



Multi-modality Imaging of Persistent Left Superior Vena Cava in Patients with Sinus Venosus Type of Atrial Septal Defect and Partial Pulmonary Venous Return

ABSTRACT

Sinus venosus type atrial septal defects (ASD) are a rare subtype of ASD. These defects commonly coexist with a partial anomalous pulmonary venous return. However, the association between sinus venosus type ASD and persistent left superior vena cava is scarcely documented in the literature. We present a case of a 30-year-old woman who reported weakness and shortness of breath. A transthoracic echocardiogram indicated right heart chamber dilatation and an enlarged coronary sinus. Subsequent transesophageal echocardiography with 2D and 3D views, computed tomography, and right cardiac catheterization confirmed the coexistence of a persistent left superior vena cava, sinus venosus type of atrial septal defect, and partial anomalous pulmonary venous return.

Keywords: Atrial septal defect, echocardiography, pulmonary venous return anomaly

Atrial septal defects (ASD) are communications between the atria resulting in blood shunting from the left to the right side of the heart. Sinus venosus atrial septal defects are the second rarest of the four ASD types, surpassed only by secundum ASD (1). These defects often coexist with partial anomalous pulmonary venous return due to their embryonic origin. A duplicated superior vena cava, also known as a persistent left superior vena cava, occurs in approximately three out of 1,000 individuals and is typically benign (2). The concurrent presence of a persistent left superior vena cava and sinus venosus atrial septal defects is infrequently reported in the literature, and although its exact prevalence in the general population is unknown, it is believed to be rare (3).

CASE REPORT

A 30-year-old woman presented to the outpatient clinic with complaints of weakness and progressive shortness of breath over the past 6 months. She has a healthy child and experienced an uncomplicated pregnancy. She reported no known illnesses and denied taking any medication. Furthermore, she had no cardiovascular risk factors such as smoking or alcohol consumption.

A cardiovascular examination revealed a soft 2/6 systolic murmur in the left second intercostal space. No S3, S4, or rub was detected. Her vital signs included a blood pressure of 110/70 mm Hg, heart rate of 75 beats per minute, respiratory rate of 15 breaths per minute, O2 saturation of 98% on room air, a weight of 70 kg, and a body mass index of 26 kg/m². An electrocardiogram showed a normal sinus rhythm and an incomplete right bundle block. Basic laboratory tests were within normal limits. The transthoracic echocardiogram displayed an enlarged coronary sinus, right atrium, and ventricle, with a systolic pulmonary pressure of 33 mm Hg. We opted for a transesophageal echocardiography (TEE) to further investigate the right-side enlargement. The TEE showed a dilated coronary sinus (Figure 1) and a persistent left superior vena cava, demonstrated by agitated saline injection through the left antecubital vein. A superior sinus venosus atrial defect measuring 11 mm was identified and visualized using a three-dimensional view (Figure 2). With TEE imaging, we visualized all the pulmonary veins except the right superior pulmonary vein. The defect was

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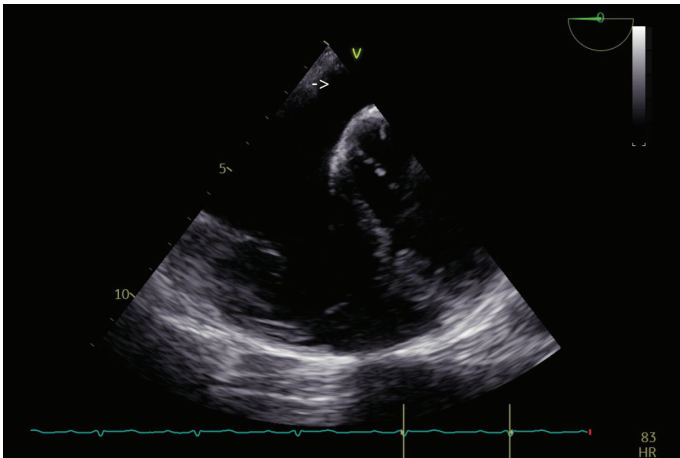


Figure 1. Transesophageal echocardiography shows a dilated coronary sinus (arrow).

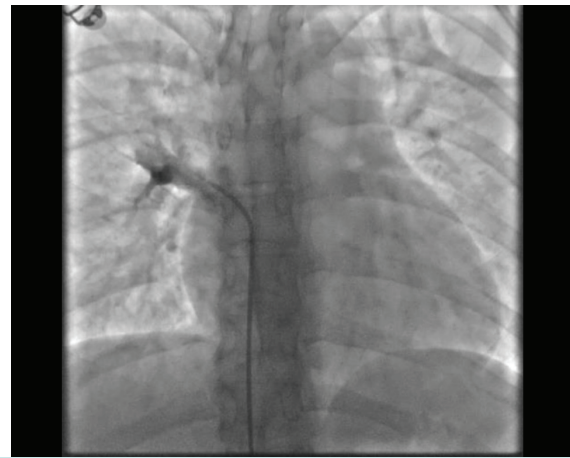


Figure 4. The connection between the right atrium and the right upper pulmonary vein is shown by right heart catheterization.

