Closing Atrial Septal Defects in Adults Older Than 60 Years

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Atrial septal defects (ASDs), allowing blood to directly communicate between systemic and pulmonary arterial circulations at the atrial level, are among the most common congenital cardiac anomalies seen in the adult population. The degree of shunting across an ASD is directly related to the area of the ASD and inversely related to the compliance of the combined atrial-ventricular chambers on either side of the heart. Under normal physiological conditions, there is net left-to-right shunting across an ASD, as the left ventricle is far less compliant than the right ventricle. This shunt of fully oxygenated blood back to the right atrium results in a volume load to the right-sided heart chambers and to the pulmonary vasculature; if left untreated, large-volume left-to-right shunting can result in atrial arrhythmias, right ventricular diastolic and systolic failure, worsened functional class, decreased exercise capacity, left ventricular diastolic failure, and, uncommonly, development of pulmonary arterial hypertension.

The indication to treat an ASD is typically related to its hemodynamic significance and its effects on the right ventricle. National care guidelines denote ASD closure with class IA recommendation in patients with evidence of right ventricular volume overload without other etiology (reflecting large-volume left-to-right shunting). The beneficial effects of ASD closure include positive right and left heart remodeling, improvement in symptoms, increase in exercise capacity, reduction in tendency to development of atrial arrhythmias, and decrease in both pulmonary infections and pulmonary arterial pressures. Furthermore, when comparing a catheter-based approach with ASD closure with a surgical approach, transcatheter closure may offer more rapid improvement in right ventricular remodeling and differences in periprocedural morbidity.

Most of the data surrounding the beneficial effects of catheter-based ASD closure have been demonstrated in either the pediatric or young adult population. Concern can be raised that the extent to which the right ventricle and pulmonary vasculature may positively remodel after ASD closure may be inversely related to both the extent and duration of past hemodynamic insult. In addition, there may be striking differences in the physiological presentation of elders with significant ASDs as contrasted to their more youthful counterparts: in elders, the determinants of left-to-right shunting may be based more on acquired abnormalities (systemic arterial and left atrial and ventricular dysfunction) than on normal differences in right- and left-sided cardiac capacitance and compliance. These effects of atherosclerosis of both the coronary and the peripheral vasculature, systemic arterial hypertension, hyperlipidemia, altered glucose metabolism, and aging may lead to diastolic and systolic cardiac changes that may persist or even worsen after ASD closure.

Whether ASD closure in elderly patients with other comorbidities allows the same beneficial affects on structural remodeling and symptomatic improvement as seen in the pediatric and young adult population and whether removal of a communication that may serve to decompress left atrial pressure is of benefit in older patients has largely remained unknown.

Until recently, there have been few data regarding the beneficial effects of ASD closure in patients older than 60 years of age. Despite being limited by its single-center, nonrandomized, retrospective nature, the study by Jategaonkar et al is the largest published analysis of catheter-based ASD closure in patients older than 60 years. The study assessed 96 patients older than 60 years who underwent transcatheter ASD closure and demonstrated limited but significant [mean 1 to 2 mL/kg per min increase in peak oxygen consumption (MVO₂)] improvement in exercise capacity (particularly in patients with preclosure Qₚ/Qₛ >2), postclosure reduction in right ventricular enlargement as measured by transthoracic echocardiography, and reduction in New York Heart Association functional class. The improvement in pulmonary arterial pressure was nonsignificant; however, the baseline pressure was at the upper limit of normal. Of note, however, nearly 20% (16 of 88) of patients who did not have preprocedural recognition of atrial fibrillation developed atrial fibrillation within 3 months of device ASD closure. Longer-term assessment of neurohormonal activation, clinical dyspnea, functional capacity, presentation to clinician for dyspnea or hospitalization rates, and morbidity due to atrial fibrillation was not performed.

In conclusion, this study corroborates other smaller studies and suggests that catheter-based ASD closure in the elderly can be performed in safe procedural fashion, may result in extremely short-term improvement in certain measured indices, and may also be associated with high rate of recognized postprocedural atrial fibrillation. The longer-term impact on life-important measures in this and all age groups largely remains unknown and awaits analyses by orchestrated regist...
tries, such as National Cardiovascular Data Registry: Improving Pediatric and Adult Congenital Treatment (NCDR-IMPACT),\(^1\) that assess interventions in adults with congenital heart disease. As clinicians still must decide on best options for older patients presenting with ASD and significant left-to-right shunting, we continue to advocate first taking steps to reduce acquired cardiovascular conditions that impact on such, by reducing body mass index, increasing exercise conditioning, maximally treating atherosclerotic risks, reducing cholesterol, improving glycemic control, and optimizing systemic blood pressure and total body salt and volume. If attempt at these interventions fails to sufficiently eliminate symptomatology, we then advocate consideration of transcatheter closure of ASD. As increasing longer-term data assessing outcomes of ASD closure in this older population become available, the appropriate place and timing of ASD closure in the elderly will become clearer.

**Disclosures**

Drs Landzberg and Martucci have been involved in research trials using various septal closure devices and clinically implanted septal defect closure devices manufactured by NMT Medical Inc and AGA Medical Corporation.

**References**


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