

MINI-FOCUS ISSUE: PROCEDURAL COMPLICATIONS

INTERMEDIATE

IMAGING VIGNETTE: CLINICAL VIGNETTE

Transseptal Access Through an Atrial Septal Defect Closure Device Resulting in Open Heart Surgery



Ott Saluveer, MD, PhD,^a Hamid Bastani, MD, PhD,^a Dinos Verouhis, MD, PhD,^a Göran Källner, MD, PhD,^b Mats Jensen-Urstad, MD, PhD^a

ABSTRACT

A pulmonary vein isolation procedure in a patient with an atrial septal defect (ASD) closure device was complicated by entrapment of a mapping catheter in the device. The procedure was converted to open heart surgery, the device with the trapped catheter was explanted, the ASD was covered with a bovine patch, and a cryomaze procedure was performed. (**Level of Difficulty: Intermediate.**) (J Am Coll Cardiol Case Rep 2022;4:685–687) © 2022 The Authors. Published by Elsevier on behalf of the American College of Cardiology Foundation. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

A 45-year-old man had a history of tachycardia-mediated cardiomyopathy and impaired left ventricular ejection fraction of 25%, owing to persistent atrial fibrillation (AF). His left ventricular ejection fraction was normalized under sinus rhythm, but the right ventricle and atrium remained dilated. Cardiac magnetic resonance showed an ASD secundum with 2.1:1 shunt, and percutaneous closure of the ASD was performed. The ASD was sized to 27 mm and closed with a 30-mm Occlutech ASD Occluder device (Occlutech Int. AB, Sweden) (named device) without any residual shunt. At follow-up, the patient still experienced symptomatic persistent AF and was referred for pulmonary vein isolation (PVI).

MANAGEMENT

The ablation procedure was performed with the patient under general anesthesia. Transesophageal echocardiography-guided puncture of the device was performed with a BRK1 needle (Abbott) through a SLO long sheath (Abbott, USA). Sequential dilation of the puncture was performed with 5 mm and 7 mm coronary balloons through a central portion of the device. After several attempts an Agilis sheath (Abbott, USA) could be placed through the device. Location of the sheath tip in the left atrium (LA) was confirmed by the injection of radiocontrast material, transesophageal echocardiography, and pressure measurements through the sheath. A Pentaray mapping catheter (Biosense Webster) was advanced through the sheath to the LA. Attempts to further advance the mapping catheter in the LA failed because the catheter was trapped in the device (**Figure 1**). Attempts to release the catheter from the device failed. The procedure was converted to cardiac surgery with the patient under cardiopulmonary bypass. The device with the trapped catheter was explanted. The 30-mm ASD defect was closed with a bovine pericardial patch, and a cryomaze procedure was performed. Postoperative

From the ^aDepartment of Cardiology, Karolinska University Hospital, Stockholm, Sweden; and the ^bDepartment of Cardiac Surgery, Karolinska University Hospital, Stockholm, Sweden.

The authors attest they are in compliance with human studies committees and animal welfare regulations of the authors' institutions and Food and Drug Administration guidelines, including patient consent where appropriate. For more information, visit the [Author Center](#).

Manuscript received December 15, 2021; revised manuscript received February 24, 2022, accepted April 8, 2022.

ABBREVIATIONS AND ACRONYMS

AF = atrial fibrillation

ASD = atrial septal defect

LA = left atrium

PVI = pulmonary vein isolation

care was complicated by pericarditis requiring pericardiocentesis. At follow-up, the patient had a stable sinus rhythm.

DISCUSSION

Patients with ASD closure devices may need to undergo a transseptal puncture for ablation procedures. If possible, the transseptal puncture should be done beside the device. If the device is >26 mm, as in our case, transseptal access through the device is recommended, preferably with sequential balloon predilation.¹

Transseptal puncture through other devices has previously been performed by us and by others,^{1,2} but to our knowledge, puncture through this ASD closure device has not been previously described. This device has a high-density structure of nitinol wires with shape metal properties, which may contribute to the risk of squeezing and trapping sheaths and catheters. The devices may induce spontaneous retraction of catheters.² This may explain why the catheter was trapped after the sheath was inadvertently retracted from the LA by the device. We hypothesize that other types of mapping catheters may also become trapped inside this device because of the properties of this device.

In patients with AF, a PVI should be considered previous to ASD closure to avoid increased complication risks resulting from difficulties with transseptal access. ASD closure is also associated with increased AF burden,³ and the threshold to perform PVI before ASD closure should be low.

CONCLUSIONS

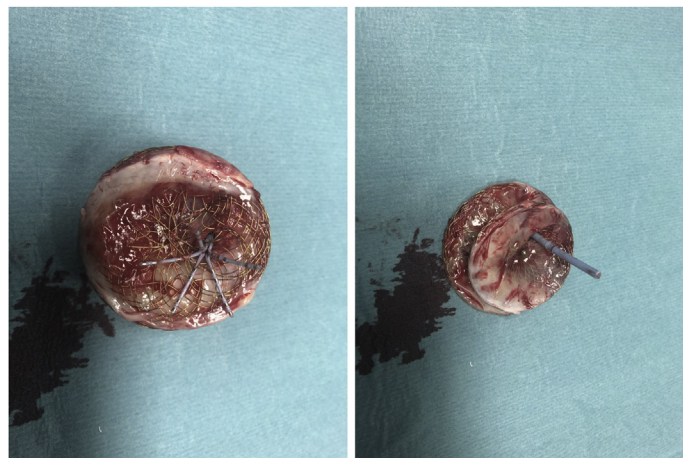
This case strongly suggests that transseptal puncture through this ASD closure device should be avoided.

FUNDING SUPPORT AND AUTHOR DISCLOSURES

The authors have reported that they have no relationships relevant to the contents of this paper to disclose.

ADDRESS FOR CORRESPONDENCE: Dr Ott Saluveer, Department of Cardiology, Karolinska University Hospital, Halsovagen 13, 14157 Stockholm, Sweden. E-mail: ott.saluveer@regionstockholm.se.

FIGURE 1 The Explanted Atrial Septal Defect Closure Device With the Trapped Mapping Catheter



REFERENCES

1. Xuping Li, Wissner E, Kamioka M, et al. Safety and feasibility of transseptal puncture for atrial fibrillation ablation in patients with atrial septal defect closure devices. *Heart Rhythm*. 2014;11:330-335.
2. Sang C-H, Dong J-Z, Long D-Y, et al. Transseptal puncture and catheter ablation of atrial fibrillation in patients with atrial septal occluder: initial experience of a single centre. *Europace*. 2018;20:1468-1474.
3. Nakagawa K, Akagi T, Nagase S, et al. Efficacy of catheter ablation for paroxysmal atrial fibrillation in patients with atrial septal defect: a comparison with transcatheter closure alone. *Europace*. 2019;21:1663-1669.

KEY WORDS ablation, atrial fibrillation, atrial septal defect, systolic heart failure, thoracotomy, X-ray fluoroscopy