

# CARDIOVASCULAR IMAGES

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## Secundum Atrial Septal Defect (ASD)

Carlos Rojas, MD, Amer Johri, MD, Mark Weinfeld, MD, and Wilfred Mamuya, MD, PhD

### Clinical History

A 47-year-old man with a history of premature ventricular contractions (PVCs) and fixed splitting of his second heart sound (S2) on physical exam underwent a transthoracic echocardiogram (TTE) to assess for underlying structural heart disease. His TTE was notable for mild right atrial (RA) enlargement, moderate right ventricular (RV) dilatation, and the presence of an atrial septal defect (ASD) by color-flow, Doppler interrogations, and observations following the injection of agitated saline. A subsequent evaluation with a transesophageal echocardiogram (TEE) confirmed the presence of a secundum type ASD. However, turbulent flow was noted entering the left atrium superior and posterior to the ASD, which was presumed to be secondary to right pulmonary vein compression by an enlarged right pulmonary artery. A cardiac CT was recommended prior to endovascular closure, in order to further delineate these findings.

### Findings

Cardiac CT confirmed the presence of a secundum ASD (Figure 1, 2, 3, 4) and enlarged right sided chambers, while excluding other associated structural anomalies. Furthermore, the spatial resolution of cardiac CT allowed for measurements of the anterior-superior rim, which revealed that the secundum ASD was amenable to percutaneous closure. An additional bonus was the exclusion of coronary artery disease. The entire study was performed with a total radiation exposure of only 2.2 mSv.

### Discussion

Uncomplicated ASDs are one of the most common congenital heart anomalies, representing up to 15% of all cases in children<sup>1</sup>, and secundum ASDs represent about 70% of all defects in the atrial septum<sup>2</sup>. Cardiac ultrasound is the primary imaging modality for the diagnosis, morphologic assessment and follow-up of patients with ASDs. Knowledge of the size, location and associated abnormalities is critical for providing information for planning of surgical or percutaneous procedures. Cardiac CT has desirable imaging characteristics including rapid acquisition, wide field of view, and low radiation exposure; and is a complementary modality in patients in which ultrasound images are limited, or when associated anomalies are suspected<sup>3</sup>.

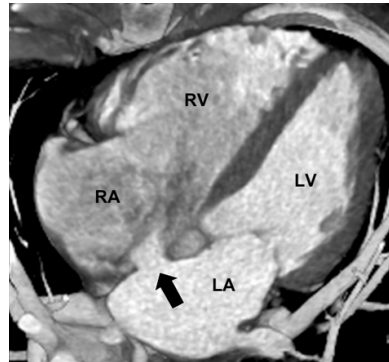


Figure 1.

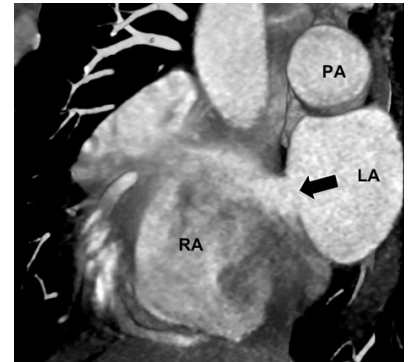


Figure 2.

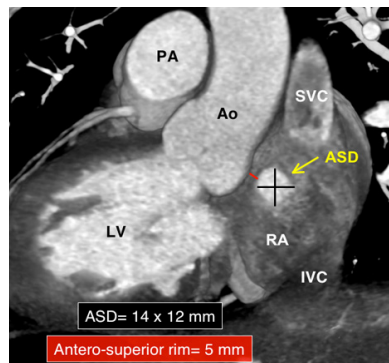


Figure 3.

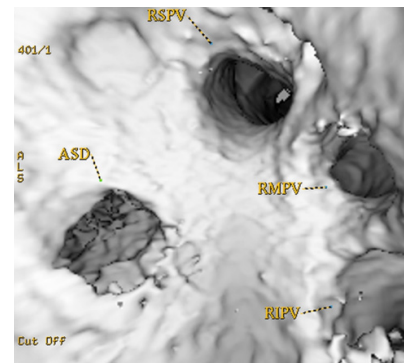


Figure 4.

**Figure 1:** Four-chamber view demonstrates a large defect in the mid inter-atrial septum, consistent with a large secundum type ASD (arrow). Notice the enlargement of the right-sided chambers secondary to chronic volume overload.

**Figure 2:** Coronal oblique image demonstrates a large defect in the mid inter-atrial septum consistent with a large secundum type ASD (arrow).

**Figure 3:** Sagittal oblique image demonstrates a secundum type ASD measuring 14 x 12 mm with sufficient antero-superior rim for potential percutaneous closure. No associated anomalies were identified.

**Figure 4:** Endoscopic "fly-through" view of the left atrium shows the relationship of the ASD to the right superior pulmonary vein (RSPV), the right middle pulmonary vein (RMPV), and the right inferior pulmonary vein (RIPV).

### REFERENCES

1. Freidberg CK: Diseases of the Heart. Philadelphia, WB Saunders, 1966
2. Hurst JW: The Heart. New York, McGraw Hill, 1978
3. Rajiah P et al. Computed tomography of septal defects. JCCT 2010; 4:231-245