

CASE REPORT

Transesophageal echocardiography diagnosis of abnormal left atrium to inferior vena cava communication: A case report

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Key Clinical Message

Abnormal traffic between the left atrium (LA) and inferior vena cava (IVC) in the database is currently rare. Herein, we present a unique case of abnormal traffic between the LA and the IVC, which was diagnosed using transesophageal echocardiography and confirmed by computed tomography angiography. This case substantiates the superiority of transesophageal echocardiography over transthoracic echocardiography in detecting specific site lesions.

KEYWORDS

abnormal traffic, computed tomography angiography, inferior vena cava, left atrium, transesophageal echocardiography

1 | INTRODUCTION

Transesophageal echocardiography, as a specialized cardiac examination modality, enables the visualization of sections that may not be adequately visualized by transthoracic ultrasonography.^{1,2} In this report, we present a case of abnormal traffic between the left atrium (LA) and inferior vena cava (IVC) diagnosed using transesophageal echocardiography. This case serves to underscore the unique advantages of transesophageal echocardiography over transthoracic echocardiography in detecting anomalous lesions in specific anatomical locations.

2 | CASE HISTORY AND METHODS

A 53-year-old female patient presented with intermittent episodes of dizziness and headache. Her vital signs,

including temperature, respiration rate, blood pressure, and pulse, were within normal limits. Her medical history was unremarkable and she reported no recent weight changes. Physical examination revealed no obvious abnormalities. Serological test results showed no obvious abnormality. The electrocardiogram revealed essentially normal findings.

We first performed the scan using 2D transthoracic ultrasound and color Doppler flow imaging (CDFI) techniques. Transthoracic echocardiography (Figure 1) revealed no significant abnormalities in the parasternal long-axis section of the left ventricle, apical four-chamber section of the heart, or sub-xiphoid sections of both atria.

In order to further improve the diagnostic accuracy, the patient underwent transesophageal echocardiography (Figure 2), during which an oblique separation was observed in the fossa oval located in the middle of the atrial

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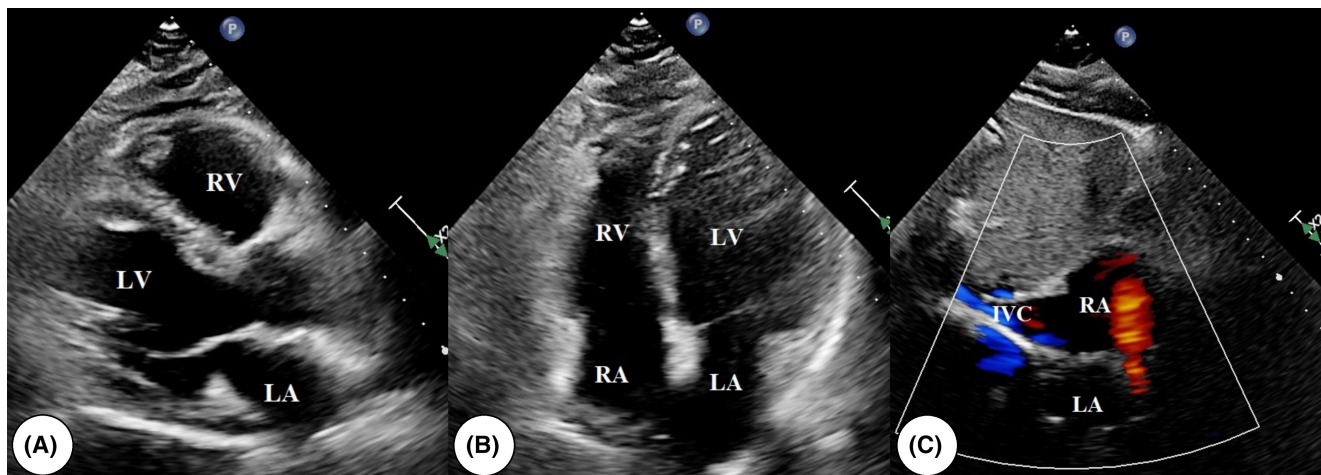


FIGURE 1 Transthoracic echocardiography images. (A) Parasternal long-axis view of the LV. (B) Apical four-chamber view of the heart. (C) Section image of subxiphoid section of both atria. IVC, inferior vena cava; LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

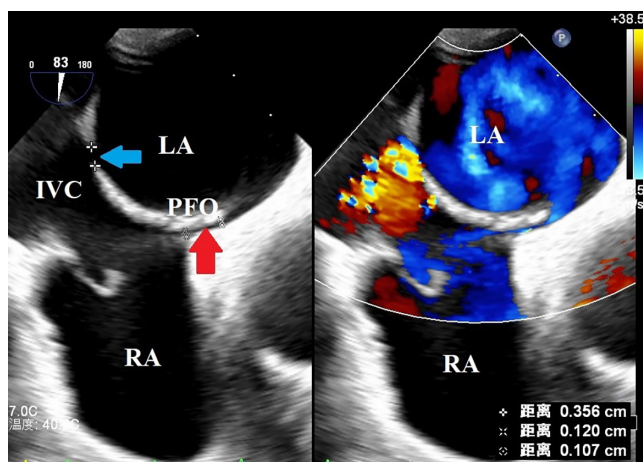


FIGURE 2 Transesophageal echocardiography images. The blue arrow indicates the echo interruption in the wall of the IVC, and the red arrow indicates the PFO. RA, right atrium; LA, left atrium; IVC, inferior vena cava; PFO, patent foramen ovale.

