

Delayed aorto-right atrial fistula following percutaneous closure of atrial septal defect

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ABSTRACT

We present the case of a 27-year-old man who underwent percutaneous atrial septal defect (ASD) repair using the Amplatzer® (St Jude Medical, St Paul, MN, US) septal occluder (ASO). Six weeks later, he presented with heart failure and was found to have an aorto-right atrial fistulation. He required urgent surgical device explantation and repair of the existing ASD using a pericardial patch repair technique. This is the first case to be reported from the UK describing a delayed aorto-right atrial fistula following percutaneous closure using ASO.

KEYWORDS

Aortoatrial fistula – Atrial septal defect – Amplatzer® device

Accepted 1 August 2013; published online XXX

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Case History

A 27-year-old man collapsed and was taken to hospital. He was diagnosed with paroxysmal atrial flutter. His father had an atrial septal defect (ASD) and pulmonary stenosis, for which he was operated on at the age of 14. During the same hospital admission, our patient was noted to have an ejection systolic murmur that was heard over the pulmonary area. Transthoracic echocardiography revealed a dilated right ventricle with preserved right ventricular systolic function, mild pulmonary stenosis with central regurgitation and an ASD. Subsequently, transoesophageal echocardiography (TOE) showed a moderate secundum ASD measuring 17mm × 15mm, with minimal superior and anterior rims, and good inferior and posterior rims. These findings favoured percutaneous closure of the ASD. A 24-hour electrocardiography recording confirmed the presence of paroxysmal atrial fibrillation and flutter. He underwent ablation with a successful outcome.

A few months later under general anaesthesia, percutaneous closure of the ASD was performed. The right femoral vein was approached. A 6Fr catheter was used to cross the ASD. A sizing balloon showed the defect to be at least 24mm in diameter and a 26mm Amplatzer® (St Jude Medical, St Paul, MN, US) septal occluder (ASO) was implanted via a 10Fr delivery sheath. Stability was checked immediately following the procedure using TOE. It was noted that positioning was appropriate and no residual shunt was identified. This was further confirmed on repeat TOE on the following day.

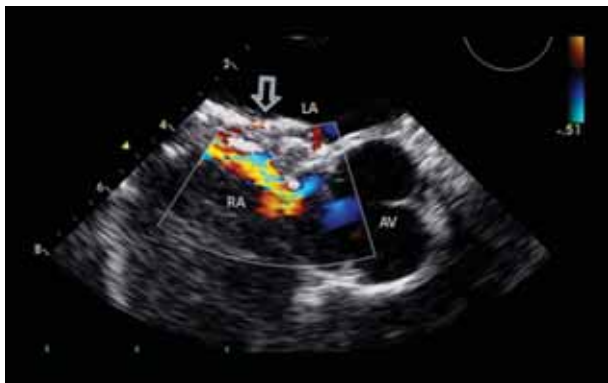
Six weeks later during the follow-up appointment, the patient complained of palpitations, dyspnoea and fatigue. On examination, a pulmonary flow murmur was noted. Echocardiography showed an aorto-right atrial fistula with a peak continuous flow of >6m/sec (Fig 1). He was readmitted to hospital for surgical assessment.

Intraoperatively, cardiopulmonary bypass was established and intermittent antegrade cardioplegia administered. The right atrium was incised and the fistula noted to be communicating anteriorly with the sinus of Valsalva. The ASO was explanted, and pericardial patch repair of the ASD and patch closure of the fistula were performed (Figs 2 and 3). The patient recovered fully following surgery and was discharged home seven days later.

Discussion

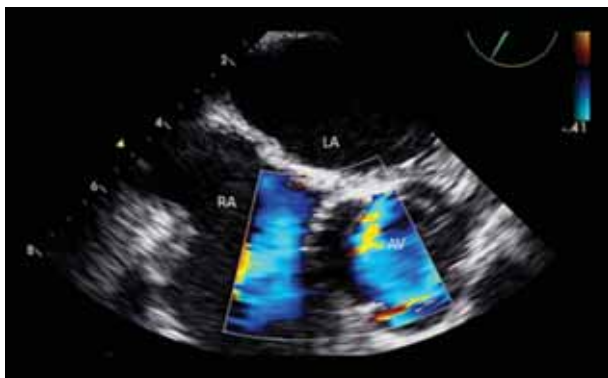
Percutaneous closure of ASD is based on morphology criteria and size of the defect. Morphologically, centrally placed defects, defects with deficient superior anterior rim, multiple defects and perforated aneurysms of the interatrial septum are judged to be suitable for a percutaneous procedure. Sizes up to 38–40mm can be closed using the ASO device. The most common complications are device embolisation, bleeding, stroke, cardiac tamponade, cardiac perforation without tamponade, retroperitoneal haematoma and endocarditis. Amin *et al* report an incidence of device erosion of 0.1% in the US.¹

To our knowledge, only three similar cases of aortoatrial fistulas following transcatheter closure of patent foramen



RA = right atrium; LA = left atrium; AV = aortic valve

Figure 1 Preoperative transoesophageal echocardiography (midoesophageal short axis view) showing aorto-right atrial fistula with flow from aorta to right atrium. Arrow indicates Amplatzer® septal occluder.



RA = right atrium; LA = left atrium; AV = aortic valve

Figure 2 Transoesophageal echocardiography (midoesophageal short axis view) showing pericardial patch repair of atrial septal defect and patch closure of the fistula showing no residual defect.

ovale (PFO) or ASD have been reported in the literature.²⁻⁴ Two case reports refer to fistulas between the aorta and the right and left atrium respectively, following percutaneous implantation of ASO for ASDs.^{2,5} One case of a fistula between the aorta and the right atrium after PFO closure with the PFO Star (Cardia, Eagan, MN, US) device has been mentioned briefly.⁴ Diagnosis was made one month after closure during routine echocardiography and the

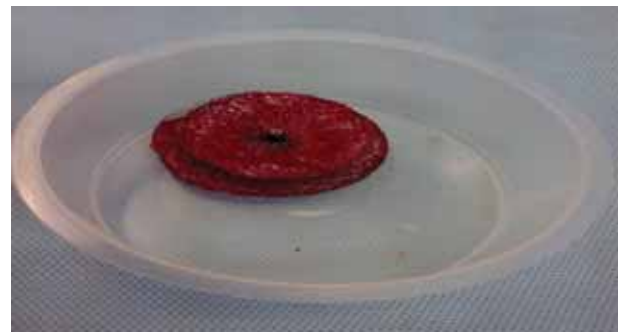


Figure 3 Photograph of explanted Amplatzer® device.

authors reported a spontaneous closure after discontinuation of oral anticoagulation.

Our patient received an ASO that was inserted under echocardiography guidance. The initial echocardiography showed minimal anterosuperior rims and a reasonable defect size, appropriate for percutaneous device closure. The postoperative chest x-rays ruled out any pleural effusion, and TOE following the procedure and 24 hours later showed that positioning was appropriate and no residual shunt was identified. Despite this, delayed aorto-right atrial fistula was diagnosed six weeks after the procedure.

Conclusions

This is the first case to be reported from the UK describing a delayed aorto-right atrial fistula following percutaneous closure of an ASD using an ASO. This is a rare complication that can lead to haemodynamic compromise and significant morbidity. As such, it requires prompt attention and surgical management to reverse the adverse outcome.

References

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