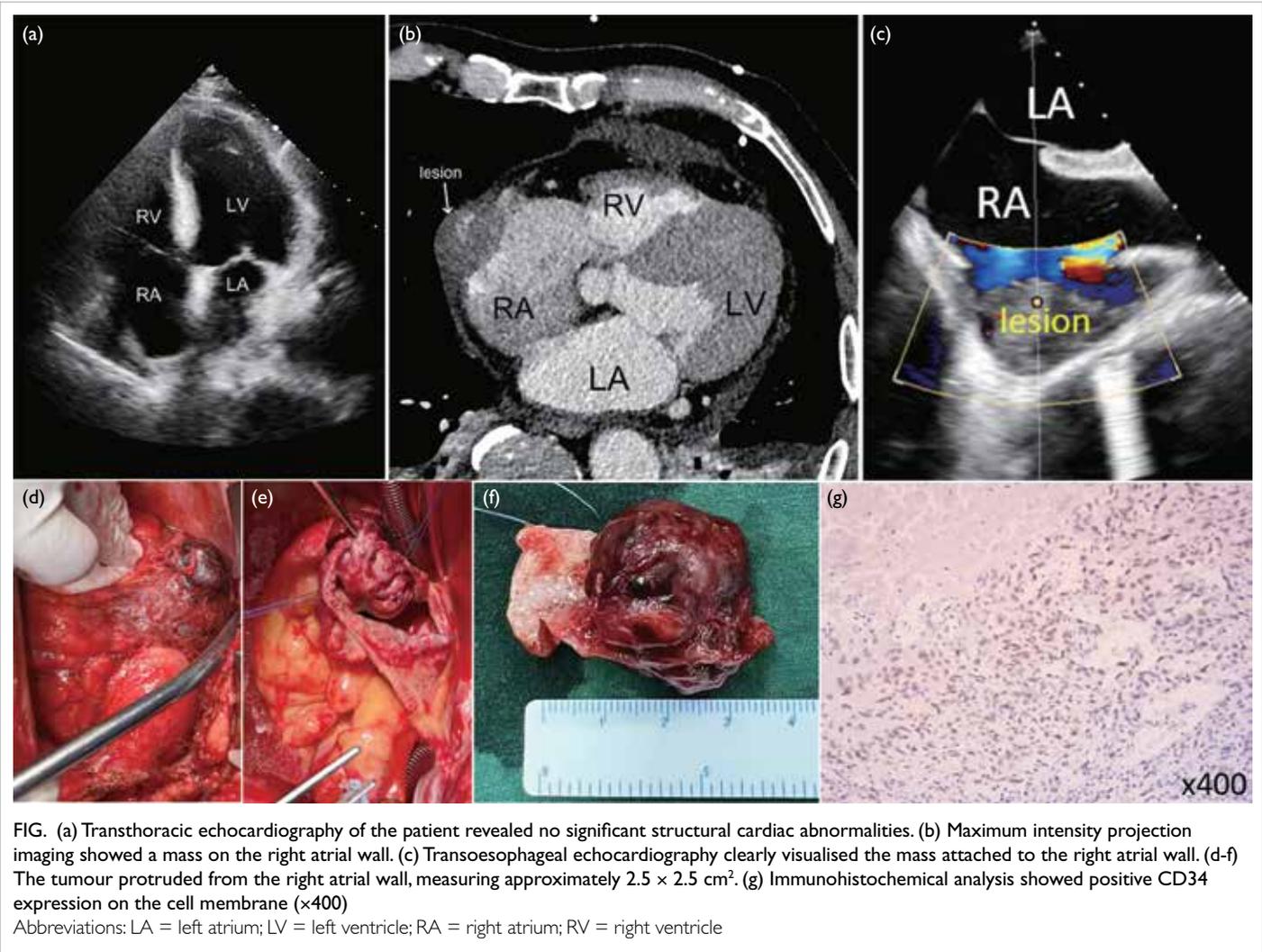
Given the patient's medical history and the initial echocardiographic findings, a preliminary diagnosis of aortic dissection was considered. Nonetheless a comprehensive aortic computed tomography angiography revealed no signs of aortic dissection or intramural haematoma. Maximum intensity projection revealed an irregular, contrast-enhancing linear area at the lower right atrium near the right atrial appendage, extending towards the pericardial edge. The contrast density was reduced and the boundary appeared indistinct, with a slightly higher-density area within the pericardium (Fig b). Maximum intensity projection is a high-resolution imaging technique that effectively visualises fine vascular structures and complex anatomical features

