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Late Erosion of Percutaneous ASD Occlusion Device

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ABSTRACT

Percutaneous closure of atrial septal defects (ASDs) is an ever more common treatment modality in selected patients. Device erosion is a rare but often fatal complication of this therapy, which usually presents early in the post-procedure course. We describe the case of a patient presenting with chest pain and shock in whom early recognition and intervention prevented a negative outcome. Awareness of this potentially lethal complication is important as the population of patients undergoing percutaneous procedures for structural heart disease continues to grow.

LEARNING POINTS

- As the number of patients undergoing percutaneous atrial septal defect closure increases, so too will the volume presenting with late complications.
- Early recognition and intervention in cases of device erosion is critical to prevent death.

KEYWORDS

Cardiac tamponade, late erosion, atrial septal defect, percutaneous ASD occlusion, structural heart disease

CASE DESCRIPTION

A 30-year-old woman, who 9 months previously had undergone percutaneous atrial septal defect (ASD) closure with a 24 mm Amplatzer Septal Occluder at another centre, was brought to our Emergency Department with acute onset of severe pleuritic chest pain and hypotension. Her medical history was otherwise unremarkable. Her hypotension responded well to fluid resuscitation and a single bolus of 200 µg phenylephrine given by the Emergency Medicine physicians.

An urgent opinion from the Cardiology department was sought, and subsequently emergent point-of-care transthoracic echocardiography was performed. This demonstrated a moderately sized circumferential pericardial effusion without echocardiographic evidence of tamponade physiology. The patient subsequently underwent urgent transesophageal echocardiography which identified the occluder device in the expected position, but did not show any obvious site of device erosion or colour flow demonstrating a site of extravasation into the pericardium (*Fig. 1a–c*, *Video 1*). Non-gated computed tomography of the chest revealed a moderately sized haemopericardium with evidence of flattening of the left atrium at the level of the pulmonary veins (*Fig. 1d*).

The patient was subsequently referred for emergent exploratory cardiac surgery which demonstrated erosion of the occluder device through the roof of the left atrium with resultant haemopericardium (*Fig. 1e*). The device was also found to be abutting the aorta with evidence of superficial erosion. The operators also made note of fresh thrombus overlying the defect; this had temporarily sealed the defect and had likely prevented the patient developing fulminant cardiac tamponade. The site of erosion was repaired and the occluder device explanted. The remaining ASD was then repaired with a bovine patch graft. The patient's subsequent post-operative course was unremarkable and she was discharged on day 8 following the procedure. She continues to remain well on outpatient follow-up.

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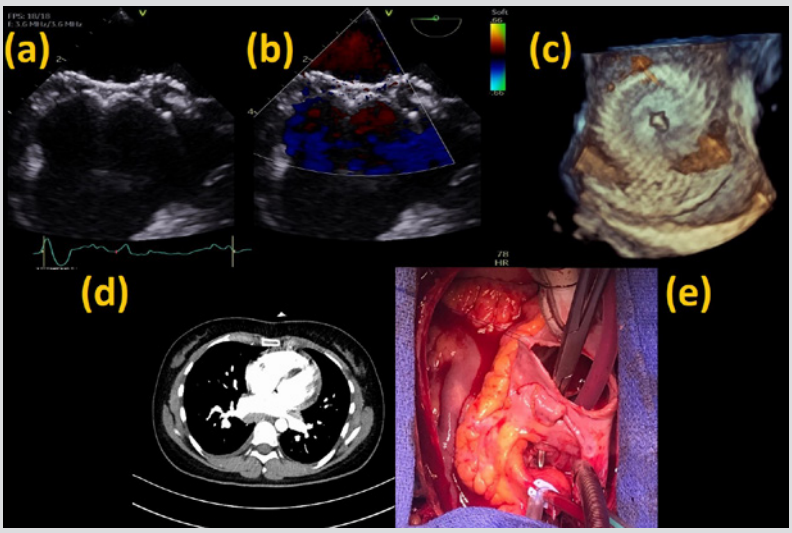
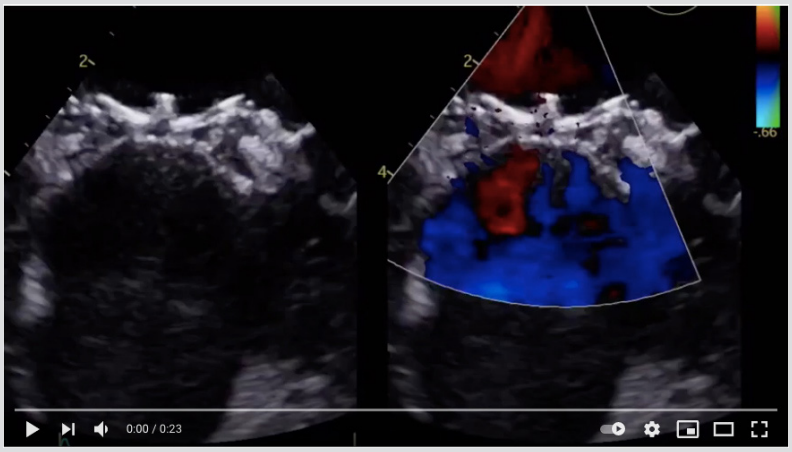


Figure 1. (a) 2D Transesophageal echocardiography (TEE) image demonstrating the atrial septal defect (ASD) occluder in the optimal position. (b) Colour flow Doppler showing no evidence of residual transseptal flow. (c) 3D TEE image demonstrating the ASD occluder without an obvious site of device erosion. (d) Non-gated CT image showing moderate haemopericardium with compression of the left atrium. (e) Intraoperative photograph demonstrating the left atrial defect (tip of forceps)



Video 1. 2D Transesophageal echocardiography (TEE) demonstrating no residual flow across the interatrial septum, and 3D TEE showing the atrial septal defect (ASD) occluder device with no obvious site of leak
To watch the video click here: https://youtu.be/PqozWYnglhg

DISCUSSION

Device erosion is a rare but potentially fatal complication of percutaneous ASD closure, as it generally results in a rapidly accumulating haemopericardium with resultant cardiac tamponade. In the majority of cases, device erosion is seen within the first 72 hours of implantation of the device, with erosion generally occurring through the roof of either the atrium or indeed the aorta itself [1]. The strongest predictor of this complication is a deficient aortic rim of less than 5 mm at implantation; this increases the risk that the device may then erode through the aorta leading to catastrophic haemopericardium and death [1, 2]. A meta-analysis of complications after percutaneous ASD closure reported an incidence of 0.04% for this complication, which may be an underestimate given the potential for presentation as sudden death [3]. Late device erosion must thus always be considered by any physician reviewing a post-procedure patient presenting with chest pain, pericardial effusion or clinical signs of tamponade, as recognition and treatment at an early stage is key.

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