

Management of Atrial Septal Defect Device Closure

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Abstract

The percutaneous atrial septal defect, which is a common congenital cardiac anomaly, the device closure is gaining popularity because of the short learning curve, cosmetic advantage and relative safety. We report here 10 cases where surgical intervention was required during attempted percutaneous closure. The atrial septal defect device closure was done in all the cases using a Amplatzer Device and delivery system, guided by Trans Esophageal Echocardiography (TEE).

Keywords: Atrial septal defect (ASD); Amplatzer Device; Trans Esophageal Echocardiography (TEE)

Introduction:

Atrial septal defect (ASD) is a common congenital cardiac anomaly. Management of Atrial septal defect (ASD) can be done percutaneously in Cath lab by cardiologists in presence of Cardiac surgeon and intensivist. When the procedure is done in Cath lab. The operation theatre is kept on stand by to meet any complication during procedure

An atrial septal defect (ASD) is an opening or hole in the wall that separates the two upper chambers of the heart. This wall is called the atrial septum. The hole causes oxygen-rich blood to leak from the left side of the heart to the right side. This causes extra work for the right side of the heart, since more blood than necessary is flowing through the right ventricle to the lungs. If the ASD is small enough, it can be closed with a special device. In the present work the management of atrial septal defect device closure has been reported by studying 10 cases done in the duration of 6 months from January to October 2025, at IGIC Patna (PMCH). All the ten patients were admitted with common symptom of Shortness of breath, Palpitation, Recurrent chest infection and Fatigueless.

Investigation: Clinical and radiological diagnosis were done, which included X ray chest and 2D echocardiography. The results of the radiological examination showed the size of arterial septum defect, pulmonary artery pressure and ratio of systemic and pulmonary blood flow. On these findings the management of all 10 patients were planned. Out of 10, 7 patient had small sized ASD. Transcutaneous closure was done in these 7 patients using Amplatzer Device and delivery system, guided by Trans Esophageal Echocardiography (TEE). The Amplatzer Device consist of 2 self-expandable round disc. Nitinol wire mesh that are linked together by short connecting waist corresponding to the thickness of atrial septum. After 3 days the patients were discharged and called for follow up after 15 days. During the period of 6 months all the patients recovered with no cardiac complications.

3 Patients underwent surgical closure using cardio pulmonary bypass because of the large size of the defect. The size of the hole was more than 3 c.m. After a week patients were discharged from the hospital.

They were called for follow up after a week. One of the patient developed minor wound infection which was treated by oral antibiotic and local dressings

Risk of percutaneous device closure: Slipping of Amplatzer Device may occur after percutaneous closure. Patients with this condition will experience non-specific chest pain accompanied by shortness of breath. A repeat TEE in 1 of the patients revealed that the device had become partially dislodged, resulting in a significant left-to-right shunt across the atrial septum.

Risk of surgical closure: Bleeding from major arteries or heart chamber have been reported in literatures. Cardiac failure, shock septicaemia has also been reported. None of the patients reported of any such symptoms.

All The patient recovered well and had an uncomplicated postoperative course.

Discussion

Arterial Septal Defect is a major health problem world wide . Most of the patients patients undergoing transcatheter device closure of ASD using the Amplatzer Device and delivery system for its closure. King and Mills [1] reported in 1976 the feasibility of percutaneous closure of ASD. Latson et al. [2] in 1991 reported successful closure of ASDs in 500 patients with Bard clamshell device. It is gaining popularity because of the short learning curve, cosmetic benefits, reduced pain and reduced hospital stay. However, technical complications with occasional deaths have been reported. The complications reported include cardiac perforations, device malposition or embolisation, residual shunts, vascular trauma, thrombus formation, atrioventricular valve regurgitation, atrial arrhythmias, infectious endocarditis and sudden death [3].

Malposition or embolisation is the commonest reason for surgical intervention. Chessa et al. [4] reported on 417 patients of whom ten patients needed surgical intervention because of malposition or embolisation. The ASDOS and Sideris devices have a higher failure rate than Amplatzer device. It is emphasized [5] that rims must be routinely evaluated to decide about suitability for device implantation.

Perforation is the next common complication. Divekar et al. [6] in a retrospective review found 24 events with Amplatzer device. The technique-related cardiac perforations occur during catheterization or typically before hospital discharge and are amenable to intervention. Device-related perforations occurred frequently after hospital discharge. The anterosuperior atrial wall and/or adjacent aorta are uniquely vulnerable. Perforations have occurred even after six months.

Rashkind et al. [7] reported Transcatheter closure of atrial septal defects in children. Berdat et al. [8] found residual shunt in 37% patients with Sideris device. Residual shunts are more frequent with percutaneous closures than with surgical closures. There are many reports of surgical closure of atrial septal defects with no residual shunt.

Rao [9] has reported The incidence of thrombus formation is 1.2% in ASD patients and 2.5% in patent foramen ovale (PFO) patients in a study of 1000 patients who underwent percutaneous device closure. The Amplatzer device with Nitinol wire covered with expanded polytetrafluoroethylene fabric is less thrombogenic than Cardio SEAL and Star FLEX devices, which have a metallic framework with Dacron fabric.

Conclusion

In the present study at the centre, both the treatment mortalities (percutaneous and surgical) showed better results when patients are selected carefully. Role team work is very important immediate post operative

period till the discharge of the patient from hospital. Transcatheter closure of ASD is gaining popularity. The procedure related complications are small but not negligible. Absence of residual shunts and late thromboembolic events is in favor of surgical closure of ASD. The need for lifelong antiplatelet agents and SBE prophylaxis has to be weighed against the disadvantage of a small incision. A promising early result does not guarantee a favorable late outcome. Austin [9] in his editorial has rightly reminded us of our experience with Ionescu–Shiley and Bjork–Shiley valves to emphasize the need for continued follow-up and critical evaluation of this method against the gold standard of surgical closure of ASD.

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