Case Report
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TRANSCATHETER CLOSURE OF SECUNDUM ATRIAL SEPTAL DEFECT WITH LARGEST FENESTRATED DEVICE

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ABSTRACT

Transcatheter closure of secundum atrial septal defect is a well accepted mode of treatment now a day in selected suitable patients. However large defects are difficult to manage percutaneously as the complications are quite significantly high in these patients. We are reporting two cases who had atrial septal defects measuring 40mm, 39 mm and were closed with 46mm and 44mm occluders respectively. There were no complications during the procedure and immediate follow up period.

INTRODUCTION

Atrial septal defect is one of the most common acyanotic congenital heart diseases. It accounts for 8-10% of congenital heart disease in children and 30-40% in adults[1]. The first transcatheter closure of secundum atrial septal defect was done by Kings and Mill in 1974[2] and now with the advances in technology has drastically changed the management option of secundum ASD in most centers. We are presenting two cases with large secundum atrial septal defect in whom 46mm and 44mm atrial septal occluders were used. Our first patient had large secundum atrial septal defect with moderate pulmonary hypertension and surgical closure was advised by different centers. To the best of our knowledge these are first ever largest device used in Pakistan for secundum atrial septal defect.

Case1

A 47 years old female patient presented with history of episodic palpitation 3 years back for which she was managed in Kingdom of Saudi Arabia and was on regular tablet Bisoprolol. She improved symptomatically and for the last 6 months developed progressive exertional dyspnea. Clinical examination revealed ejection systolic murmur in pulmonary area with wide fixed splitting of 2nd heart sound. 2-D Transthoracic echocardiography showed large secundum atrial septal defect with moderate pulmonary hypertension. Transesopheal echocardiography (TEE) was performed for suitability of device closure of secundum ASD that showed 40mm secundum atrial septal defect with adequate rim (5mm) except deficient aortic rim. The balloon sizing of the defect with stop flow technique also showed a 40mm defect (Fig-1). The mean pulmonary artery pressure was 53mmHg (88/28/53) that was 50% of systemic pressures with Qp:Qs 3:1 and pulmonary vascular resistance was 3.6wum². She was planned for device closure of secundum ASD. In the meantime a special device SHSMA (Shangai Shape Memory Alloy Company, China) of 46mm was ordered along with fenestration in the device considering the pulmonary hypertension. The procedure was carried out under general anaesthesia with TEE guidance for device deployment. The device was deployed in a standard fashion under fluoroscopy with balloon assistance technique and TEE guidance (Fig-3). She was shifted to post catheterization ward after completion of procedure and monitored for arrhythmias and other related complications. She was given tablet sildenafil, spironolactone and aspirin. She was discharged home after 24 hours and transesophageal echocardiography showed well placed device with left to right shunting through fenestration (Fig.2). She was followed up in outpatient department at 2 weeks, 1 month and 3months and there was no complication like pericardial effusion, aortic erosion, heart block, and atrioventricular valve dysfunction or device embolization.

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Case 2

A 29 Years old male patient presented with history of shortness of breath (NYHA-II) and clinical examination revealed fixed splitting of 2nd heart sound with ejection systolic murmur 3/6 in left 2nd intercostals space. 2-dimensional echocardiography revealed large

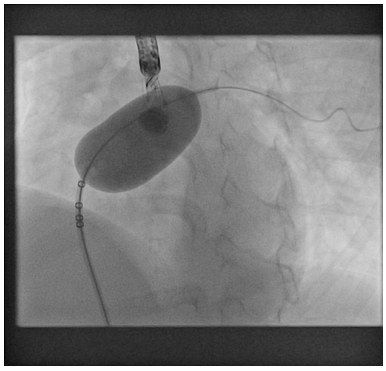

Figure-1: The mean pulmonary artery pressure.

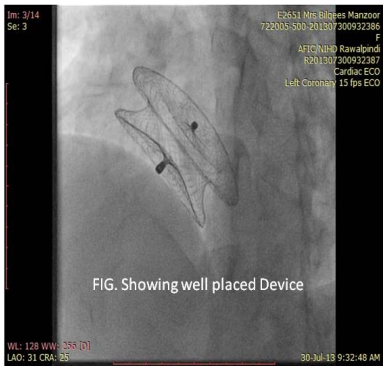

Figure-2: Showing well placed device.

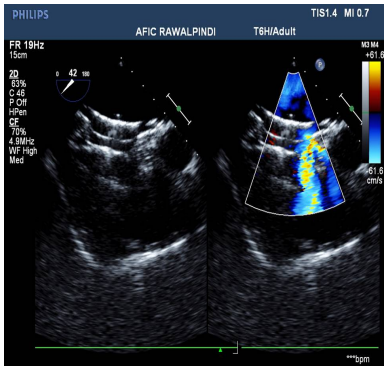

Figure-3: Post catheterization wiew after completion of procedure.

secundum defect with adequate all rim except deficient aortic rim. He underwent cardiac catheterization and balloon sizing with stop flow technique under TEE guidance revealed 39 mm defect. The ratio of pulmonary to systemic blood flow (Qp:Qs) was 4:1 and pulmonary vascular resistance was 1.5 wum^2. A 44 mm special device was requested from Shangai Shape Memory Alloy Company, China and on its availability from company, he underwent re-catheterization. The device was deployed in a standard way under TEE guidance with balloon assistance technique. There were no procedural or post-procedural complications and the patient was discharged home after 24 hours. He was followed up in OPD at 1, 3 and 6 months with no complications.

DISCUSSION

Transcatheter device closure of secundum atrial septal defect is an effective and attractive alternative way to surgical closure[3]. It shortened the hospital stay as well as surgery related complications[4]. In most suitable small defects percutaneous approach is straight forward but the large atrial septal defects are difficult to manage with this approach[5]. However a number of different techniques help in deployment of large devices including balloon assistance, dilator support and pull through technique[6]. The proper assessment of defect size, its rims and relation with the surrounding structures is a key to success in device deployment[7]. We did transthoracic echocardiography and TEE as well as balloon sizing the defect with stop flow technique [Fig-1] for measurement of defect. As earlier reported largest device reported in literature was without fenestration[8] but our patient had moderate pulmonary hypertension so we had fenestration in the device (46mm). We deployed the device by using standard approach from right upper pulmonary vein with balloon assistance technique and under transesophageal echocardiography. A number of complications can result during the deployment of device as well as after the procedure in patients with larger defects[9,10]. However we did not encounter vascular injuries, device malpositioning, arrhythmias, atrioventricular valve regurgitation, pericardial effusion, device embolization, thromboembolism, aortic regurgitation or death.

CONFLICT OF INTEREST

This study has no conflict of interest to declare by any author.

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