

IMAGE

A New Kid on the Block in POCUS: “LISA”

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Transesophageal echocardiography (TTE) and computed tomography angiography (CTA) are methods of choice for definitive diagnosis and prognostic stratification of acute aortic syndromes (AAS).¹ Point-of-care ultrasound (POCUS) has important applications in the initial workup of these patients in the emergency room (ER), ruling out other potential causes of chest pain and allowing a faster diagnosis,² although conventional transthoracic echocardiographic acoustic windows do not allow for imaging of some segments of the thoracic aorta (TA), especially the descending TA (DTA).

A 49-year-old man, with a 20-day history of dorsal and abdominal pain, shortness of breath (NYHA-III) and peripheral edema was admitted to the hospital ER. He had uncontrolled systemic hypertension and a history of smoking, without a family history of aortic diseases or sudden death.

At admission, the patient was unstable hemodynamically, with clinical signs of biventricular heart failure. A TTE showed dilation of all cavities, severe biventricular systolic dysfunction, a giant (10.1cm) dissecting aneurysm (DA) of ascending aorta (AAo) (Fig.1-A, Video1), with a partially thrombosed false lumen extending to the supra-avalvular aortic region, causing geometric distortion of the aortic root and moderate-to-severe aortic regurgitation (Fig.1-B). The entry tear was nicely depicted in two-dimensional/three-dimensional TTE from a right parasternal window (Figures

1-C,D, Video2), located in tubular AAo. The dissection extended to the descending thoracic aorta (DTA) and abdominal segments, with a large and highly pressurized false lumen. The posterior path of the dilated DTA in the thorax was easily accessible by ultrasound using a matrix probe, through a non-conventional left interscapular window, with good definition of intimal flap, spontaneous contrast and thrombus in the false lumen, in short-axis and longitudinal view (Figures 2 A, B, C, Video3), and nicely depicted by three-dimensional reconstructed images (Figure 2-D, Video4). These findings were confirmed by CTA, showing a giant Stanford type A DA (Figures 2-E-F).

AAS are life-threatening conditions with high morbidity and mortality, especially when there is a delay in diagnosis and adequate treatment.³ POCUS as a first line approach for patients with suspected AAS in the ER can provide important data for a faster and more accurate diagnosis, detecting also signs of complications as pericardial effusion, pericardial tamponade, left and right ventricular dysfunction, acute aortic regurgitation, periaortic hematoma and hemothorax, supporting the need for urgent intervention. The DTA is not well visualized with conventional TTE windows, and a dorsal window is not currently cited as part of the routine investigation in the guidelines.^{4,5}

We propose the use of a new echocardiographic window, the **Left InterScapular Approach (LISA)**, for POCUS screening of patients with suspected AAS, even without pleural effusion. In cases where there is dilatation of DTA, due to its posterior path in the thorax, this new approach may provide images with great anatomic details, as exemplified in a case of a giant dissecting TA aneurysm, with very good correlation with CTA findings.

It is the first description of this new window obtained by the **LISA**, and we strongly suggest that it may be incorporated in the initial workup of patients with suspected AAS as a non-invasive tool.

Keywords

Aortic Diseases/diagnostic,imaging; Echocardiography; Transesophageal/methods; Tomography; X-Ray Computed/methods; Takayasu Arteritis/complications.

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Author contributions

Conception and design of the research: Alex dos Santos Felix. Acquisition of data: Alex dos Santos Felix, Rafael Castro. Analysis and interpretation of the data: Alex dos Santos Felix, Marcelo Tavares de Melo, Thaissa Santos Monteiro, Maria Carolina Terra Cola, Rafael Castro, Nicolas Merke. Writing of the manuscript: Alex dos Santos Felix, Marcelo Tavares de Melo, Thaissa Santos Monteiro, Maria Carolina Terra Cola, Rafael Castro, Nicolas Merke. Critical revision of the manuscript for intellectual content: Alex dos Santos Felix, Marcelo Tavares de Melo, Thaissa Santos Monteiro, Maria Carolina Terra Cola, Rafael Castro, Nicolas Merke.

