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Utility of the Gore Septal Occluder in Transcatheter Closure of Post-Myocardial Infarct Ventricular Septal Defect

Initial Experience

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We present 2 examples of post-myocardial infarction ventricular septal defect (PMIVSD) successfully treated by percutaneous closure using the Gore septal occluder (GSO) (W. L. Gore and Associates, Flagstaff, Arizona).

A 71-year-old woman was transferred to our institution after elective percutaneous intervention to the left anterior descending artery, complicated by coronary dissection and a periprocedural myocardial infarction. Two days later, a new pansystolic murmur was detected and echocardiography confirmed an apical PMIVSD. With incipient multiorgan failure, she underwent successful percutaneous closure of the defect using a 30-mm GSO on day 10 post-myocardial infarction.

A 79-year-old woman with a late presentation anterior myocardial infarction and PMIVSD underwent surgical repair with a bovine pericardial patch and bypass grafting. Post-operative echocardiography revealed 2 large separate residual PMIVSDs. Twenty-two days after surgery, she underwent percutaneous closure.

In both examples, procedural access was via the right internal jugular vein and right femoral artery. Left ventriculography showed severe left-to-right shunt. Standard percutaneous techniques, including crossing of the defect retrogradely and arteriovenous circuit formation were performed (1). Transoesophageal echocardiography and fluoroscopy were used for guidance.

In the first example, a 30-mm GSO was deployed and control angiogram showed a second separate apical defect with a mild to moderate shunt. After the procedure, liver and renal function normalized and the patient was discharged with a plan for elective surgery (**Figure 1**, Online Video 1). In the second example two 30-mm GSO devices were deployed in the inferior and posterior aspects of the septum surrounding the bovine pericardial patch. A control angiogram showed no residual shunt and the patient was discharged 5 days later (**Figure 2**, Online Video 2). Post-procedure, a gated computed tomography scan showed devices in situ with excellent conformation to the ventricular chambers (**Figures 3 and 4**). In both examples, an immediate hemodynamic improvement was noted.

Closure by PMIVSD is a complex procedure and technical challenges include unstable septal anatomy and a huge variation in size and shape of the defects. Early after the insult, the myocardium remains friable

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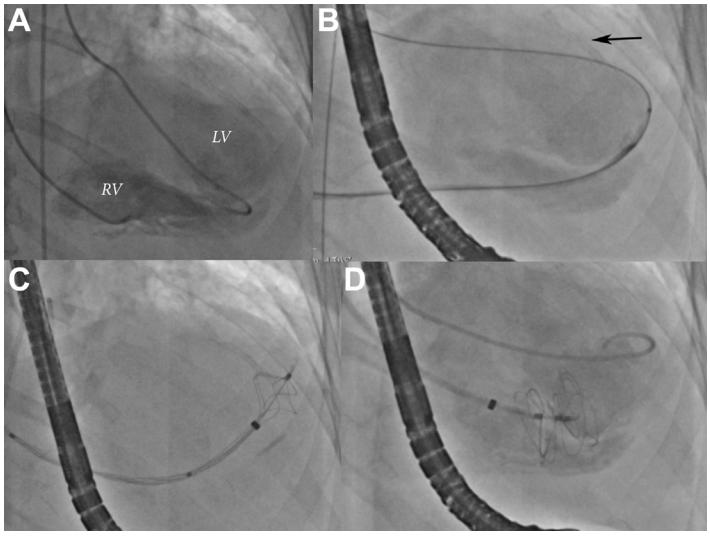
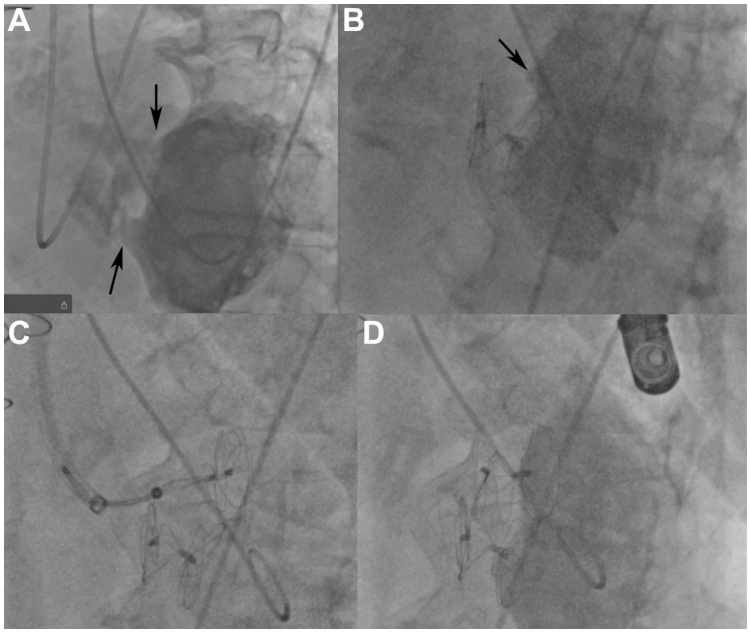
FIGURE 1 Deployment of the Gore Septal Occluder Device



