CASE REPORT

Transcatheter Retrieval of Embolized Atrial Septal Defect Occluder Device by Waist Capture Technique

Ae-Young Her, MD, Kyung-Hun Lim, MD and Eun-Seok Shin, MD

Summary

This case study describes the successful percutaneous transcatheter retrieval of an embolized Amplatzer occluder device using the “waist capture technique” in a patient with an atrial septal defect. This technique allowed for stability of the Amplatzer device, compression of the atrial discs for easier removal, prevention of further embolization, and minimal injury to vasculature during device retrieval. This novel and effective technique can be used safely for the retrieval of Amplatzer devices in the venous system.

Key words: Amplatzer occlusion device, Percutaneous transcatheter occlusion

The percutaneous transcatheter occlusion technique is an effective, successful alternative to surgery for the treatment of atrial septal defects (ASD). The Amplatzer septal occlusion device is efficient, safe, and easy to use and has a high success rate. However, a common complication occurring in 0.55% of cases is device embolization. Transcatheter retrieval of the embolized device is possible in about half of cases, and several techniques have been described, including the use of gooseneck snares, pig tail catheters, and bioptomes. In this case study, we report the successful transcatheter retrieval of an embolized ASD occluder device using the “waist capture technique.”

Case Report

A 51-year-old man presented with dyspnea on exertion (NYHA class II), with physical examination revealing a split second heart sound and a left sternal systolic murmur. Electrocardiography showed incomplete right bundle branch block. Transthoracic echocardiography (TTE) showed a secundum type ASD with a left to right shunt and a moderate pulmonary/systemic flow ratio (Qp/Qs) of 2.2 and transesophageal echocardiography (TEE) confirmed the presence of a round shaped ASD, measuring 20 mm by 18 mm. The aortic rim was the shortest measuring 2 mm, while all other surrounding rims had adequate margins. Preparation was made for percutaneous ASD closure with the patient’s informed consent. The procedure was performed under general anesthesia with TEE guidance. The stretched maximal diameter of the defect with sizing balloon was 22 mm, and a 22 mm Amplatzer septal occluder device was selected for use.

The device was loaded into the delivery system and introduced into a 9-French long sheath that had already been placed over the exchange wire. After the device was advanced into the left atrium (LA), the delivery system was withdrawn into the right atrium (RA) until the LA sided disc opened and aligned with the interatrial septum. When continuous TEE confirmed adequate device positioning, the RA sided disc was opened, and to assure stability and appropriate apposition to the rims, gentle push/pull (The Minnesota Wiggle) was performed prior to releasing the device. In view of the complete obliteration of color flow across the defect on TEE as well as the stable position of the device, it was left in place.

The next day, routine chest x-rays and TTE were performed. The x-rays revealed the Amplatzer device shadow was located at the right hilum region, and the TTE showed the embolized Amplatzer device was situated in the right pulmonary artery. As the patient was asymptomatic and hemodynamically stable, percutaneous retrieval of the device was attempted. A 0.035-inch guidewire (Terumo Europe N.V, Belgium) was introduced through the right femoral vein through an 8-French sheath (William Cook Europe Aps, Denmark). To stabilize the embolized device, a 0.035-inch guidewire was passed into the right pulmonary artery which penetrated the mesh of the RA sided disc. A 15-mm Amplatz gooseneck snare (EV3, Endovascular Company, USA) was applied to catch the tip of the guidewire. After stabilizing the embolized device, a 0.035-inch guidewire was passed into the right pulmonary artery which penetrated the mesh of the RA sided disc. A 15-mm Amplatz gooseneck snare (EV3, Endovascular Company, USA) was applied to catch the tip of the guidewire. After stabilizing the embolized device with the looped wire, the device was pulled back into the inferior vena cava (IVC). An attempt was made to snare the hub on the LA sided disc. This was however unsuccessful, and the device migrated to the left pulmonary artery. A 0.014-inch neuro-guidewire (Boston Scientific...
In the heart January 2018 227

TRASNCATHETER RETRIEVAL OF ASD OCCLUDER

Figure. A: The waist of the device was captured by a looped 0.014-inch neuro-guidewire. B: The screw on the RA sided disc was snared by the 15-mm Amplatz gooseneck snare. C: The RA sided disc was slenderized and retrieved into the 12-French Fast-Cath™ sheath.

Corp, USA) was introduced through the 8-French sheath by bending in half and forming a large loop on the distal tip of the sheath (Live video). To stabilize the device, the waist of the device was captured by a looped 0.014-inch guide wire (we call this method “waist capture technique”) (Figure A). The device was once again pulled back into the IVC. We successfully snared the screw on the RA sided disc by the 15-mm Amplatz gooseneck snare (Figure B). However, the inner diameter of the 8-French sheath was too small to retrieve the device and therefore a 12-French Fast-Cath™ Hemostasis sheath (St. Jude Medical, Inc., St. Paul, MN, USA) was introduced through the 8-French sheath after cutting the connector of the 8-French sheath. With slight release of the trapped waist of the device by the looped guidewire, the RA disc was slenderized and retrieved into the 12-French sheath (Figure C). The entire device was then easily pulled into the sheath and successfully retrieved.

The stretched diameter of the defect had increased up to 23 mm on intra-procedural TEE. Therefore, a 26-mm Amplatzer occluder was deployed carefully across the defect without any complications. The patient was discharged 48 hours later after confirmation of the device location on TTE.

Discussion

A percutaneous transcatheter occlusion device is an alternative to surgical closure of ASD, because of its low complication rates and shorter hospital stays compared to surgical repair.10 Device embolization is a common and potentially fatal complication of percutaneous ASD closure, which may be a result of inadequate rim margins, improper sizing, and improper placement of the device.1,3,6 Our patient had an aortic rim measuring 2 mm, and margins of < 5 mm may predispose the patient to early and late device embolization.9 Surgery for retrieval of the device is a proposed treatment, but it carries additional risks including bleeding secondary to antiplatelet therapy. Several transcatheter retrieval techniques of embolized devices have been described using gooseneck snares, pig tail catheters, and biopettes.3,5

In this case report, we introduce a technique called “waist capture technique”. This technique allowed for stability of the Amplatzer device while a downward pulling motion resulted in compression of the RA and LA sided discs into narrow, elongated shapes which made for easier removal. Further embolization was also prevented as the device was secured with the “waist capture technique”. This technique can minimize complications such as injury to vessels or valves during retrieval of the embolized device. The use of an 8-French sheath for retrieval did not allow for the snare captured screw-receiver to pass through the introducer. Therefore, the use of a sheath larger than the initial deployment sheath to retrieve the embolized device is an important learning point in this case.

In conclusion, we report the first case of transcatheter retrieval of an embolized ASD occluder device using the “waist capture technique” which was successful and effective. This technique can be used safely for the retrieval of Amplatzer devices in the venous system.

Acknowledgments

The authors wish to acknowledge the contributions made by Dr. Young Woo Seo to the case and completion of the manuscript.

Disclosures

Conflicts of interest: The authors declare no conflicts of interest in association with this study.

References


