Case report

Late presenting partially displaced atrial septal closure device: Surgical vs percutaneous correction? A case report

Mian Mustafa Kamal a,*, Abdul Ahad Sohail a, Mian Yasir Kamal b, Naveed A. Pasha c, Syed Shahabuddin b, Hasanat Sharif a

a Department of Cardiothoracic Surgery, Aga Khan University, Karachi, Pakistan
b Department of Cardiology, Khyber Teaching Hospital, Peshawar, Pakistan
c Department of General Surgery, Aga Khan University Hospital, Karachi, Pakistan

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ABSTRACT

Introduction: Atrial Septal Defect (ASD) is one of the most common congenital cardiac defect. Even though surgical repair of ASD is the current method of choice but percutaneous device closure is rapidly gaining popularity as it is less invasive. Dislodgment and embolization of the device may occur requiring urgent surgical retrieval.

Case presentation: We report a case of 54-years-old female patient with a history of ASD device closure 4 years ago, presenting with progressive shortness of breath for past 2 months. She had a partial dehiscence of an ASD device causing a residual ASD of 17 mm. She underwent urgent surgical repair of an ASD with a bovine pericardial patch without ASD device being explanted.

Clinical discussion: Management of a dislodged ASD device may be percutaneous or surgical. Dislodged ASD devices that present months after deployment may become fibro-adhered to the site of embolization. Hence its retrieval can be challenging even via open surgical method. Our case describes a novel method to repair a residual ASD and prevent complications associated with dislodgement of device without completely explanting the device.

Conclusion: In this case, the late presentation of the patient with a partially dehisced device makes it a distinctive case with a novel way on how to treat such a presentation surgically, ensuring that the device doesn’t embolize further causing fatal complications.

1. Introduction

Atrial Septal Defect (ASD) is one of the most common congenital cardiac defect with a reported incidence of 2.78/1000 live births [1]. It allows shunting of oxygenated blood from left atrium into right atrium leading to serious complications if not treated in time [2]. It can be classified into four different types that is ostium secundum, ostium primum, sinus venosus and coronary sinus ASD [3]. Currently there are two methods of repairing Atrial Septal Defect, percutaneous device closure or open surgical repair. Even though surgical repair of ASD is the current method of choice but percutaneous device closure is rapidly gaining popularity as it is less invasive with rapid restoration of hemodynamics [3,4]. In percutaneous device closure there are different types of ASD closure devices used, with the Amplatzer type being used more often with good results as reported in literature [1,2]. Percutaneous device closure has its own risks and associated complications such as device failure, dislodgement, infection, migration and embolization [4,5]. Dislodgment and embolization usually occur in first few hours of placement and its reported incidence in different studies is 0.5–1.1 % [6]. Retrieval of dislodged device is necessary in order to prevent further complications and usually requires surgery.

There have been several cases with early displaced ASD devices; however there is limited literature reporting late displacement of an ASD device. To the best of our knowledge, this is the first case in literature with a late presenting partially dislodged ASD closure device treated with successful open surgical repair of the residual ASD with a bovine pericardial patch without the ASD closure device being explanted. This case report has been reported in line with SCARE 2020 criteria [7].

* Corresponding author at: Department of Cardiothoracic Surgery, Aga Khan University Hospital, Stadium road, Karachi Postal code: 74800, Pakistan.
E-mail addresses: mian.kamal@aku.edu (M.M. Kamal), naveed.pasha@aku.edu (N.A. Pasha), syed.shahab@aku.edu (S. Shahabuddin), hasanat.sharif@aku.edu (H. Sharif).

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2. Presentation of case

We report a case of a 54-years-old obese female patient who presented to our outpatient department with a history of percutaneous atrial septal defect (ASD) device closure in another institute 4 years back. The Atrial septal defect was diagnosed on routine transthoracic echocardiography as part of a preoperative work up for her planned gynaecological procedure. She remained well since then. Unfortunately she had no medical records available for that procedure.

She now developed shortness of breath on exertion and paroxysmal nocturnal dyspnoea for past two months. She was currently in New York Heart Association (NYHA) class III. Her physical examination revealed bilateral basal crepitations on auscultation, rest of examination was unremarkable. She had transthoracic echocardiogram done from another institute which showed displaced ASD device overlying mitral valve with residual ASD.

