

CASE REPORT

Epicardial and transverse sinus fat pad near left atrium appendage; role of 3D echocardiography

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Abstract

Pericardial fat pad in transverse sinus adjacent to left atrial appendage (LAA) is a rare condition that may resemble LAA thrombosis especially in suspected cases. More Trans-esophageal echocardiography (TEE) angulations and also 3D TEE images are helpful tools to confirm the diagnosis.

KEYWORDS

epicardial fat pad, three-dimension echocardiography, transverse sinus

1 | INTRODUCTION

The anatomy of pericardial cavity consists of two sinuses; transverse and oblique. A recess in pericardial cavity adjacent to pulmonary vein and also another one in transverse sinus near pulmonary artery have been detected in 70%-80% of general population. Transverse sinus (TS) is located anterior to the left atrium (LA) and almost posterior to the aortic root. In some people, the tip of the Left Atrial Appendage (LAA) may be located posterior, inferior or even into the pericardial sinus. Many anatomic variations in LAA have been reported in the literature. Sometimes puncture of the interatrial septum (during septostomy) may enter the transverse pericardial sinus and endanger the aortic root.^{1,2}

Pericardial fat pad in transverse sinus adjacent to LAA is a rare condition that may resemble LAA thrombosis especially in suspected cases. LAA itself has many complex variations. Atrial fibrillation (AF) and severe mitral stenosis (MS) change the morphology and geometry of both LA and LAA.

Herein, we present a rare anatomic variation called transverse sinus fat pad (TSFP), in a patient with severe MS and normal sinus rhythm who was candidate for percutaneous

transvenous mitral commissurotomy (PTMC). Even an expert operator may make a mistake at fist if he or she is not familiar with TSFP.

2 | CASE PRESENTATION

A 60-year-old woman with the history of dyspnea on exertion from 2 years ago presented to the Tehran Heart Center.³ At the time of admission, the patients' vital sign was stable; blood pressure of 120/75 mmHg, heart rate of 87 beat per minute (sinus rhythm) and normal Oxygen saturation.

After initial evaluations in trans-thoracic echocardiography (TTE) severe MS with Wilkins⁴ score of 7 was diagnosed. She was planned to undergo TEE for further evaluation and probable PTMC in the index admission. She was on Inderal 20 daily from 6 months ago. Furosemide 20 mg daily was added recently due to her dyspnea. TEE was done without complication after local anesthesia with 1.5 mg midazolam. Severe MS was seen and low LAA velocity (28.2 cm/s) was noted, Figure 1; Panel A. Suspicious mass was seen near LAA and was first consumed to be a LAA thrombosis. After

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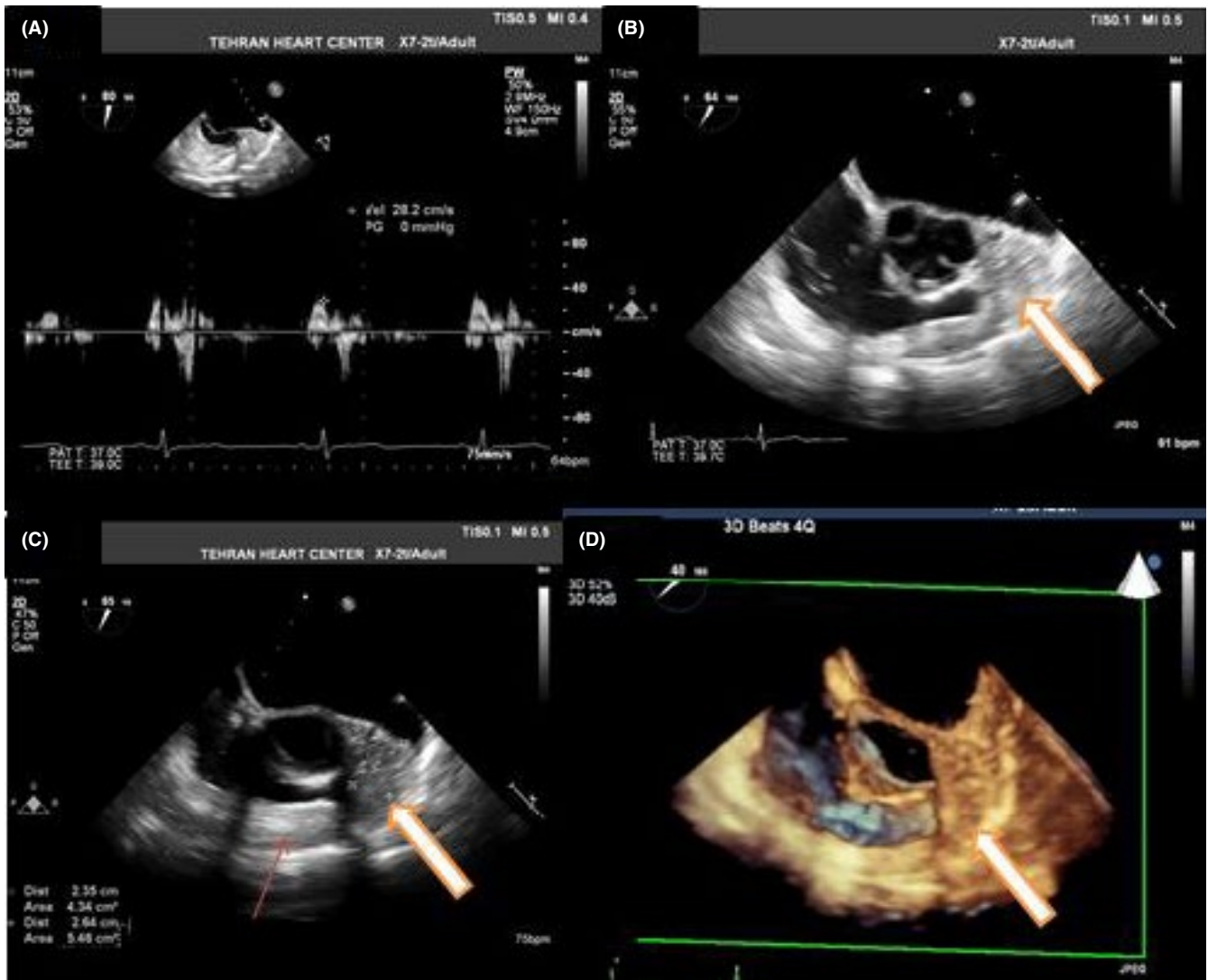


