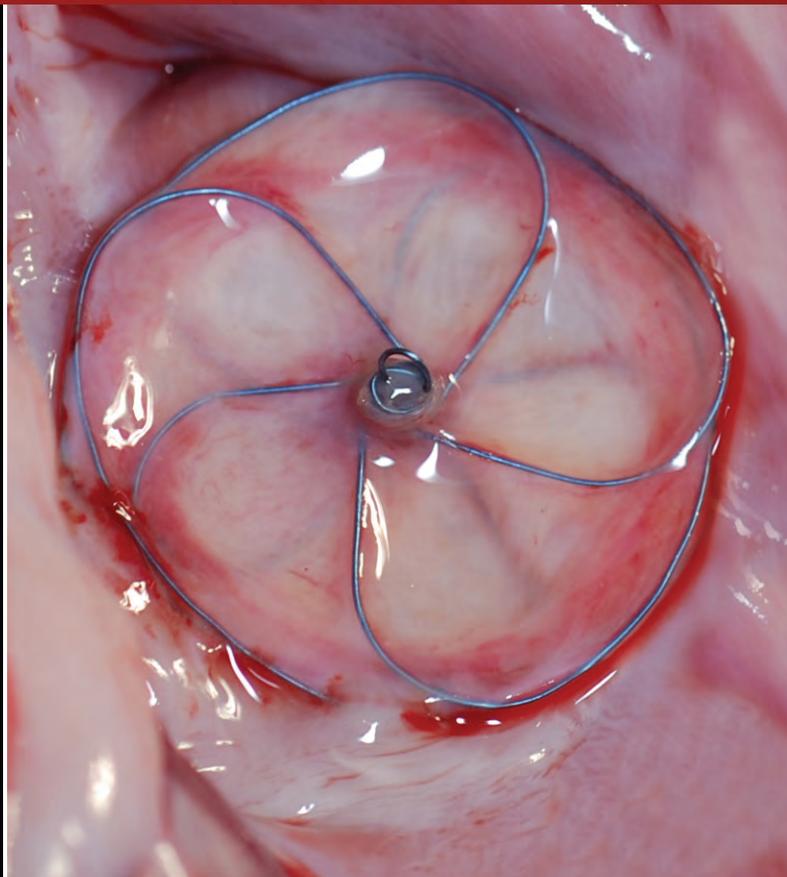


Case Study



► Closure of a Large Defect with Deficient Retroaortic Tissue (Pediatric) with a GORE® CARDIOFORM Septal Occluder



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CASE STUDY

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This is a three-year-old, 15 kg, asymptomatic child with a large secundum atrial septal defect referred for transcatheter atrial septal defect closure.

Procedure

The patient was brought to the cardiac catheterization laboratory and placed under general anesthesia. Antibiotics were given. A baseline transesophageal echocardiogram demonstrated a large secundum defect with deficient retroaortic tissue. The static diameter of the defect was 12 mm with less than 1 mm of retroaortic tissue in multiple views. The inferior vena caval rim was adequate (*Figure 1*).

Vascular access was achieved in the right groin with a 6 Fr sheath in the femoral vein, and a 2 Fr monitoring line

in the femoral artery. Heparin was administered. Right and left heart hemodynamics and a main pulmonary artery angiogram were obtained. There was a significant step-up in saturation from 72% in the superior vena cava to 86% in the branch pulmonary arteries. The Qp:Qs ratio was 2:1, and indexed pulmonary vascular resistance 1.3 Wood units.

A 4 Fr angled GLIDECATH® Hydrophilic Coated Catheter was used to position a 0.035" Safe-T-J® Rosen Curved Wire Guide in the left upper pulmonary vein. A 24 mm AMPLATZER Sizing Ballon II was then advanced across the atrial septum. The 'stop flow' stretched diameter of the defect was 15 mm by fluoroscopy and 14.9 mm by transesophageal echocardiogram (*Figure 2*).