Potential Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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Study Association

This study is not associated with any thesis or dissertation work.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of the CEP INC under the protocol number 3.641.775. All the procedures in this study were in accordance with the 1975 Helsinki Declaration, updated in 2013. Informed consent was obtained from all participants included in the study.

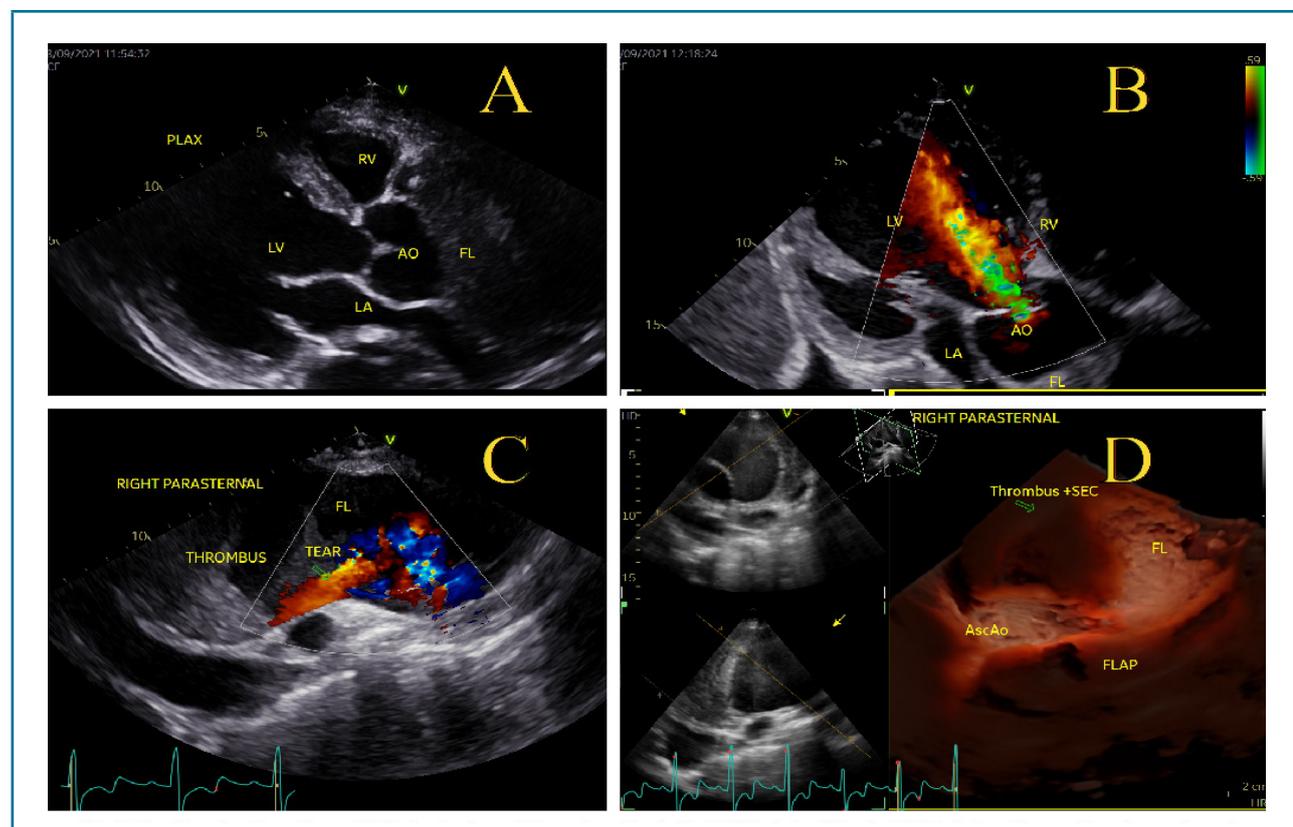


Figure 1 - Transthoracic echocardiogram (TTE) showing, from a left parasternal longitudinal (PLAX) window (A), a giant (10.1cm) dissecting aneurysm of the ascending aorta (AscAo), with partially thrombosed false lumen (FL) extending to the supravalvular aortic (AO) region, causing geometric distortion of the aortic root and moderate-to-severe aortic regurgitation, showed from an apical longitudinal view (B). The entry tear was depicted from a right parasternal window (C), located in the tubular portion of the AscAo, nicely illustrated by rendered images acquired by 3DTE (D).

