

## Answer to Quiz: Echo imaging on page ... and case discussion

Correct answer is B.

In our case, a round intrapericardial structure was visualized in parasternal long-axis view on transthoracic echocardiography (TTE) incidentally during preoperative evaluation (Fig. 1). We suspected this structure to be a dilated coronary sinus (CS) or descending aorta. Dilated CS was shown on TTE, posteriorly tilted modified 4-



Figure 1. The dilated coronary sinus (asterisk) in the parasternal long-axis view (transthoracic echocardiography)

Further evaluation was done by agitated saline injections from right and left antecubital veins, respectively (Fig. 3, AB). Right atrium was the first chamber opacified with right arm injection. We notified opacification first in the CS followed by right atrium during left arm injection. There were no echocardiographic findings for the moderate to severe tricuspid regurgitation, pulmonary hypertension or right ventricular dysfunction. Further examination with transesophageal echocardiography (TEE) also revealed a dilated CS (Fig. 4, Video 1,2) with intact interatrial

chamber image (Fig. 2). Apparent inter-atrial shunt or significant valvular disease was not detected. A persistent left superior vena cava (PLSVC) should be suspected when a dilated CS is identified via TTE.

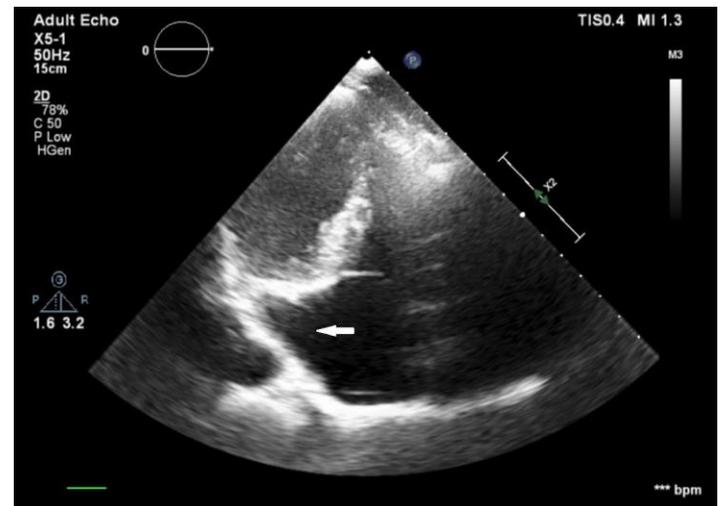


Figure 2. The dilated coronary sinus (arrow) in the posteriorly tilted apical 4-chamber view (transthoracic echocardiography)

septum, tricuspid aortic valve and normal pulmonary vein opening to left atrium.

Coronary sinus is the main vein of the cardiac venous system. This tubular structure with 1 cm caliber runs in the posterior atrioventricular groove and its length varies between 3-5.5 cm (1, 2). TTE apical 4-chamber view with posterior angulation is the frequently used window for CS evaluation (3) but others such as apical 2-chamber, right ventricular inflow views are also possible (4).

**Address for Correspondence:** Zehra Ilke Akyildiz, Izmir, Turkey Email: ziakyildiz@hotmail.com

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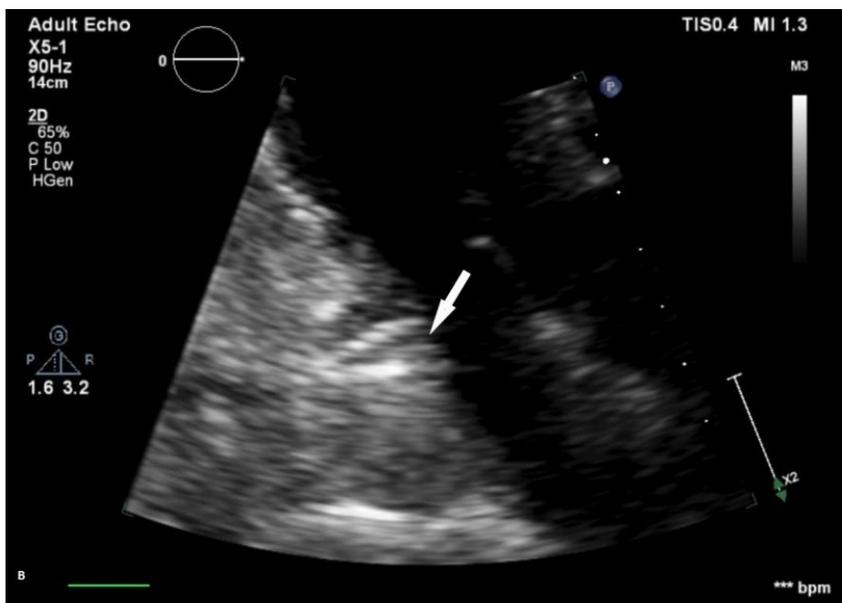


