





## Persistent Left Superior Vena Cava

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A 63-year-old man with no significant past medical history presented with epigastric pain. Physical examination was unremarkable except for a cardiac murmur heard at the left sternal border. Laboratory data including complete blood count, electrolytes, amylase, and lipase were within normal limits except for a brain natriuretic peptide value of 614 pg/mL (normal <100 pg/mL). Transthoracic echocardiography showed a markedly dilated right atrium (RA) and coronary sinus (CS) (Figure 1). Because persistent left superior vena cava (PLSVC) was suspected, agitated saline bubble contrast was injected into the left antecubital vein. The saline bolus appears in the CS before being seen in the RA (Supplemental Video 1). A second bolus of saline bubble contrast injected into the right antecubital vein appeared in the

RA and right ventricle (RV) alone (Supplemental Video 2). Magnetic resonance angiography of the chest with gadolinium enhancement showed a persistent left superior vena cava (arrow) leading into the coronary sinus (Figure 2).

Persistent left superior vena cava (PLSVC) occurs when the left superior vena cava (LSVC) fails to regress during fetal development. Venous blood from the left upper extremity returns to the heart via the coronary sinus. In a small number of cases, PLSVC drains into the left atrium through the pulmonary veins. The recognition of PLSVC is important when procedures using a left venous approach to the heart, such as a pacemaker or implantable cardioverter defibrillator placement, or right heart catheterization are contemplated. If



**Figure 1.** Transthoracic echocardiography apical 4-chamber view. The right atrium (RA) is markedly enlarged. A dilated coronary sinus (CS) is present. The right ventricle (RV) and left ventricle (LV) have normal dimensions. The left atrium (LA) is compressed between the CS and RV.



**Figure 2.** Gadolinium-enhanced chest magnetic resonance angiogram. A persistent left superior vena cava (arrow) is seen leading into the coronary sinus.

PLSVC is unrecognized, catheter manipulation in the coronary sinus may result in cardiac arrhythmia, cardiogenic shock, cardiac tamponade, or coronary sinus thrombosis.

#### **Disclosure statement**

The authors report no conflicts of interest. The authors alone are responsible for the writing and content of this article.