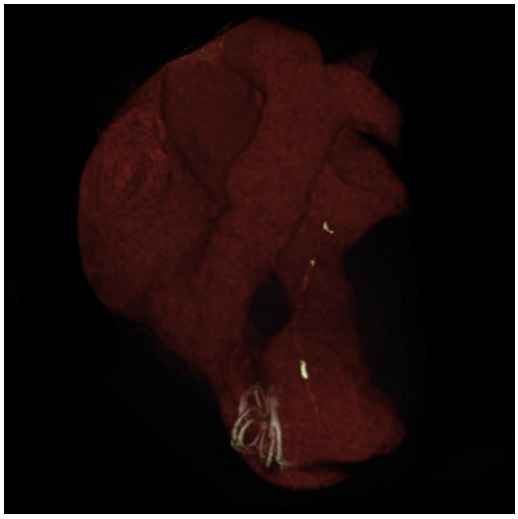
(A) An angiogram is undertaken using a pigtail catheter in the LV to delineate the defect (Online Video 1). The catheter in the right ventricle is a JR4. **(B)** The defect has been crossed from the LV side with a Terumo wire and an arteriovenous loop has been created. A multitrack catheter has been advanced on the wire. The **black arrow** points to the previously implanted LAD stents. **(C)** The device has been advanced from the venous sheath and the left sided disc has been deployed. **(D)** The device has been pulled back on to the ventricular septum and the right sided disc deployed in the RV. JR4 = Judkins Right; LAD = left anterior descending; LV = left ventricle; RV = right ventricle.

FIGURE 2 Deployment of 2 Gore Septal Occluder Devices



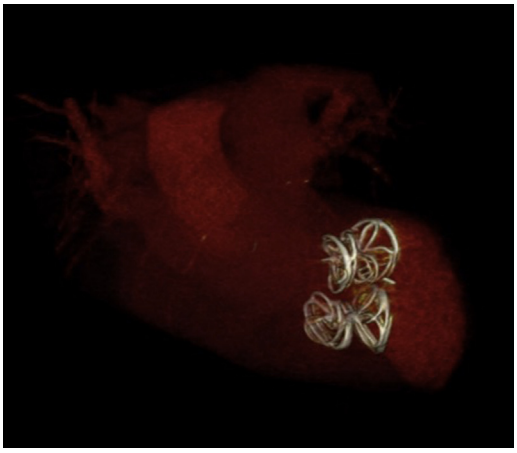
(A) Initial left ventriculography (Online Video 2) demonstrates 2 separate shunts on either side of the surgical patch **(black arrows)**. **(B)** The first device has been deployed across the more apical defect, but a shunt is still seen from the other defect **(black arrow)**. **(C)** A second device being deployed in the second defect. **(D)** Final result demonstrating no residual shunt.

FIGURE 3 Computed Tomography Reconstruction



Computed tomography reconstruction demonstrating the apical position of the Gore septal occluder device in the first example. Artifact from the left anterior descending arterial stents is clearly seen.

FIGURE 4 Computed Tomography Reconstruction



Computed tomography reconstruction demonstrating the 2 Gore septal occluder devices sited in the second example.

and in some cases stiffer devices could potentially extend the defect. In addition, we decided to use this device for the following reasons: 1) presence of slit-like defect at the infarct borders; 2) soft and compliant discs that could mold to the shape of the LV; and 3) a small waist so there was less chance of stretching the defect further. To the best of our knowledge, the information presented herein demonstrates the first successful use of the GSO to close PMIVSDs (2).

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KEY WORDS Gore septal occluder, post-myocardial infarction, ventricular septal defect

APPENDIX For supplemental videos and their legends, please see the online version of this article.