

Images in
Cardiovascular Medicine



Persistent Left Superior Vena Cava Associated with an Anomalous Drainage of Right Superior Vena Cava into the Left Atrium

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An eighty-three years-old female with a history of multiple idiopathic strokes was referred to our hospital with stroke relapse. We performed a transthoracic echocardiogram that underlined a dilated coronary sinus (CS) despite the absence of a cause for elevated right atrial pressure. Through agitated saline (AS) injection in a left antecubital vein, a persistent left superior vena cava (LSVC) was identified by the classical appearance of microbubble earlier in the CS than in the right atrium (RA). As part of our protocol, we also injected AS in a right antecubital vein, and interestingly, the microbubble filled only the left cavities, demonstrating a right-to-left shunt (RLS) (**Figure 1A** and **Supplementary Video 1**). Computed tomography scan showed, along with the persistent LSVC, an anomalous right superior vena cava (RSVC) complete drainage into the left atrium (LA) (**Figure 1B and C**). This cause of RLS is extremely rare in association with a persistent LSVC and could explain the patient's multiple stroke history. At the heart team evaluation, a conservative approach was recommended because of the patient's age and comorbidities, and oral anticoagulation was initiated.

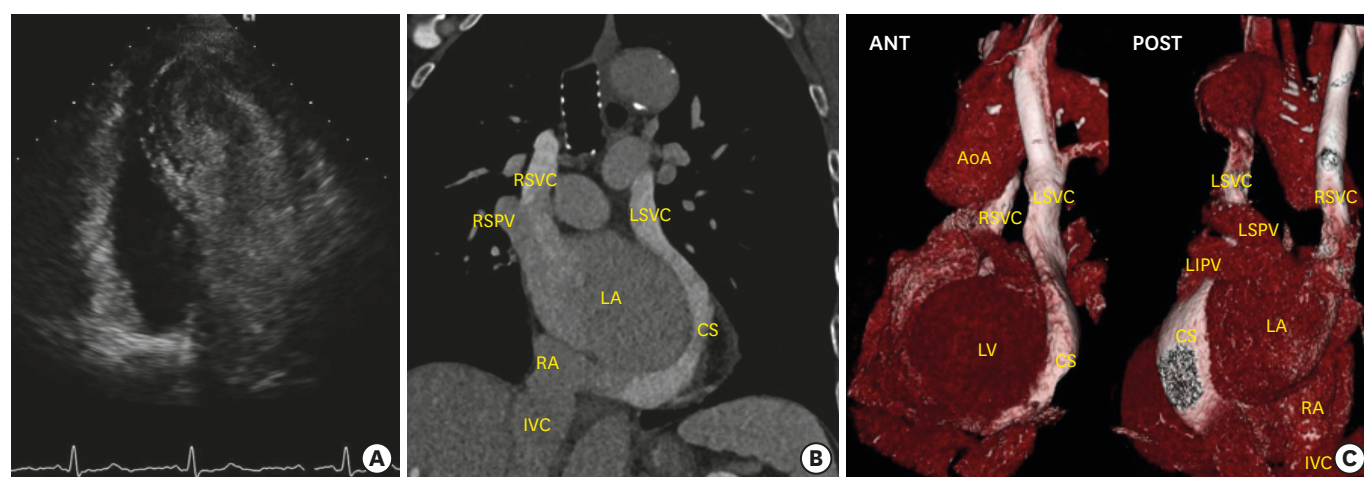


Figure 1. Echo bubble study (A): only the left cavities are filled after AS injection through the right arm, underscoring a RLS. 2D and 3D rendering CT images (B and C): persistent LSVC drains into the RA through the CS. RSVC drains into the LA, causing RLS. AoA = ascending aorta (partially cut); CS = coronary sinus; IVC = inferior vena cava; LA = left atrium; LIPV = left inferior pulmonary vein; LSPV = left superior pulmonary vein; LSVC = left superior vena cava; LV = left ventricle; RA = right atrium; RLS = right-to-left shunt; RSPV = right superior pulmonary vein; RSVC = right superior vena cava.

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Conflict of Interest

The authors have no financial conflicts of interest.

Data Sharing Statement

The data generated in this study is available from the corresponding author upon reasonable request.

Author Contributions

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In conclusion, the anomalous RSVC drainage was suspected, in addition to the persistent LSVC, thanks to the AS injection also in the right arm, underscoring the importance of routinely performing echocardiographic bubble study through both sides. Written informed consent was obtained from the patient in **Figure 1**.

SUPPLEMENTARY MATERIAL

Supplementary Video 1

Echocardiography bubble study performed with AS injection through the right antecubital vein showing only the left cavities microbubbles filling, proving the existence of RLS.

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