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Value of Real – Time Three – Dimensional Transesophageal Echocardiography in Assessment and Percutaneous Closure of Multiple Atrial Septal Defects

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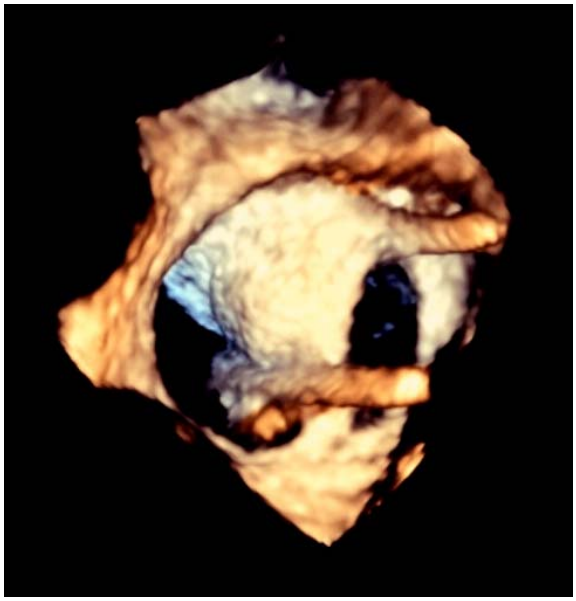

Introduction: Evaluation and percutaneous closure of multiple or multifenestrated atrial septal defects (ASDs) can often be challenging under conventional two – dimensional transesophageal echocardiographic (2DTEE) guidance. Real – Time Three Dimensional Transesophageal Echocardiography (RT3DTEE) is a recently introduced technique, capable of real-time three-dimensional imaging with no need for multiple – beat acquisition with ECG gating and off-line processing. It is particularly useful for guidance of percutaneous procedures, when detailed information regarding number, size, shape and spatial relationships of multiple ASDs is required and when locating guidewires and catheters and assessing multiple device position are essential.

Methods: We performed RT3DTEE in 8 patients (5 females, age range 12-63 years) undergoing cardiac catheterization for percutaneous closure of ASDs. Of them, 6 had a previous transthoracic echocardiographic diagnosis of multiple or multifenestrated ASDs.

Results: RT3DTEE provided detailed *en-face* views of the atrial septum on both sides and thorough information regarding size, shape and spatial arrangement of the defects. It showed a multifenestrated/cribrous-type defect in 2 patients, and multiple sizeable ASDs in the remaining 6. The atrial septum appeared aneurysmal in 5 patients. Three patients, due to deficient margins and excessive size of the defects, were deemed unsuitable for percutaneous treatment, and referred for surgical closure. Surgical exploration confirmed RT3DTEE findings in both. Five patients underwent successful transcatheter closure of the ASDs, in 3 cases with a single large device, and with two devices in 2 cases. RT3DTEE enabled accurate location of guidewires, sizing balloons and catheters when crossing the defects, ensuring correct choice and placement of the devices. In the cases where two devices were used, RT3DTEE provided information on their arrangement and relationship with surrounding structures.

Conclusions: Our preliminary data show that RT3DTEE is a feasible and accurate technique that provides reliable information and guidance during transcatheter closure of multiple ASDs, overcoming many of the limitations of 2DTEE in managing this complex type of defects.