Sixty-one years old man came to our hospital due to progressive dyspnea. The physical examination revealed left parasternal heaving, loud P2, pansystolic murmur grade III/IV at left lower sternal border with increasing intensity during inspiration, compatible with tricuspid regurgitation (TR) with pulmonary hypertension (PHT). Transthoracic echocardiography (TTE) demonstrated dilated right ventricle (RV) and right atrium (RA), severe TR, RV systolic pressure 70 mmHg. No atrial septal defect (ASD) was detected. TTE findings were compatible with volume overload of right heart. However, sensitivities of 92% to 100% have been reported for detection of ASDs by TTE (1,2).

Transesophageal echocardiography (TEE) has proved to be superior to transthoracic study in adult patients for detecting small ASD, sinus venous defects and anomalous pulmonary venous return that could be the cause of dilated RA and RV chambers in this patient (3,4). TTE showed sinus venosus ASD at the opening of superior vena cava to RA with bidirectional shunt flow (Figure 1, 2). Anomalous pulmonary venous drainage should be established because it found in more than 80% of patients with sinus venous defect (5). Right upper pulmonary vein connecting to the SVC was demonstrated from transesophageal examination (Figure 3). The patent foramen ovale (PFO) was detected incidentally (Figure 4). In conclusion, the diagnosis was sinus venosus ASD, partial anomalous pulmonary venous drainage and PFO.

**Figure 1.** TEE, 90-degree bicaval view showed atrial septal defect at the entrance of SVC to RA, compatible with sinus venosus defect (*). RA, right atrium; LA, left atrium; SVC, superior vena cava.

**Figure 2.** Doppler color TEE with simultaneous biplane imaging, 90-degree midesophagus, showed sinus venosus ASD (*). Bidirectional shunt flow was demonstrated. RA, right atrium; LA, left atrium; SVC, superior vena cava; PA, pulmonary artery.
**References**


**Figure 3.** TEE, 0-degree mid-esophagus, just above left atrium. Right upper pulmonary vein connecting to superior vena cava in figure 3-B compare to normal anatomical relationship of aorta, superior vena cava and right upper pulmonary vein in figure 3-A. Ao, aorta; SVC, superior vena cava; RUPV, right upper pulmonary vein; RPA, right upper pulmonary artery.

**Figure 4.** TEE, 75-degree midesophagus showed patent foramen ovale with bidirectional shunt flow. RA, right atrium; LA, left atrium; PFO, patent foramen ovale.