Because of the deficiency of tissue in the retroaortic region, a 30 mm GORE® CARDIOFORM Septal Occluder was chosen. The delivery system was flushed, and device was loaded under sterile saline in the recommended fashion. The

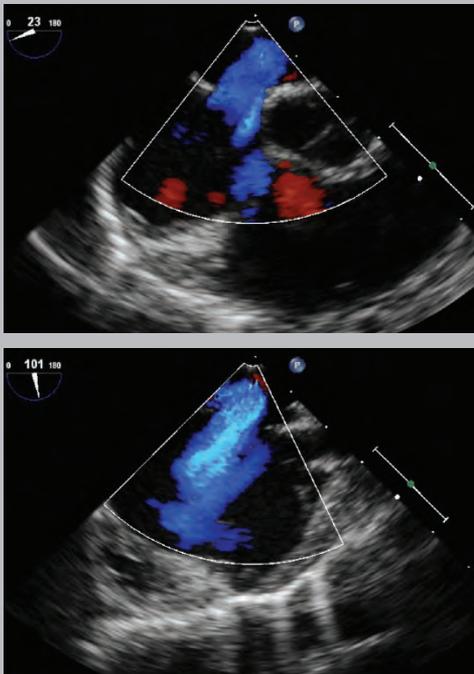


Figure 1. Color flow Doppler demonstrating an ASD with a deficient retroaortic rim in a short axis view (top) but with adequate superior vena caval rim in a bicaval view (bottom).

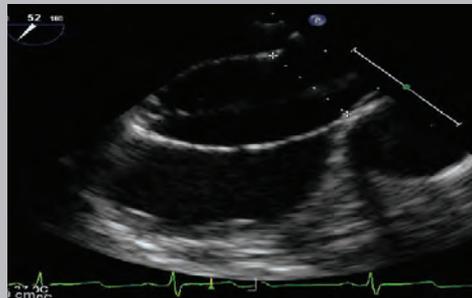


Figure 2. Stop-flow balloon sizing of the ASD showed a diameter of 14.9 mm on echocardiography.



Figure 3. After clockwise rotation of the handle the left disc had a more parallel approach to the atrial septum. Forming part of the right atrial disc helped to center the device in the defect as the left disc was fully pulled to the septum.

delivery catheter was placed over the monorail Safe-T-J® Rosen Curved Wire Guide and advanced into the pulmonary vein, through an 11 Fr sheath*. The wire was removed. Careful consideration to the size of the left atrium in a small child must be made when forming the left atrial disc of a larger occluder. As the slider is used to form the device, the initial portion of the left disc is released straight. In a small child, it may help to begin forming the left atrial disc in the pulmonary vein, to ensure there is enough room to allow the disc to form without prolapse into the right atrium. In this case, the left atrial disc was formed fully within the left atrium and brought toward the atrial septum. On the first two attempts to deploy the right atrial disc, the left disc began to prolapse through into the right atrium. Two additional technical refinements were employed to assist with capturing the septum appropriately. First, clockwise rotation of the delivery system was used to approach the septum from the posterior aspect of the atrium, and

therefore, more parallel to the plane of the septum. Second, it is possible to begin forming a portion of the right atrial disc to create a small ‘waist’, which may center the device within the defect and minimize prolapse (*Figure 3*). The right atrial disc was formed, and the echocardiogram demonstrated a small but real superior residual shunt (*Figure 4*). In order to correct this, the right disc was re-captured, and the device repositioned slightly more superiorly. There was no residual shunting by the echocardiogram. With gentle push and pull maneuvers, the device appeared quite stable. There was no shunting, and scanning the device in multiple views confirmed atrial septum present between the discs in all planes. The locking step was then performed, and there was significant reorientation (*Figure 5*).

Following release there was no residual shunting seen in the bicaval or short axis views (*Figure 6*). Despite the deficiency of the retroaortic septum, the device was not flared around the aorta on the TEE, or as noted in its extremely flat profile



Figure 4. A residual shunt was observed in a bicaval view on the superior edge of the device before it was locked in place. Reloading of the right disc and repositioning of the device eliminated this shunt.



Figure 5. Fluoroscopy images showing the device before locking (top) and after locking (bottom) when tension from the delivery system has been relieved and the device sits in a more neutral position on the septum.