in small volumes, making it particularly suitable for analysing microvasculature. After multidisciplinary discussions, the progressive pericardial effusion was suspected to be related to an abnormality or mass lesion in the right atrium. A decision was made to proceed with exploratory thoracotomy.

Preoperative transoesophageal echocardiography confirmed the presence of a mass in the right atrial free wall (Fig c). During surgery, a 2.5 × 2.5 cm² mass was found protruding from the free wall of the right atrium, infiltrating the atrial wall. The mass was located approximately 1 cm from the atrioventricular junction and at a sufficient distance from the superior and inferior vena cavae (Fig d-f). The tumour was successfully resected with a safe margin, and the atrial wall defect repaired using a bovine pericardial patch. Postoperative histopathological examination confirmed the diagnosis of cardiac angiosarcoma (Fig g). Follow-up echocardiography revealed normal cardiac chamber structure and function. The patient made an uneventful recovery and was discharged on postoperative day 9 feeling well. Nonetheless, approximately 3 months later, the patient developed pericardial effusion again, suggesting recurrence with possible metastatic progression. The patient did not undergo further treatment.

Discussion

In clinical practice, chest pain associated with acute pericardial effusion is often considered a potential indication of aortic dissection, as was initially suspected in this case. Nonetheless, routine preoperative assessments for aortic dissection revealed no structural abnormalities in the heart or aorta, leading us to exclude this diagnosis. In establishing a definitive diagnosis, we broadened our differential diagnosis to include other conditions that could cause chest pain with acute pericardial effusion, such as cardiac tumour that is not easily detected in clinical practice. Additionally, we considered whether appropriate diagnostic methods



had been used. Hence, we employed more specialised and less commonly used diagnostic techniques such as maximum intensity projection imaging and transoesophageal echocardiography to obtain a clearer understanding of the cardiac structures and reach a definitive diagnosis.

The pathological diagnosis in this patient's tumour was angiosarcoma. Cardiac angiosarcoma, a rare malignant cardiac tumour, accounts for about 25% to 30% of all primary malignant cardiac tumours.¹ Most affected patients are under 65 years of age, and the tumour most frequently originates in the right atrium, often invading adjacent structures.² Typical clinical manifestations include dyspnoea, pericardial effusion, and chest pain, and these usually appear in the advanced stages of disease, leading to a poor prognosis.³

Conclusion

Patients with chest pain and pericardial effusion are

often clinically diagnosed with aortic dissection. Nonetheless, once initial evaluations exclude this diagnosis, it is essential to consider cardiac tumour, a relatively rare condition in clinical practice.

Author contributions

Concept or design: Z Xu, G Zhang.

Acquisition of data: H Yang, X Zhang.

Analysis or interpretation of data: H Yang, X Zhang, Z Chen, F Zhang.

Drafting of the manuscript: H Yang, X Zhang, Z Chen, F Zhang.

Critical revision of the manuscript for important intellectual content: Z Xu, G Zhang.

All authors had full access to the data, contributed to the study, approved the final version for publication, and take responsibility for its accuracy and integrity.

Conflicts of interest

All authors have disclosed no conflicts of interest.

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Ethics approval

The patient was treated in accordance with the Declaration of Helsinki. The patient was provided with information regarding the study and gave written informed consent for all treatments, procedures, and publication of the case report with the accompanying images prior to participation.

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