Chapter 38
Device Closure of Multi-Fenestrated Atrial Septal Defect

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Abstract Atrial septal defects (ASD) are categorized into ostium primum, ostium secundum, sinus venosus, and coronary sinus types with the secundum type being the most prevalent form. ASD should be repaired once diagnosed to prevent progressive right ventricular enlargement and volume overload. With the advances in the field of structural heart disease interventions and advent of new occluder devices many secundum type ASDs are amenable to catheter closure. The major limitations of the percutaneous method are insufficient rims, multiple ASDs and highly aneurysmal atrial septum. However new devices have been developed for closure of the multi-fenestrated or "Cribriform" defects that help the patients benefit from a less invasive repair method. Here we present a patient with multiple defects successfully managed by catheter intervention.

History and Clinical Presentation

A 31-year-old female presented with recent onset palpitation and mild exertional dyspnea. Past medical history was negative and she had no history of drug use. Physical examination was normal except for wide fixed splitting of the second heart sound in cardiac auscultation.

Para-Clinic Assessment

Twelve lead ECG showed normal sinus rhythm with incomplete right bundle branch block and T wave inversion in V2–V3 precordial leads. Chest X-ray depicted evidence of right ventricular (RV) enlargement and pulmonary overflow.

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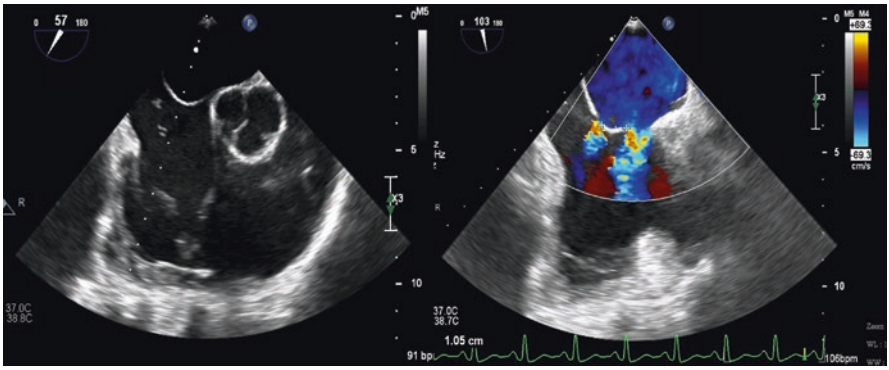

Fig. 38.1 Two-dimensional and color Doppler TEE views showing aneurysmal IAS with multiple defects in different echocardiographic planes

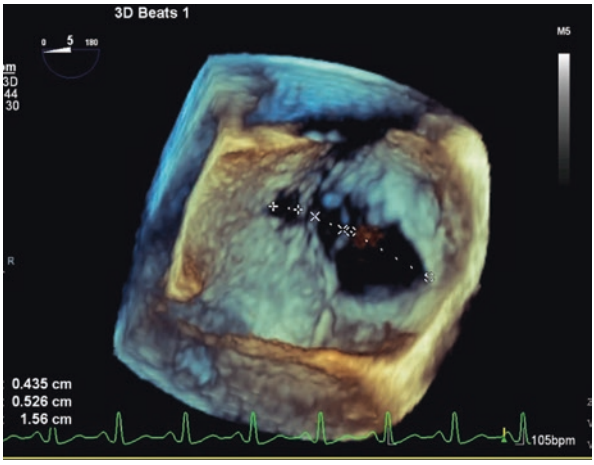

Fig. 38.2 Three-dimensional echocardiography image of multiple ASDs

Transthoracic and transesophageal (TEE) echocardiography was performed that showed moderate RV enlargement with normal RV systolic function, mildly increased pulmonary arterial pressure(40 mmHg), aneurysmal interatrial septum (IAS), and multiple secundum type ASDs (three defects measuring 16, 7, and 5 mm) with significant left to right shunt. IAS was redundant and aneurysmal (Figs. 38.1 and 38.2).

Management

Cardiac catheterization and hemodynamic assessment showed significant left to right shunt and a Qp/Qs: 2.9:1. Under TEE guidance a superstiff guidewire was passed through the most central defect and a dedicated Figulla® Flex II UNI 33 mm Occlutech device was deployed with good final results. Intra-procedural TEE showed that all the defects were covered by the device (Figs. 38.3 and 38.4).

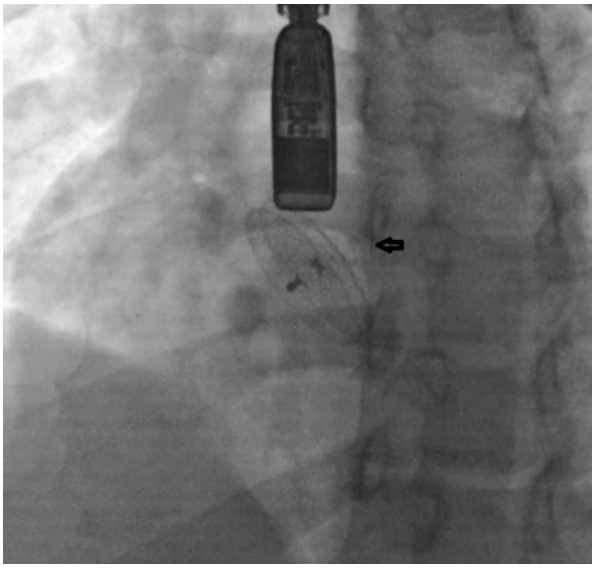

Fig. 38.3 Fluoroscopic image showing implanted occlude device

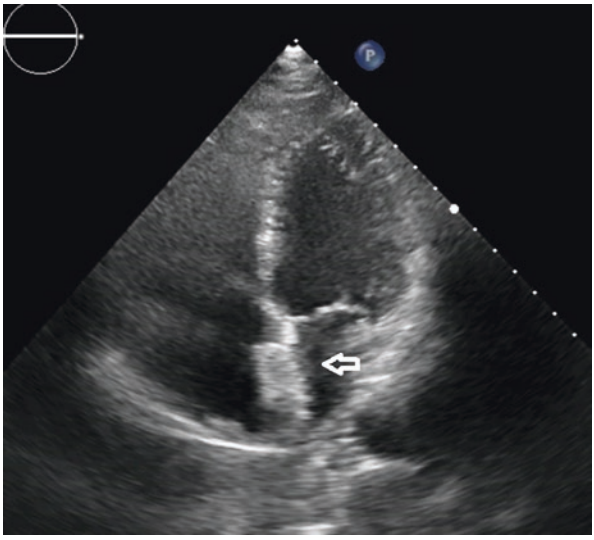

Fig. 38.4 Post-procedural echocardiography showing the occlude device on IAS (arrow)

Conclusion

Transcatheter device closure of multiple secundum ASDs that was once considered an indication for surgical repair is evolving. Various methods including covering all the defects by an oversized device, use of two separate devices, or dedicated devices for cribriform IAS has been carried on with satisfactory results. Three-dimensional (3D) echocardiography facilitates the definition of the IAS and defect anatomy as well as planning of the procedure and guiding the device deployment [1–3].

References

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