# Multi-Fenestrated Atrial Septal Defect: Value of 3D Transesophageal Echocardiography for Diagnosis and Guidance in Percutaneous Closure

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Female patient, aged 60, diagnosed with ostium secundum type atrial septal defect (osASD) with left to right shunt, Qp/Qs 2:1, dilated right heart chambers, and pulmonary hypertension (45 mm Hg), with symptomatic dyspnea. Transesophageal echocardiography estimated the ASD diameter in 20 mm, with an edge > 4 mm around the entire circumference, except for the aortic area. Percutaneous closure of ASD was indicated. The procedure was performed with the assistance of the three-dimensional transesophageal echocardiography (3D TEE), which determined the presence of ASD with multiple fenestrations (Figures 2A and B), which the 2D TEE had failed to show. At the same time, an improved definition of the edge and diameter of the septal defect was achieved, which was estimated in 26 mm, greater than that provided by 2D TEE and similar to that estimated by hemodynamics (28 mm). The 3D TEE was very useful during the procedure, because it accurately identified which of the ASD holes was crossed in each time (Figures 3A and B), and thus it allowed to choose the larger diameter hole in which the occluder would finally be released.

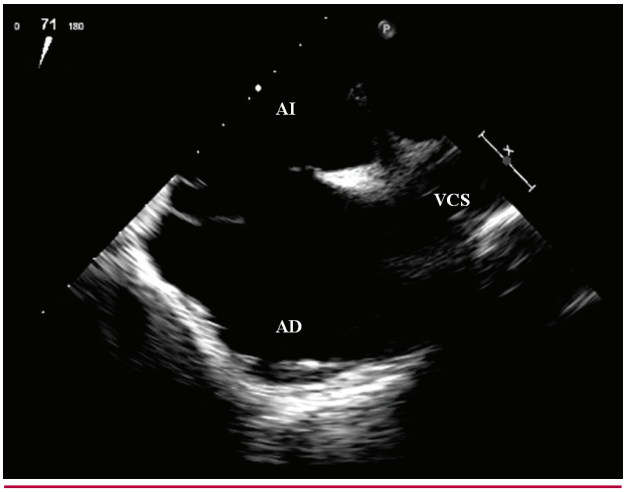


**Fig. 1.** Bi-dimensional transesophageal echocardiography, midesophagus view at 70°, where the ASD is visible. LA: Left atrium. RA: Right atrium. SVC: Superior vena cava.

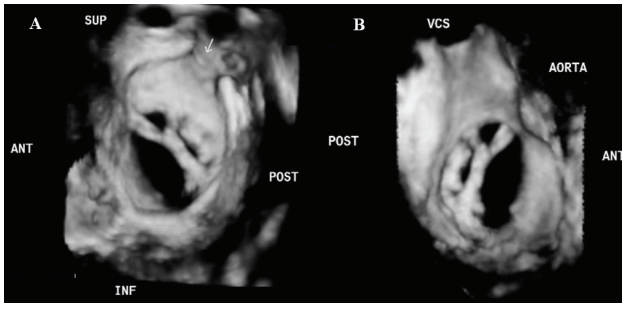


**Fig. 2.** Three-dimensional image of the atrial septum (IAS). **A.** The IAS viewed from the left atrium; note that this is a multifenestrated ASD. The arrow indicates the entrance of the right superior pulmonary vein into the left atrium. **B.** The ASD viewed from the right atrium; note the absence of edge at the level of the aorta. SVC: Superior vena cava. ANT: Anterior. POST: Posterior. SUP: Superior. INF: Inferior.midesophagus view at 70°, where the ASD is visible. LA: Left atrium. RA: Right atrium. SVC: Superior vena cava.

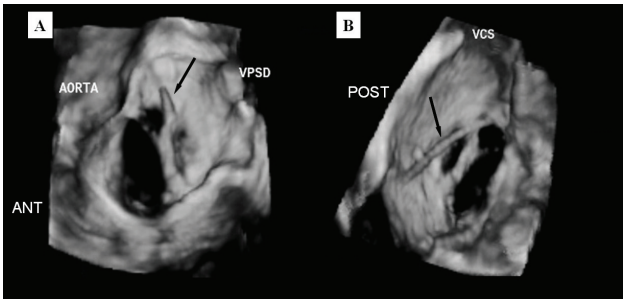


**Fig. 3. A.** The ASD from the left atrium. **B.** ASD from the right atrium. The arrows show the device guidewire crossing one of the small ASDs. RSPV: Right superior pulmonary vein. SVC: Superior vena cava. ANT: Anterior. POST: Posterior.

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