FIGURE 1 2D and 3D TEE imaging. A, TEE short axis of aorta at 80° angulation reveals reduced LAA velocity. B, TEE short axis aorta at 64° angulation shows fat pad in transverse. C, well-define echo-density 2.35 cm * 2.65 cm between aorta and LAA, epicardial fat pad around right ventricle is also evident (thin arrow). D, 3D TEE imaging reveals fat like density around LAA

more angulations of the probe in off-axis views a well-defined mass-like lesion in TS was visualized, Figure 1; Panel B; measuring 2.35 cm * 2.65 cm, Figure 1; Panel C. In this figure, one can also notice thick epicardial fat pad. The echogenicity of the lesion within TS is exactly like the epicardial fat around right ventricle (RV), Figure 1, Panel C thin arrow.

Three-dimension mapping was performed with live 3D wide angled full volume TEE. Echogenicity and features of the lesion were against thrombosis and both were in favor of fat tissue, Figure 1; Panel D. Hence, TSFP was diagnosed. Videos of 3D and 2D TEE have been attached as a Video S1.

3 | DISCUSSION

The transverse sinus is a pericardial reflection which is between the arterial and the venous mesocardium. Existence of

epicardial fat between ascending aorta and transverse sinus is a normal finding; however, presence of fat pad in the sinus adjacent to LAA is rare and also may be misleading. Epicardial fat surrounding the left pulmonary artery recess but not in TS was previously reported by Johner et al² They were not familiar with this anatomic variation around LAA and cancelled the cardioversion for AF due to LAA thrombosis.

As far as we know, our case is the third case of TSFP reported in the literature. First case was introduced by Chhabra et al⁵ and the second case was presented with Pergolini et al both in 2019.⁶ Both cases were reported in patients with AF and no sign of severe mitral stenosis in echocardiogram. In the first case, the patient had AF and underwent TEE to rule out thrombosis before cardioversion and TSFP was diagnosed with CT scan. In the second case, TSFP was mistakenly considered to be thrombosis and cardioversion was delayed 4 weeks for anticoagulation. None

of these studies evaluated the patients with 3D technique. Hence, the unique features of the present case are; TSFP diagnosis with 3D mapping in a patient with severe MS who was candidate for PTMC.

In our experience, 3D mapping is a useful modality to evaluate and differentiate thrombosis and fat pad. An expert echocardiologist may be able to differentiate these two pathologies in or around LAA. In present patient the increased epicardial fat pad around RV was also noted. The similarity of the density between RV fat pad and TS lesion is another clue that this is not a thrombosis.

2D TEE has higher resolution than 3D mapping due to higher frame rate; however, 3D mapping technology allows more comprehensive evaluation of LAA anatomy and its nearby structures. Its ability to differentiate the borders between LAA and adjacent structures made 3D TEE a feasible and reliable tool before invasive procedures such as LAA device closure.

Low velocity in LAA increases the risk of thrombosis formation; however, the absence of smoky pattern is against the presence of thrombosis in LAA. Several TEE angulations can prove that TSFP originates from outside the LAA in contrast to thrombosis that is inside LAA. Echocardiography (both 2D&3D) is not an accurate tool for tissue characterization. Hence, Utilization of other imaging modalities such as CT scan and MRI are helpful in both diagnosing the anatomic variation, and differentiating the tissue characterization and texture.

4 | CONCLUSION

Sometimes epicardial fat pad fills the transverse sinus (TSFP) near LAA and resembles thrombosis. This mistake may preclude or delay further procedures such as cardioversion or PTMC. Hence, along-side 2D imaging, 3D TEE may be helpful to delineate the complex structure of LA and LAA. One may summarize the clues and ways to differentiate thrombosis and TSFP as follows: 1- More angulations of the TEE probe may show the origin of this pathology which is outside the LAA; 2- Absence of smoky pattern in LAA despite low velocity; 3-Texture similarity with fat pad around RV/LV is in favor of TSFP; 4- Finally, if there is still doubt, CT scan and MRI findings are the most reliable tools to precisely differentiate these two pathologies.

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CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTION

RMB and KH: Gathered all clinical materials and images. MS: performed 3D TEE and scientific supervision. MMB: Performed TEE. MS: revised the manuscript. KH: Reviewed the literature and drafted the initial version of manuscript.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.

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