She underwent Transoesophageal echocardiogram which showed partial dehiscence of ASD device at the superior and anterior rims causing a residual ASD of 17 mm. The device was tilted towards the left atrium, just above the mitral valve. There was left to right shunting of blood through the ASD, leading to severely dilated right atrium and ventricle. Peak and mean pressure gradient across mitral valve were 8 and 4 mmHg respectively. Left atrium volume index was 46 ml/m². There was severe pulmonary hypertension with pulmonary artery systolic pressure of 55 mmHg and secondary severe tricuspid valve regurgitation. (Figs. 1 and 2). Left ventricular ejection fraction was 55%. A 12-lead electrocardiogram and baseline blood tests were normal, while the chest x-ray showed cardiomegaly and features of pulmonary congestion. (Fig. 3).

Due to risk of acute mitral stenosis and heart failure an urgent surgical intervention was planned.

2.1. Operative management

She underwent open heart surgery via median sternotomy. Cardio-pulmonary Bypass was established via aorto-bicaval cannulation. Heart was arrested via antegrade cold Del Nido cardioplegia solution given through the aortic root. After cross clamp, right atriotomy was done. A large ASD device was seen with about half of the circumference dehisced. (Fig. 4). The device was firmly anchored to the rest of atrial septum with dense fibrosis around the device. We decided not to explant the device, as it was firmly adherent to the interatrial septum and its removal may cause distortion of the interatrial septum leaving deficient margins for anastomosis of a bovine patch.

Hence the entire ASD device including the residual ASD was covered with bovine pericardial patch which was anastomosed to the normal interatrial septum margins. Bicuspidization of tricuspid valve was done for severe tricuspid regurgitation.

Post-operatively patient made smooth recovery and was discharged home on 5th post-operative day. Transthoracic echocardiogram was done before discharge which showed improvement in the size of left atrium, right atrium, and right ventricle. A small residual ASD was found.

2.2. Follow up

The patient has been on regular follow up in outpatient cardiac surgery clinic for past 4 years. Currently she is NYHA class I and asymptomatic. Repeat recent transthoracic echocardiography report showed no residual ASD.

3. Discussion

Percutaneous ASD device closure is a widely accepted method of treatment for ASD closure but there are risks associated with it. Early and late postoperative complications have been reported with its use, including device failure, residual ASD, infection, thrombosis, displacement and cardiac perforation. Device embolization is the most common and lethal complication, with the device mostly displacing to the right side of the heart. Dislodged ASD devices that present months after deployment may become fibro-adhered to the site of embolization and its retrieval can be challenging in the face of device fibrosis and requires open surgery [8].

There have been multiple reports describing the retrieval of an ASD closure device after its displacement. Wagdi et al. described the percutaneous retrieval of a dislodged ASD closure device from abdominal aorta presenting 4 months after deployment where the patient tolerated the procedure well without any complications [8]. Dhalwal et al. reported a case of surgical removal of the Amplatzer septal occluder 4 years after percutaneous closure with uneventful postoperative recovery [9]. However, none of the cases within the literature have yet reported correction of a partially detached ASD closure device.

In this patient, the ASD closure device was partially detached from the deployment site and was lying over Mitral Valve. If left alone this could have led to acute heart failure by completely obstructing Mitral valve inflow or by causing Acute Mitral Regurgitation. In order to prevent such a catastrophic event urgent surgical repair was done. In literature the dislodged devices are either retrieved percutaneously or explanted surgically. We did not explant the device rather patched whole of the device along with residual ASD with bovine pericardial patch thus preventing distortion of interatrial septum and achieving closure of residual ASD. The bovine patch will cause fibrosis around the device thus preventing its dislodgment.

This approach minimized surgical trauma to cardiac tissue and cross...
clamp time while achieving the required goals of closure of residual ASD and preventing future embolization of the device.

4. Conclusion

In this case, the late presentation of the patient with a partially dehisced ASD device makes it a distinctive case. We approached the case with a novel way to treat such a presentation surgically, ensuring the closure of residual ASD and prevention of device embolization in future while minimizing surgical trauma and cross clamp time. Ideal management is unknown considering the rarity of late presenting dislodged ASD closure devices. Surgical exploration and closure of residual ASD is a reasonable treatment option. Such cases should be reported to facilitate more research.

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Nothing to declare.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Ethical approval

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Author contribution

Hasanat Sharif and Mian Mustafa Kamal: Case report Concept and Design.
Abdul Ahad Sohail: Data Collection.
Mian Yasir Kamal: Writing the paper.
Naveed A. Pasha: Data Analysis and Interpretation.
Syed Shahabuddin and Fateh Ali Tipu: Contributors.
Registration of research studies

Not applicable.

Guarantor

Mian Mustafa Kamal and Hasanat Sharif

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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