LV: left ventricle; RV: right ventricle; LV: left ventricle; AO: aorta; SEC: spontaneous echo contrast.

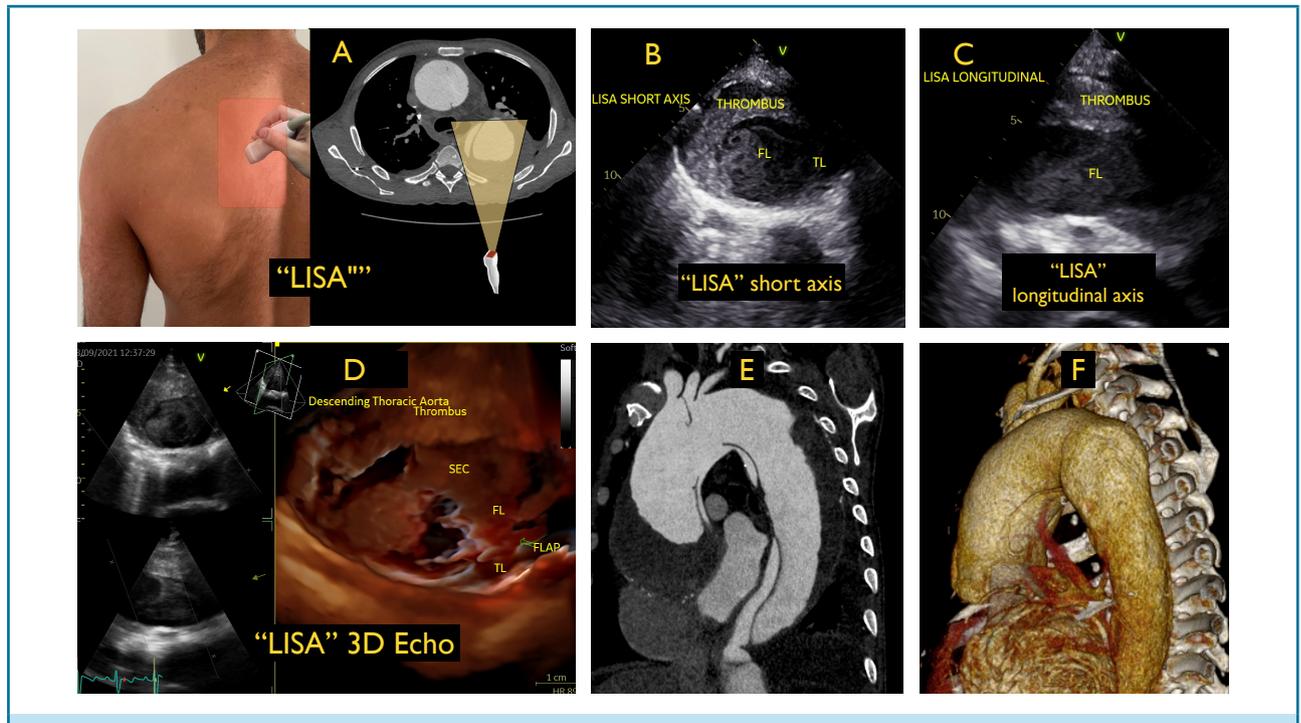


Figure 2 - Schematic illustration of probe positioning to obtain images of the descending thoracic aorta (DTA) using the left interscapular approach (LISA) (A), with computed tomography (CT), highlighting the close relation of dilated DTA to posterior thoracic wall. The intimal flap is easily seen with this approach, from both short-axis (B) and longitudinal views (C), showing spontaneous contrast and the thrombus in the false lumen (FL). A good 3D transthoracic echo dataset was also obtained, and reconstructed. The rendered images depicted in detail the structures and their spatial relationships (D). CT angiography (CTA) confirmed the findings, showing a giant Stanford type A dissecting aneurysm (E,F). FL: false lumen; TL: true lumen; SEC: spontaneous echo contrast.

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*Supplemental Materials

See the Supplemental Video 1, please click here.

See the Supplemental Video 2, please click here.

See the Supplemental Video 3, please click here.

See the Supplemental Video 4, please click here.

