

CASE REPORT

Transcatheter Device Closure of Secundum Atrial Septal Defect in Adult Patient

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ABSTRACT

Background: Atrial septal abnormalities are common congenital lesions remaining asymptomatic until adulthood in a great number of patients. The most frequent atrial septal defects in adults are ostium secundum atrial septal defect (ASD). Complications from untreated, hemodynamically significant ASD are atrial arrhythmia, paradoxical embolization, Eisenmenger's syndrome, pulmonary hypertension, and right ventricular failure. **Objective:** We present a case report of secundum ASD in adult female patient who underwent transcatheter device closure with Amplatzer occluder. **Methods and Results:** The case of female Bosnian patient 50 years old who lives in Belgium for 20 years ago and during her visit to Bosnia she came to our polyclinic for cardiological exam. Echocardiographic exam showed enlargement of left atrium (LAD 51mm), right atrium and ventricle (RAD 46mm, RVd 33mm), atrial septal defect 9mm with left right shunt Qp:Qs 2,3:1. Several months later transcatheter device closure with Amplatzer occluder was performed and subsequent symptomatic improvement reported after closure. **Conclusion:** Echocardiography has superior role for precise evaluation of ASD type secundum who are suitable for transcatheter device closure as primary treatment option. Transcatheter techniques has now become preferable to surgical repair and provide valid option of treatment for this type of CHD.

Keywords: Atrial septal defect (ASD), echocardiography, Doppler echocardiography, transcatheter device closure, atrial septal occluder (ASO), Amplatzer occluder.

1. BACKGROUND

Atrial septal defect (ASD) is the most common type of congenital heart disease (CHD) in adults which cause shunting of blood between the systemic and pulmonary circulations (1, 2). The estimated birth prevalence of 1.6 per 1000 live births and a 97% probability of survival into adulthood. During the last decade, there has been remarkable change in the treatment strategy of ASD, shifting the therapeutic gold standard from surgery to transcatheter closure, along with refinements and the evolution of device technology.

2. OBJECTIVE

We present a case report of secundum ASD in adult patient. Echocardiography as non-invasive imaging method and Transesophageal echocardiography has superior role

for precise evaluation of ASD type secundum who are suitable for device closure with Amplatzer septal occluder as primary treatment option.

3. CASE REPORT

We present a case of female Bosnian patient 50 years old who lives in Belgium for 20 years ago and during her visit to Bosnia she came to our polyclinic for cardiological exam. In the last 4 years ago, she complained of cardiac arrhythmia, palpitations, anaemia and iron deficiency and high blood pressure. During physical exam she was acyanotic, BP 150/100 mmHg, HR 83/min, Spo2 96%, respiratory rate 15 breaths/min. and BMI 30. The cardiovascular examinations revealed regular heartbeat with rumbling middiastolic murmur at the lower left sternal border. ECG showed sinus rhythm, RBBB with

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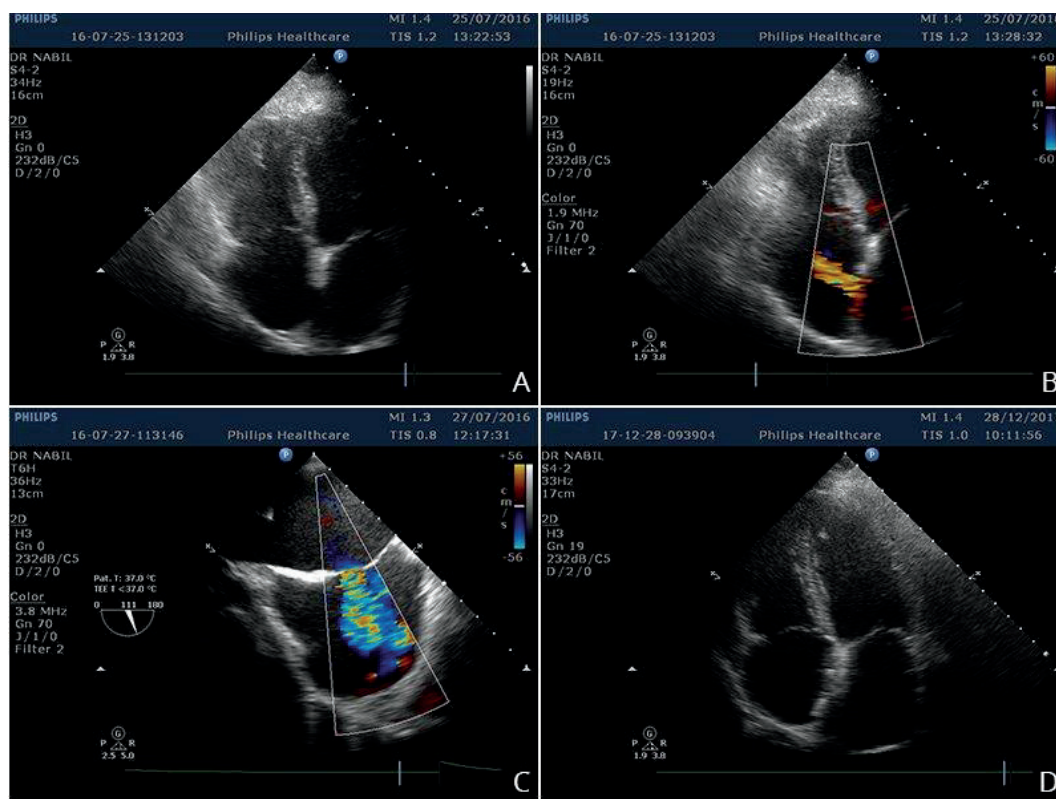


