

Retrieval of an embolized septal occluder with minimal access cardiothoracic surgery.

Damian Gimpel¹ and Jurgen Passage¹

¹Sir Charles Gairdner Hospital

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Abstract

Atrial septal device embolization within transcatheter structural heart disease although rare is life threatening. We present a case of a 15-year-old female who presented with a large 17mm septum secundum atrial septal defect associated with a left to right shunt and right heart dilation. The closure with atrial septal occluder (ASO) embolised into the left ventricle and couldn't be retrieved by percutaneous methods. This otherwise healthy young female underwent emergency retrieval of the ASO via minimal access surgery with a right anterolateral mini thoracotomy. It's important to highlight the role of minimal access surgery for retrieval of embolised percutaneous devices.

Introduction:

With the development of minimal access surgery, it's important to highlight its use within a heart team for retrieval of embolised percutaneous devices. For those devices that can't be retrieved by percutaneous methods are traditionally removed by traditional median sternotomy (1-2) We present a case of a 15-year-old female presented with a large 17mm septum secundum atrial septal defect (ASD) associated with a left to right shunt and right heart dilation (Figure 1). The patient was symptomatic from the ASD with New York Heart Association functional class II and suffered pre-syncope episodes. She had no other medical history or cardiac risk factors. The patient proceeded for percutaneous closure with AMPLATZER septal occluder (ASO; St. Jude Medical [now Abbott], St. Paul, MN). During the procedure the aortic rim was not captured as the device repeatedly moved posteriorly. Subsequently, the ASO embolised into the left ventricle and was unable to be retrieved percutaneously (Video 1). The patient was therefore brought forward for surgical retrieval.

Intervention:

The patient underwent surgical retrieval through a minimally invasive approach with a right anterolateral mini thoracotomy in the fourth intercostal space. Cardiopulmonary bypass was achieved with a left common femoral artery and vein and a right internal jugular vein cannula. The left common femoral vessels were utilised due to constriction on the right from prior percutaneous access. Through a right atriotomy, visualisation was achieved of the large secundum type ASD with a deficient posterior rim. The ASO was located in the left ventricular outflow tract, associated with the mitral valve sub valvular apparatus. It was removed through the ASD without complication and the ASD was closed with a bovine pericardial patch (Video 2). Standard closure was undertaken and intraoperative transoesophageal echocardiogram demonstrated no valvular abnormalities or any new regional wall abnormalities. The patient was discharged home day four post operatively and transthoracic echocardiogram prior to discharge demonstrated a normal functioning left and right ventricle with no residual atrial shunt by colour doppler.

Comment:

Device embolization within transcatheter structural heart disease intervention although rare is potentially life threatening (3). A large prospective, nonrandomized, multicenter clinical study in the United States only demonstrated embolization of the ASO at time of procedure in 0.2% of patients (4). In the event of ASO embolisation and subsequent retrieval, Alkhouli et al described a four step management plan including adequate anticoagulation, to ask for senior assistance or be comfortable with retrieval techniques, involve appropriate cardiac surgical advice and finally set a finite time to abort percutaneous events and convert to surgery (2). Techniques have also been described about the surgical removal of embolised devices with the use of surgical snuggers in order to compress the device so that surrounding structures such as the sub valvular apparatus is not injured (5). There is however a lack of literature to state the possibility of minimal access surgery in order to retrieve embolised devices particularly within the left ventricular outflow tract. This case demonstrates that endoscopic minimal access surgery is possible for embolised ASO to the left ventricle. Minimal access surgery should be a part of the multi modal discussion and available options when retrieving an embolised ASO or other percutaneous devices.

1 – Wen B, He J. Emergent surgical removal of a migrated atrial septal defect occluder: case report. *Journal of Cardiothoracic Surgery*. 2020;15:327

2 – Errahmouni A, Hattouai ME, Drighil A, Boumzebra D. Silent Embolization of an Amplatzer septal occluder in the left ventricular outflow tract requiring emergent surgical retrieval. *Ann Pediat Cardiol*. 2012;5(10):89-91

3 – Alkhouli M, Sievert H, Rihal C. Device Embolization in Structural Heart Interventions. *J Am Coll Cardiol Interv*. 2019;12(2):113-126.