Figure 3. A) A zoomed image of the dilated coronary sinus (asterisk) before left arm agitated saline injection; B) A zoomed image of the dilated coronary sinus (arrow) during left arm agitated saline injection

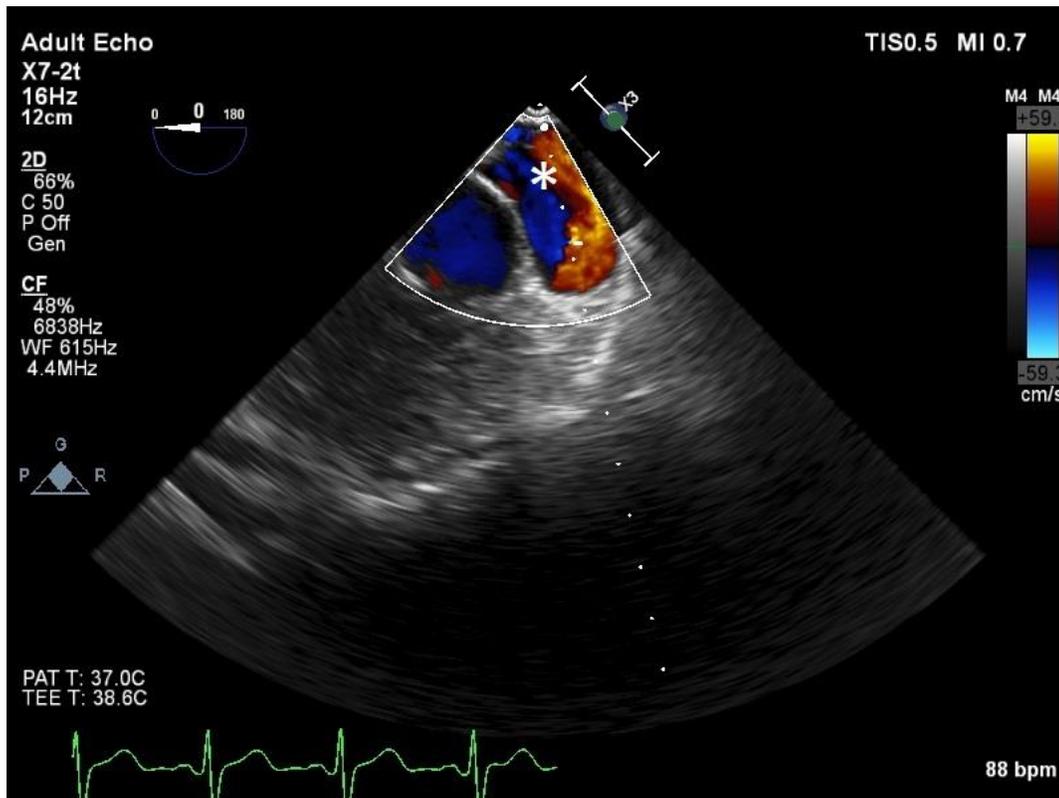


Figure 4. Transesophageal echocardiography: lower esophageal view showing blood flow in a dilated coronary sinus (asterisk)

Video 1. Echocardiographic views of dilated coronary sinus

Video 2. Echocardiographic views of dilated coronary sinus

A dilated CS is a rare echocardiographic finding. Apart from thoracic vein abnormalities, right ventricular dysfunction, pulmonary hypertension, moderate to severe tricuspid regurgitation and high right atrial pressure are main causes of it (5).

PLSVC is the most common thoracic vein abnormality, which has a prevalence rate of 0.5% in the absence of other congenital cardiac disease and 3–10% when associated with other cardiac defects (6). In more than 90% of cases right and left superior vena cava both, exist (7). The absence of right superior vena cava usually complicates the picture with other cardiac abnormalities such as atrial septal defect, ventricular septal defect, bicuspid aortic valve, etc. (5).

Distal opening site of PLSVC shows some variability. It drains into the right atrium in 80–90% of cases but left atrial, hepatic vein or inferior cava connections are also possible (7).

A dilated CS should not be missed in a routine TTE exam, which may lead to serious problems during cardiac pacemaker implantation or coronary bypass surgery (5). Therefore, incidental detection of a dilated CS in TTE should prompt further investigation with agitated saline injection and also multi-slice computed tomography with angiography to confirm the suspected diagnosis of PLSVC and to rule out other abnormalities, such as an atrial septal defect, coarctation of the aorta, and anomalous pulmonary venous return.

Zehra Ilke Akyildiz<sup>1</sup>, Oben Baysan<sup>2</sup>

<sup>1</sup>Private Cardiology Clinic, İzmir, Turkey

<sup>2</sup>Güven Hospital, Ankara, Turkey

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Carpathian Mountains: Snow and Sun, Ukraine, December 2020. Uliana Pidvalna, Lviv, Ukraine.