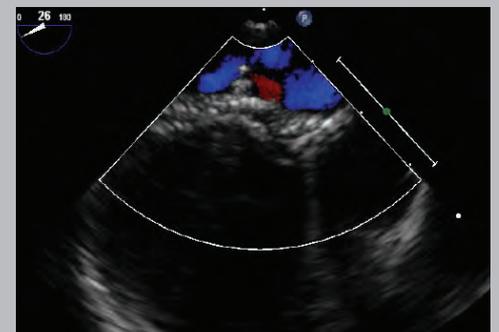
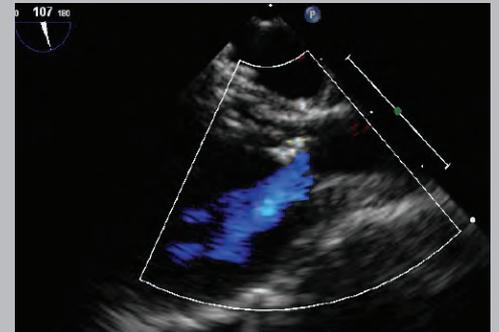


Figure 6. Echocardiography after device release shows a flat profile without residual shunt in bicaval (top) and short axis (bottom) views.

on cine (Figure 7). The pre-discharge transthoracic study demonstrated the device to be in excellent position with no residual shunting (Figure 8).

Discussion

In summary, this child had a large secundum atrial septal defect with deficient retroaortic septum and underwent successful closure using a 30 mm GORE® CARDIOFORM Septal Occluder. Several technical considerations must be given to smaller patients with larger defects and deficient retroaortic septum. A large GORE® CARDIOFORM Septal Occluder may prolapse through a small left atrium while attempting to form the left atrial disc. This can be minimized by beginning to form the disc in the pulmonary vein. It is more likely to see the left disc prolapse while forming the right atrial disc in a patient such as this. One can avoid left disc prolapse with clockwise rotation of the delivery system, promoting a posterior approach toward the atrial septum, while simultaneously using a portion of the right atrial disc to center the device within the defect. Despite no retroaortic tissue, the GORE® CARDIOFORM Septal Occluder provided an excellent result with no residual shunting in the catheterization laboratory or on follow-up imaging.



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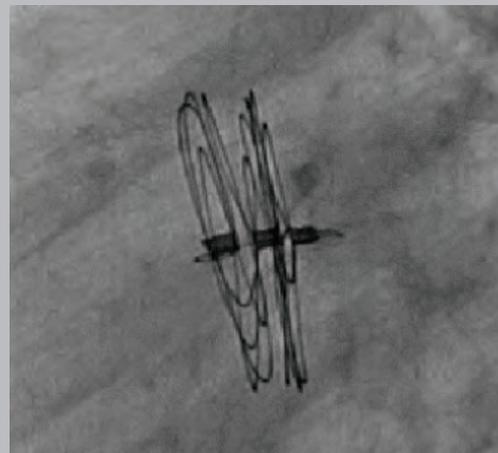


Figure 7. The final, flat appearance of the device was demonstrated on fluoroscopy.

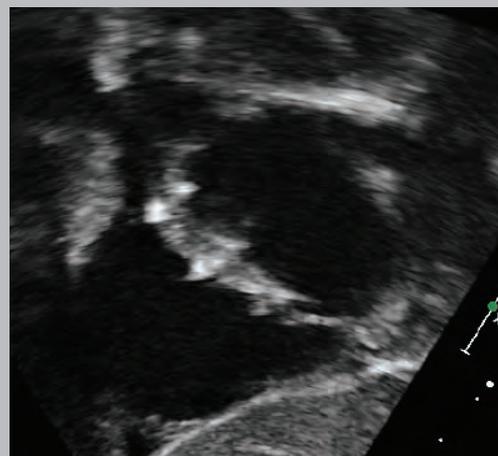
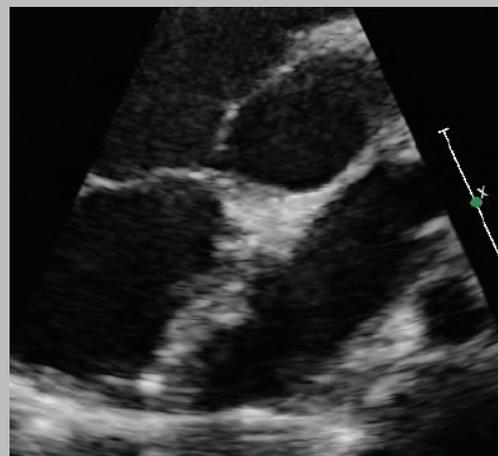


Figure 8. Pre-discharge echocardiograms one day after implantation confirmed good device placement without residual shunt.