septum, with a left atrial separation measuring 1.0 mm and a right atrial separation measuring 1.2 mm, resulting in a separation length of 12 mm, which was indicative of a patent foramen ovale. Additionally, an echo interruption measuring 3.5 mm in width was detected in the wall of the IVC approximately 5 mm away from its entrance into the right atrium. CDFI revealed visible blood shunting from the LA to the IVC through this defect.

3 | CONCLUSION AND RESULTS

For further verification, the patient underwent a computed tomography angiography (CTA) examination (Figure 3),

which revealed that the atrial septum was intact, there was an interruption in the echo within the wall of the IVC, and the contrast agent was observed to be shunted into the IVC from the LA. This result proved that the diagnosis of transesophageal echocardiography was correct.

The patient is currently under close follow-up.

4 | DISCUSSION

There is currently a paucity of reported cases of abnormal traffic between the LA and the IVC, and no relevant reports were found after we searched the relevant databases.

This case is different from an atrial septal defect, which is a common congenital heart disease that can be divided into several types, such as the primary foramina, secondary foramina, venous sinus, and coronary sinus.³ The diagnosis of atrial septal defect mainly relies on echocardiography,⁴ although electrocardiography may also reveal related abnormal manifestations.^{5,6} The treatment of atrial septal defect includes minimally invasive interventional therapy and thoracotomy.⁷ In this case, the atrial septum was intact, the defect was located in the wall of the IVC, and CDFI revealed that the blood shunt entered the IVC through the LA. According to these features, this case can be distinguished from an atrial septal defect.

We considered that the disease was caused by congenital factors. In this case, because the abnormal traffic was small and did not significantly affect hemodynamics, the patient only had intermittent dizziness and headaches. Therefore, based to the clinician's assessment, the patient did not need surgery. At present, the patient was treated symptomatically and closely

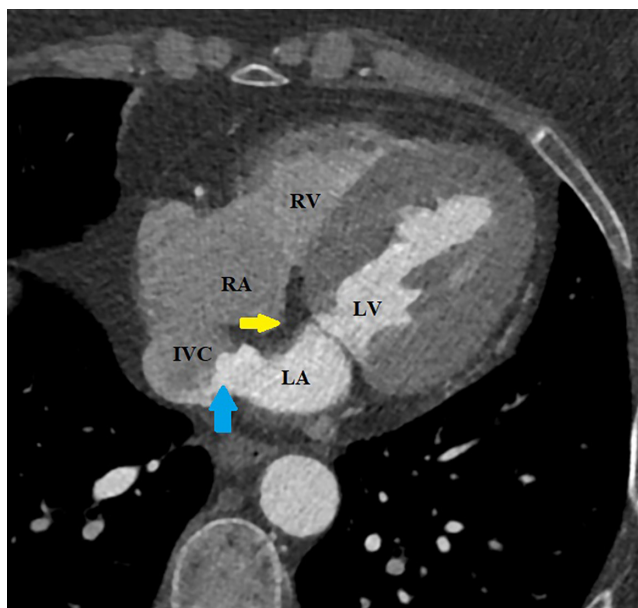


FIGURE 3 Computed tomography angiography image. The blue arrow indicates the echo interruption in the wall of the IVC, and the yellow arrow indicates the atrial septum. IVC, inferior vena cava; LA, left atrium; LV, left ventricle; RA, right atrium; RV, right ventricle.

followed-up. However, if symptoms worsen, surgery will be considered.

Transesophageal echocardiography is an imaging technique that scans the heart forward through the esophagus, avoiding the interference of the lungs and ribs, and can show sections that cannot be shown by transthoracic echocardiography. In this case, no significant abnormalities were found by transthoracic ultrasonography, whereas abnormal traffic between the LA and the IVC was identified by transesophageal ultrasonography, which was further confirmed by CTA. This case proves that transesophageal echocardiography has better application value than transthoracic echocardiography in finding abnormal lesions in special sites, and it is worthy of widespread application in clinical practice.

In the future, further research on the application of multimodal imaging methods for accurate diagnosis of such diseases can be considered, and we should explore the pathophysiology of the condition and evaluate novel treatment modalities.

AUTHOR CONTRIBUTIONS

Hui Xu: Conceptualization. **Dian-Bo Cao:** Data curation. **Xiao-Dong Li:** Conceptualization; data curation; funding acquisition.

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CONFLICT OF INTEREST STATEMENT

All of the authors have no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

CONSENT

Written informed consent was obtained from the patient to publish this report in accordance with the journal's patient consent policy.

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