Letter to the Editor

Pericardial Effusion in the Transverse Sinus

A 51-year-old woman with dyspnea on exertion was referred for echocardiography. The patient's heart was in sinus rhythm. Transthoracic echocardiography revealed normal left ventricular size and systolic function (ejection fraction =55%), normal right ventricular size and systolic function, severe rheumatic mitral stenosis (orifice area by direct planimetry =1.2 cm^2), mild mitral regurgitation, mild-to-moderate aortic regurgitation, and mild tricuspid regurgitation with normal systolic pulmonary artery pressure (estimated pulmonary artery pressure =31 mm Hg).

Transesophageal echocardiography, performed for a more comprehensive assessment of the mitral valve, confirmed the transthoracic echocardiography findings and the absence of a left atrial appendage (LAA) clot. Additionally, it demonstrated pericardial effusion around the LAA and a space between the left atrium (LA) in the posterior view, the ascending aorta in the anterior view, and the pulmonary artery in the anterolateral view, suggesting effusion in the transverse sinus (TS).

We present this case to emphasize the significance of recognizing this anatomy. Pericardial sinuses are formed by the reflection of the pericardium where the great vessels enter the pericardial sac. The TS is located posterior to the aortic and pulmonary trunk and above the LA.[1]

Despite its importance, this anatomic structure has not received sufficient attention in the imaging literature, and cardiologists are commonly unfamiliar with the TS during echocardiography.[2] Understanding the anatomic characteristics of the TS is crucial, particularly during and early after interventional procedures, as the initial indication of complications can be a fluid collection in the TS. These procedures encompass a broad spectrum, ranging from intra-LA to great vessel interventions. Such procedures include transcatheter aortic valve replacement, atrial septal defect device closure, catheter-based radiofrequency ablation, minimally invasive methods of atrial fibrillation rhythm, and video-assisted thoracoscopic procedures.[2-4] Moreover, the LAA may expand to form the floor of the TS. In such cases, it may be mistaken for a mass in the TS. Similarly, an LAA clot can also mimic a mass in the TS. The presence of the pectinate muscle in the LAA can be helpful for differentiation. A significant differential diagnosis of effusion in the TS is a pseudoaneurysm of the aortomitral intervalvular fibrosa, which may result from cardiac surgery or infective endocarditis. The absence of flow on color Doppler studies suggests effusion in the TS.[1,5] Furthermore, it has been reported that pericardial effusion may be the initial manifestation of some systemic diseases.6 These examples underscore the importance of accurate identification of the TS for proper clinical decision-making. However, diagnosing the TS in transesophageal echocardiography may pose a challenge, and cardiologists should be familiar with the anatomic location of this structure to ensure early detection of pericardial effusion. This could serve as an indicator of pericardial involvement in systemic diseases or as a complication of certain procedures. Additionally, they should be able to differentiate the TS from other normal structures or pathologies to avoid potential misdiagnoses.

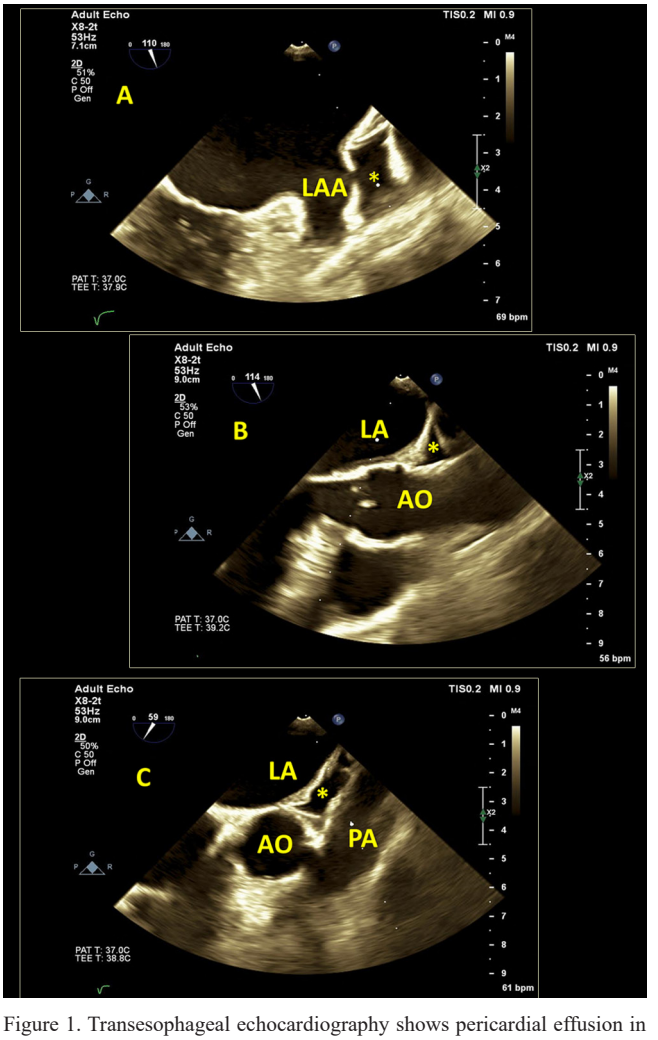

Figure 1. Transesophageal echocardiography shows pericardial effusion in the transverse sinus (*) around the LAA (A), between the LA and the AO in the long axis of the AO view (B), and between the LA and the AO and the PA in the short axis of the AO (C).

LA, Left atrium; AO, Ascending aorta; PA, Pulmonary artery; LAA, Left atrial appendage

To watch the following videos, please refer to the relevant URLs.

https://jthc.tums.ac.ir/index.php/jthc/article/view/2104/1136

Video 1. Transesophageal echocardiography demonstrates pericardial effusion in the transverse sinus around the left atrial appendage and between the left atrium and the ascending aorta and the pulmonary artery, suggesting pericardial effusion in the transverse sinus in a patient with mitral stenosis.

References

1. Penmasta S, Silbiger JJ. The transverse and oblique sinuses of the pericardium: Anatomic and echocardiographic insights. Echocardiography 2019;36:170-176.
2. Burysz M, Batko J, Olejek W, Piotrowski M, Litwinowicz R, Słomka A, Kowalewski M, Suwalski P, Bartuś K, Rams D. Morphology and Anatomical Classification of Pericardial Cavities: Oblique and Transverse Sinuses. J Clin Med 2023;12:4320.
3. Takei M, Hasegawa T, Ohtsubo S, Takahashi T. Effusion in transverse sinus: a primary echocardiographic sign for aortic annular rupture in transcatheter aortic valve replacement. J Echocardiogr 2021;19:121-122.
4. Burysz M, Batko J, Olejek W, Piotrowski M, Litwinowicz R, Słomka A, Kowalewski M, Suwalski P, Bartuś K, Rams D. Morphology and Anatomical Classification of Pericardial Cavities: Oblique and Transverse Sinuses. J Clin Med 2023;12:4320.
5. Muroke V, Tuohinen S, Jalanko M, Sinisalo J. Anatomical variability of transverse sinus and its implication on atrial septal defect closure device erosion. Eur Heart J Cardiovasc Imaging 2023;24:1563-1565.
6. Allam HH, Kinsara AJ, Alrajawi A, Tuaima T, Vriz O. Transverse sinus mass misinterpreted as the source of cardiac emboli. Monaldi Arch Chest Dis 2021;91.
7. Stępniak D, Żechowicz M, Moczulska B, Gromadziński L. Inflammation of Pericardial Transverse Sinus Leading to Suspicion of Takayasu Syndrome. Am J Case Rep 2022;23:e937196.

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