4 – Turner D, Owada C, Sang C et al. Closure of Secundum Atrial Septal Defects With the AMPLATZER Septal Occluder: A Prospective, Multicenter, Post-Approval Study. *Circ Cardiovasc Interv*. 2017;10(8):e004212

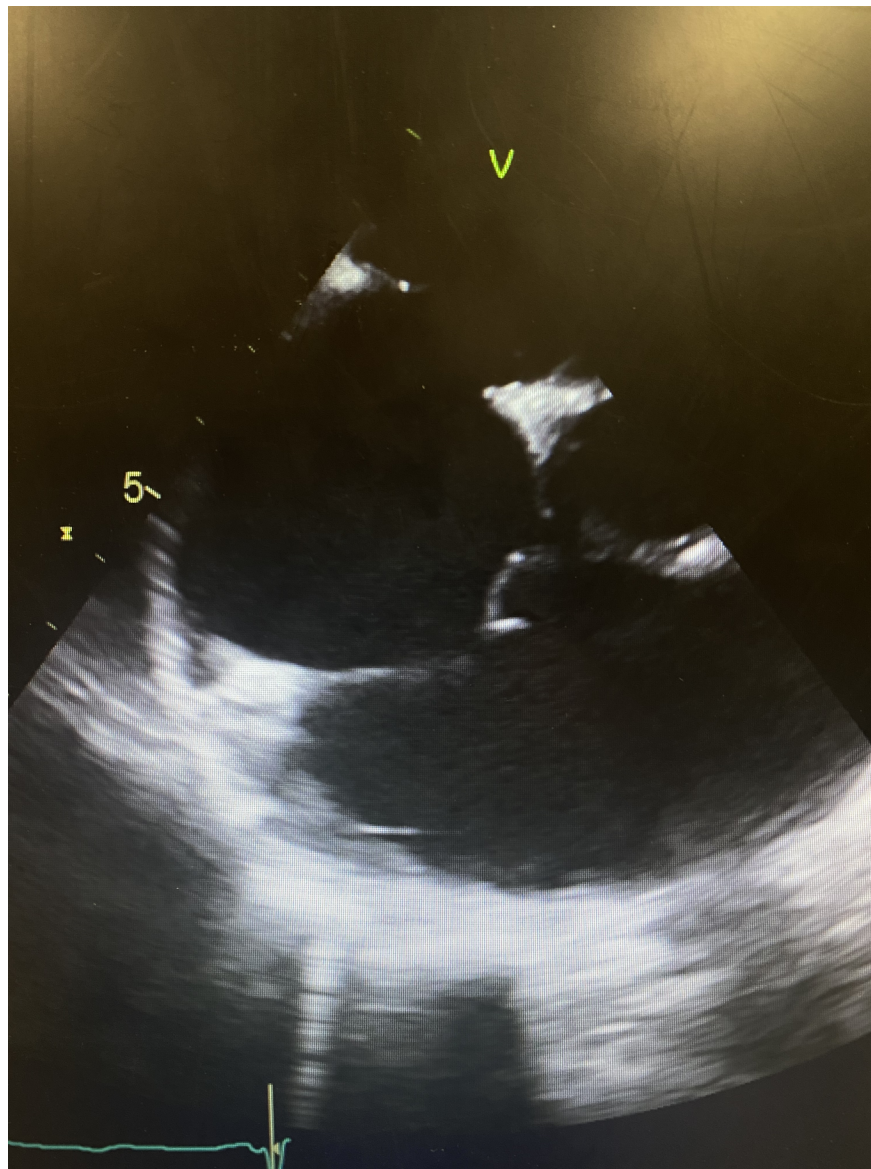
5 – Yates M, Anderson D. Safe Surgical Retrieval of Embolized Atrial Septal Defect Closure Device. *Ann Thorac Surg*. 2017;103(2):e213-e214

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Figures: 1. Demonstration of large atrial septal defect on transoesophageal echocardiogram

2. Demonstration of embolised atrial septal occluder in the mitral subvalvular apparatus

3. Demonstration of minimal access surgical retrieval via small right anterior thoracotomy



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