Not too old to be closed...

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The population of adults with congenital heart disease has dramatically increased. Atrial septal defect (ASD) is the most common lesion (20 to 30%) in adults; 80% is a secundum ASD. Many patients with isolated ASD are diagnosed in adulthood because most children with ASD are free from overt symptoms. Diagnosis is often accidental. Clinical symptoms including palpitations, exertional dyspnoea, and fatigue are frequently observed beyond the fourth decade. Life expectancy is overall reduced but survival is much better than reported in early studies. With increasing age, pulmonary arterial pressures (PAP) usually increase and atrial arrhythmias become more common. Systemic embolism may be caused by paradoxical embolism (rare) or atrial fibrillation.

Echocardiography is the key diagnostic tool: right ventricular volume overload, defect visualisation (2D) and confirmation (colour Doppler). For the exact anatomy of the ASD transoesophageal echocardiography is usually required. Cardiac catheterisation is only indicated in case of a high PAP on echo (>50% of systemic pressure) to determine pulmonary vascular resistance.

Closure of ASDs in adults is indicated in patients with signs of right ventricular overload. Previous studies have shown benefits of ASD surgical closure at all ages in comparison with medical treatment. Surgery can be performed with low mortality (<1% in patients without pulmonary vascular disease) and good long-term outcome.

Outcome is best with repair at age <25 years. ASD closure after the age of 40 years no longer appears to affect the frequency of arrhythmia development during follow-up. However, patients benefit from closure at any age, particularly with regard to morbidity (exercise capacity, shortness of breath, right heart failure). In recent years, transcatheter closure of ASD has been established as an effective and secure treatment. Transcatheter occlusion,

usually with an Amplatzer device, is currently the treatment of choice and is feasible in approximately 80% of cases. Defects not suitable for transcatheter closure (including big defects: stretched diameter >38 mm, those with poorly developed margins or some multiple defects) should be closed by surgery. Surgery remains the only option for primum and sinus venosus defects.

Currently, the indications for ASD closure as recently published in the ESC guidelines are: a) Patients with significant shunt (signs of RV volume overload), PVR <5 WE regardless of symptoms: class IB;

Patients with PVR >5 watts units (WU) but less than 2/3 systematic vascular resistance (SVR) (baseline or when challenged with vasodilators or after specific PAH therapy) and evidence of left-to-right shunt: class IIB C;

All ASDs regardless of size in patients with suspicion of paradoxical embolism (exclusion of other causes): class IIA C;

ASD with Eisenmenger physiology should not be closed.

In 'asymptomatic' adults without any signs of right-sided pressure or volume overload, the long-term benefit of closure is doubtful and closure is currently not recommended in these patients with small ASDs. In patients with substantial pulmonary hypertension and pulmonary pressures above 2/3 of systemic pressures, closure is still possible when the net left-to-right shunt exceeds 1.5 or when reversibility of the increased pulmonary vascular resistance is evident. Pretreatment with bosentan or other targeted therapy for pulmonary arterial hypertension can be considered a bridge to closure when pulmonary resistance seems initially too high. Poor left ventricular function (systolic and diastolic) may cause pulmonary congestion after ASD closure and may require pre-interventional testing (balloon occlusion with re-assessment of the haemodynamics) and treatment.

Recent studies on device closure of ASDs have reported no mortality and serious complications in ≤1%.² Atrial arrhythmias occurring early after intervention are mostly transient; erosion of atrial wall or aorta as well as thromboembolic events appear to be very rare. Antiplatelet therapy is required for at least six months. Studies comparing surgery and

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catheter intervention have reported similar success rate and mortality but morbidity was lower and hospital stay shorter with catheter intervention. Transcatheter treatment is safer and more acceptable for elderly patients than surgical treatment, because for transcatheter closure thoracotomy and cardiopulmonary bypass are not required.

Recently, several studies in adult patients have demonstrated that cardiac remodelling occurred after percutaneous closure and this benefit was observed irrespective of age at time of closure even in patients older than 60 years of age.

Patel et al.³ reported that ASD closure is safe and effective in 112 patients over 40 years of age with minimal complications. The procedure resulted in a decrease in RV size that was accompanied by improvement in clinical symptoms. These findings suggest that device closure of ASDs in adult patients >40 years of age should be the first option of management.

In the current issue of the Netherlands Heart Journal, these results are confirmed by Altindag et al.⁴ in 47 Dutch patients >40 years. During a mean follow-up of 15 months three patients needed surgical re-intervention because of device embolisation or dislocation. Most patients showed regression of right ventricular enlargement and improvement in functional class. As the authors state, also asymptomatic patients should have their ASD closed; however, only when signs of RV overload are present. Nowadays, closure of ASDs in the elderly has been established as a safe and effective therapy. Device closure is the treatment of choice, when anatomy is appropriate.

In the CONCOR registry 246 ASD device closures, of whom 141 in patients >40 years, have been reported during the last years in the Dutch adult population.

In a study by Elhershari et al.⁵ a total of 41 patients >60 years of age and with indications for ASD closure underwent transcatheter device closure. At a median interval of six months after closure, right ventricular end-diastolic dimension decreased significantly postprocedure, and 89% of the patients showed improvement in symptoms. On a median follow-up interval of 28 months, patients were doing well with no major clinical events.

Even in patients complicated with permanent atrial fibrillation, device closure of ASD can contribute to symptomatic improvement as well as cardiac geometric remodelling. In a study by Taniguchi et al.⁶ nine patients over 60 years of age with ASD and atrial fibrillation were successfully closed percutaneously. Although atrial fibrillation persisted, NYHA functional class improved dramatically in all patients. These results demonstrate that closure of ASD in patients with permanent atrial fibrillation is feasible.

Without repair or with repair after 40 years, atrial fibrillation becomes more common and may require antiarrhythmic therapy. In patients with atrial flutter, a right-sided Maze operation may be combined with surgical closure of the defect. The surgery may also restore and maintain sinus rhythm. Little is known about ablative therapy after device closure and access to the left atrium is restricted. Patients with atrial fibrillation require oral anticoagulation. Regular follow-up is indicated for all patients after device closure. Endocarditis prophylaxis is recommended for six months after device closure, otherwise no prophylaxis is indicated neither prior nor after repair.

In older patients with a significant ASD, closure of the defect is the right thing to do. Patients will improve both clinically and haemodynamically. Percutaneous closure is the treatment of choice. ■

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