Figure 1. A secundum atrial septal defect (ASD) with left-to-right shunt was confirmed by 2-dimensional transthoracic echocardiogram (TTE) (Panel A), 2-dimensional TTE colour Doppler (Panel B). Transesophageal bicaval view with colour Doppler (TEE) (Panel C) and TTE echocardiography of the final result after transcatheter closure with Amplatzer occluder (Panel D).

rSR1 in V1 lead. Transthoracic echocardiographic showed enlargement of left atrium (LAD 51mm), right atrium and ventricle (RAD 46mm, RVd 33mm), atrial septal defect with left right shunt and mild mitral regurgitation, mild pulmonary hypertension and Qp:Qs 2,3:1. Blood lab analysis showed anaemia with low Hb 91 g/L, low Hct 28%, low Iron 8 $\mu\text{mol/L}$ and high lipids. Next day the 2D and 3D Transesophageal (TEE) exam confirmed the existence of secundum atrial septal defect 9mm diameter size with left right shunt and mild mitral regurgitation, no signs of pulmonary hypertension. Several months later transcatheter device closure with Amplatzer occluder was performed and subsequent symptomatic improvement reported after closure (Panels A, B, C, D).

4. RESULTS AND DISCUSSION

ASD is one of the most common congenital heart lesions in adults that requires intervention. Many patients with ASDs are free of overt symptoms, although most will become symptomatic at some point in their lives (3, 4). Exercise intolerance in the form of exertional dyspnoea or fatigue is the most common initial presenting symptom (1, 2). Complications from untreated, hemodynamically significant ASD atrial arrhythmia, paradoxical embolization, Eisenmenger's syndrome, pulmonary hypertension, and right ventricular failure. The mortality rate from untreated, hemodynamically significant ASD can approach 25% (3, 5, 6).

Transesophageal echocardiography is powerful method to confirm the type of ASD and to delineate the pulmonary venous return. TEE can show unique views of

the entire anatomy of ASD and facilitates monitoring of transcatheter procedures for deployment of an Amplatzer septal occluder (7, 8, 9). Patients with isolated atrial septal defects have benefited from important recent advances in the diagnosis, evaluation, and management of this congenital lesion (7, 10). Current guidelines recommend that all patients with hemodynamically significant ASD should undergo ASD closure, regardless of symptoms, to prevent long-term complications such as atrial arrhythmias, pulmonary hypertension, and/or paradoxical embolism (6). The atrial septal occluder (ASO) was approved for transcatheter closure of secundum ASD in the United States in 2001 (13). Trans-catheter closure of secundum ASD with a self-expanding Amplatzer septal occluder has become an alternative to surgical closure (7, 8, 9). Acute complications are rare but may include tears of the atrial septum from the sizing balloon, device embolization or entrapment, stroke, and cardiac tamponade (4, 10).

