A Novel Wire-Assisted Technique for Closing Large Atrial Septal Defects

New Concepts of Closure Mechanism

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Transcatheter closure of an atrial septal defect (ASD) with the Amplatzer Septal Occluder (ASO) (St. Jude Medical, St. Paul, Minnesota) is a well-established treatment strategy. Although a majority of ASDs are easy to close percutaneously, large ASDs or those with deficient aortic/superior rims are challenging to close with conventional techniques.

Case 1 shows a large ASD with deficient aortic and superior rims (Figures 1A to 1C, Online Video 1). After several attempts using conventional techniques failed, the Amplatzer stiff wire was placed into the left upper pulmonary vein (LUPV). The ASO (26 mm) was deployed successfully via the LUPV approach. Theoretically, the wire helps keep the left atrial disk parallel to the septum and prevents prolapse into the right atrium (Figure 1C, yellow arrow).

Case 2 shows a large elliptical ASD (26 × 16 mm) (Figure 2A, Online Video 2). It was difficult to deploy the ASO using several techniques. Therefore, the wire (with a multipurpose catheter to prevent tearing of the posterior septum) was placed into the right upper pulmonary vein (Figure 2B). The ASO was successfully implanted in the appropriate position (Online Video 2). The wire likely causes the deformity in the defect (Figure 2C). This deformity brings down the superior rim (Figure 2C, yellow arrows) and provides adequate tension at the superior rim (Figure 2C, red arrow) to maintain the top edge of the left atrial disc in position.

This technique is a novel, simple, and less invasive maneuver that shows promise in challenging ASDs. It is called the wire-assisted technique.

**KEY WORDS** Amplatzer Septal Occluder, atrial septal defect, wire-assisted technique

**APPENDIX** For supplemental videos, please see the online version of this article.

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FIGURE 1 The Wire-Assisted Technique 1

(A) Fluoroscopic image of the wire-assisted technique 1 (Online Video 1).  
(B) A 3-dimensional computed tomography image (using EnSite Verismo Segmentation Tool [St. Jude Medical, St. Paul, Minnesota]) of the relationship between the wire position and the Amplatzer device.  
(C) Illustration of the mechanism of the wire-assisted technique 1. Yellow arrow indicates prevention of left atrial disc prolapse into the right atrial.  
ASO = Amplatzer Septal Occluder; LA = atrium; LAO = left anterior oblique; RA = right atrium.
FIGURE 2 The Wire-Assisted Technique 2

(A) Three-dimensional transesophageal echocardiography of a large elliptical atrial septal defect. (B) Fluoroscopic image of the wire-assisted technique 2 (Online Video 2). (C) Illustration of the mechanism of the wire-assisted technique 2. Abbreviations as in Figure 1.