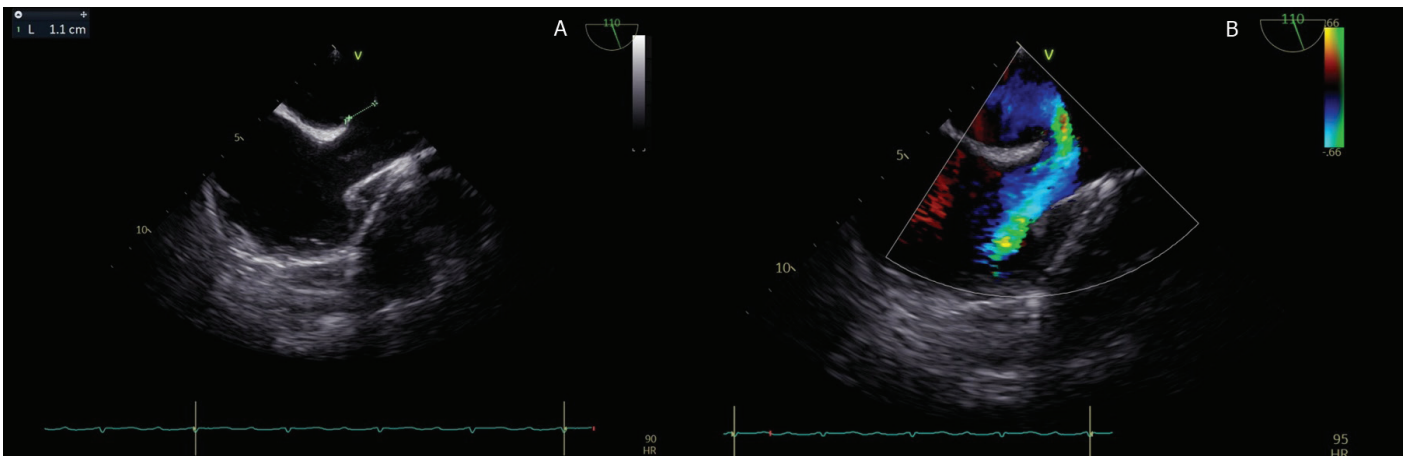


Figure 2. A. Bicaval view shows the defect size. B. Color Doppler shows the sinus venosus type ASD in the TEE image.

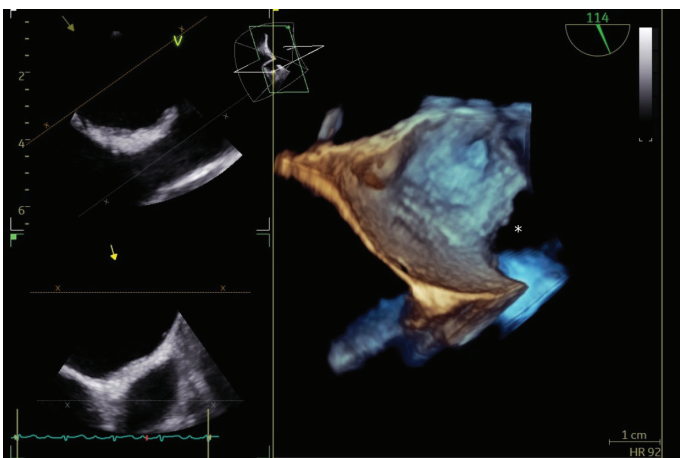


Figure 3. The 3D transesophageal echocardiography view shows the superior sinus venosus atrial defect (*).



Figure 5. Computed tomography shows a partial pulmonary venous return anomaly.

further illustrated in the 3D TEE view (Figure 3). We then proceeded with right cardiac catheterization and planned for pulmonary vein imaging via computed tomography. The findings included a dilated coronary sinus, sinus venosus type atrial septal defect, and partial

anomalous pulmonary venous return (Figure 4). We recorded a QP/QS of 1.9, a systolic pulmonary pressure of 35 mm Hg, and a pulmonary vascular resistance of 1.4 Wood units. The connection between the right superior pulmonary vein and the right atrium, indicating

a partial anomalous pulmonary venous return, and a persistent left superior vena cava were validated using computed tomography (Figure 5). The case was discussed among our cardiology team, and cardiac surgery was recommended.

Informed Consent: Written informed consent was obtained from the patient for the publication of the case report and the accompanying images.

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