Inferior sinus venosus type atrial septal defect (ASD) is rare and difficult to depict by transthoracic echocardiography (TTE) because of its infero-posterior location of the fossa ovalis. So, this defect is frequently missed with conventional TTE views. We report a case of 19-year-old man with inferior sinus venous type ASD from the clue only from slight diastolic flattening of interventricular septum and mild pulmonary hypertension (PH).

**CASE**

A 19-year-old man without any specific past medical history came to the clinic, complaining of dyspnea on exertion for 4 years. He visited several hospitals before, but they couldn’t find out the cause of his symptoms. His symptom has been aggravating for the recent 3 months. An electrocardiogram showed normal sinus rhythm and QRS axis.

TTE showed no specific findings except mildly dilated right atrium and ventricle and slight diastolic flattening of interventricular septum and mild pulmonary hypertension (PH).

Although mPAP showed mild PH, we recommended the right heart catheterization to determine the cause of symptom. It demonstrated significant oxygen step-up between superior vena cava and inferior vena cava (oxygen saturation of superior vena cava: 73.2%, inferior vena cava: 89.7% and main pulmonary artery: 84.9%), increased pulmonary blood flow (Qp/Qs=1.8) and increased mPAP (26 mmHg). To find out the site of the shunt, we performed the transesophageal echocardiography (Fig. 3). It confirmed an inferior sinus venous type ASD. ASD patch closure operation was performed for...
symptomatic hemodynamically significant left to right shunt (Fig. 4). The patient tolerated the operation and had an uneventful recovery.

**DISCUSSION**

Generally, sinus venosus type ASD is a rare cardiac abnormality in adults. In General, the patient may remain asymptomatic and undiagnosed until the fourth decade of life when clinical signs and symptoms of pulmonary hypertension may develop. And pulmonary hypertension and increased pulmonary vascular resistance occur at an earlier age in patients with a sinus venosus defect than other types of ASD and are clearly related to NYHA functional class. And these defects are frequently missed, and too difficult to visualize with conventional two-dimensional echocardiography views. Although not taking in this case, agitated saline contrast occasionally maybe helpful to detect left to right shunt even in TTE.

TRV is usually the primary method for determining actual pulmonary pressure. However, TRV usually varies with respiration and was occasionally confused with high velocities.
from aortic stenosis or mitral regurgitation. Although slight diastolic flattening of interventricular septum was observed at two dimensional view, TRV showed within normal range in this case. Because TRV has many caveats like this case, we should evaluate alternative methods such as simplified Mahan’s equation in the case of clinically suspected PH. Nonetheless, RVOT AT using simplified Mahan’s equation is not perfect and can be dependant on cardiac output and heart rate. Disappointingly, this case showed such discrepancy (about 9.6 mmHg) between mPAP from simplified Mahan’s equation and mPAP through right heart catheterization. So, right heart catheterization would be often required to confirm the presence of PH, establish the specific diagnosis, and determine the severity of PH.

Actually our patient had taken a long time to diagnosis. In this case, we found the clue only from slightly diastolic flattening of IVS because mildly dilated right ventricle and atrium are usually common findings in the pediatric and teen ages. Therefore, when encountering a patient with unexplained dyspnea on exertion, physicians and sonographers should have a clinical suspicion of PH and should not overlook a subtle clue which may lead to find an critical diagnosis for the patient.

REFERENCES