The transcatheter closure of the ASD has low incidence of morbidity and mortality, and an important advantage of the ASO is that it can be easily retrieved into the delivery sheath and re-deployed several times before final release. This greatly diminishes the risk of the malposition and embolization of the device (14). Transcatheter closure is much less invasive than surgery, also has fewer periprocedural complications, and is associated with a shorter length of stay. Approximately 80% of secundum ASD are suitable for closure using currently available devices (6-14). Transcatheter closure of secundum ASD has been shown to be safe and effective in patients with right heart volume overload, with similar success and compli-

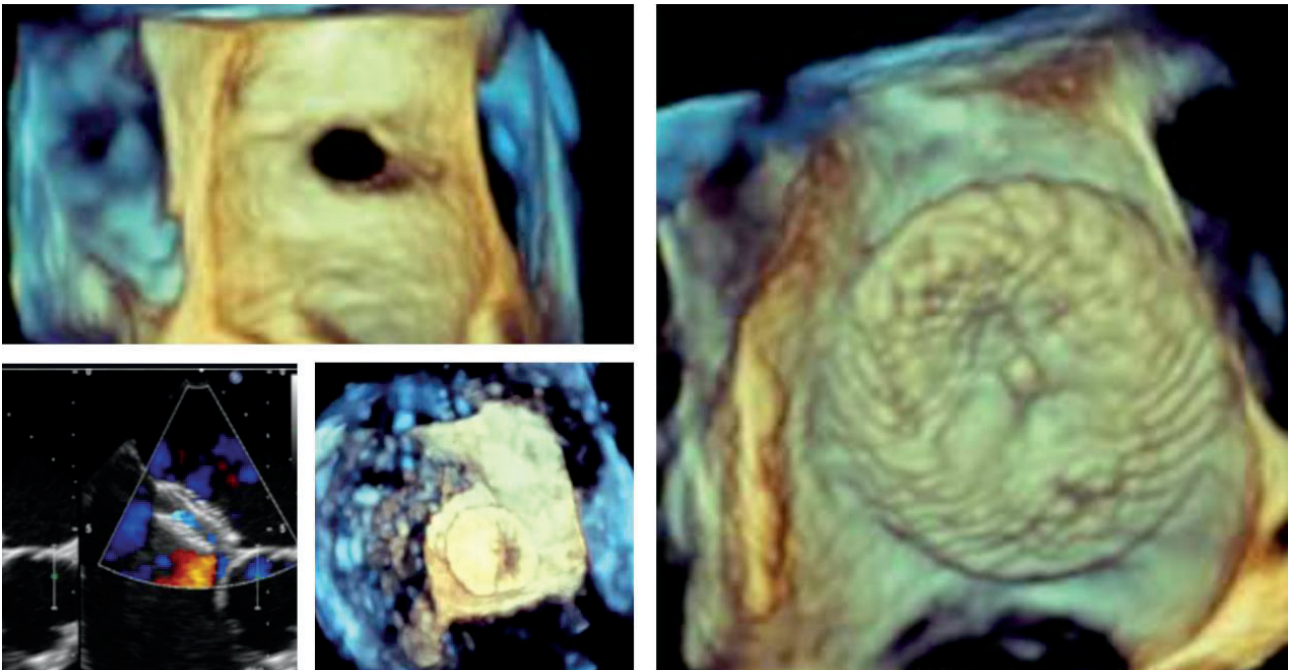


Figure 2. Three-dimensional transesophageal echocardiography images before and after secundum atrial septal defect closure using an atrial septal occluder.

cation rates compared with surgery (5, 13, 14, 15).

5. CONCLUSION

Atrial septal defect secundum is the most common CHD. It constitutes about 80% of these defects, has a female predominance of approximately 2:1, and is frequently discovered in adulthood. Patients with an isolated ASD secundum often remain asymptomatic during childhood and adolescence, the rates of exercise intolerance, supraventricular arrhythmias, right ventricular dysfunction, and pulmonary arterial hypertension increase with patient age, enlargement of the right heart chambers in ASD are subject to important age-related morbidity and reduced life-expectancy. Echocardiography as non-invasive imaging method and Transesophageal echocardiography (2 and 3D) remains valuable non-invasive diagnostic method for locating and assessing ASD. All hemodynamically significant secundum ASDs should be closed, regardless of age and symptoms. Transcatheter techniques has now become preferable to surgical repair and provide valid option of treatment for this type of CHD.

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- **Conflict of interest:** The authors declare that they have no conflict of interest.
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