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IMAGES IN INTERVENTION

Percutaneous Ventricular Septal Defect Closure After Sapien 3 Transcatheter Aortic Valve Replacement

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An 89-year old man with severe, symptomatic aortic stenosis (Society of Thoracic Surgeons estimated mortality of 5.6%) underwent transcatheter aortic valve replacement (TAVR) with a #29 Sapien 3 (Edwards Lifesciences, Inc., Irvine, California) prosthesis as part of the PARTNER trial (Placement of Aortic Transcatheter Valve Trial) intermediate-risk registry cohort. Post-operatively, a new asymptomatic restrictive membranous ventricular septal defect (VSD) was noted on transthoracic echocardiogram, a rare complication post-transcatheter aortic valve replacement (1,2). One month later, he presented with a progressive nonproductive cough and dyspnea. A transesophageal echocardiogram revealed a larger VSD and new left ventricular dysfunction (**Figure 1A**, Online Video 1; **Figure 1C**, Online Video 3). Right heart catheterization demonstrated a Qp/Qs ratio of 1.6:1. The decision was made to repair the VSD with a transcatheter closure device. Under general anesthesia and transesophageal echocardiographic guidance, percutaneous VSD closure was performed with an Amplatzer Muscular VSD occluder (St. Jude Medical, Inc., St. Paul, Minnesota) (10-mm diameter) with an anterograde arteriovenous loop technique. No significant shunting was observed post-deployment (**Figures 1B, 1D, 1E, and 1F**, Online Videos 2, 3, 5, and 6).

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From the Cardiology Division, Department of Medicine, Perelman School of Medicine of the University of Pennsylvania, Philadelphia, Pennsylvania. Dr. Ferrari has fiducial responsibilities to the Society for Cardiovascular Magnetic Resonance Executive Committee and the American College of Cardiology Board of Governors. Dr. Herrmann has received research funding from Abbott Vascular, Edwards Lifesciences, St. Jude Medical, Medtronic, Gore, Siemens, Boston Scientific, and MitraSpan; has received consultant fees and honoraria from Siemens, Edwards Lifesciences, Merck, and GlaxoSmithKline; and has equity in Micro-interventional Devices. Drs. Mark and Prasanna have reported that they have no relationships relevant to the contents of this paper to disclose.

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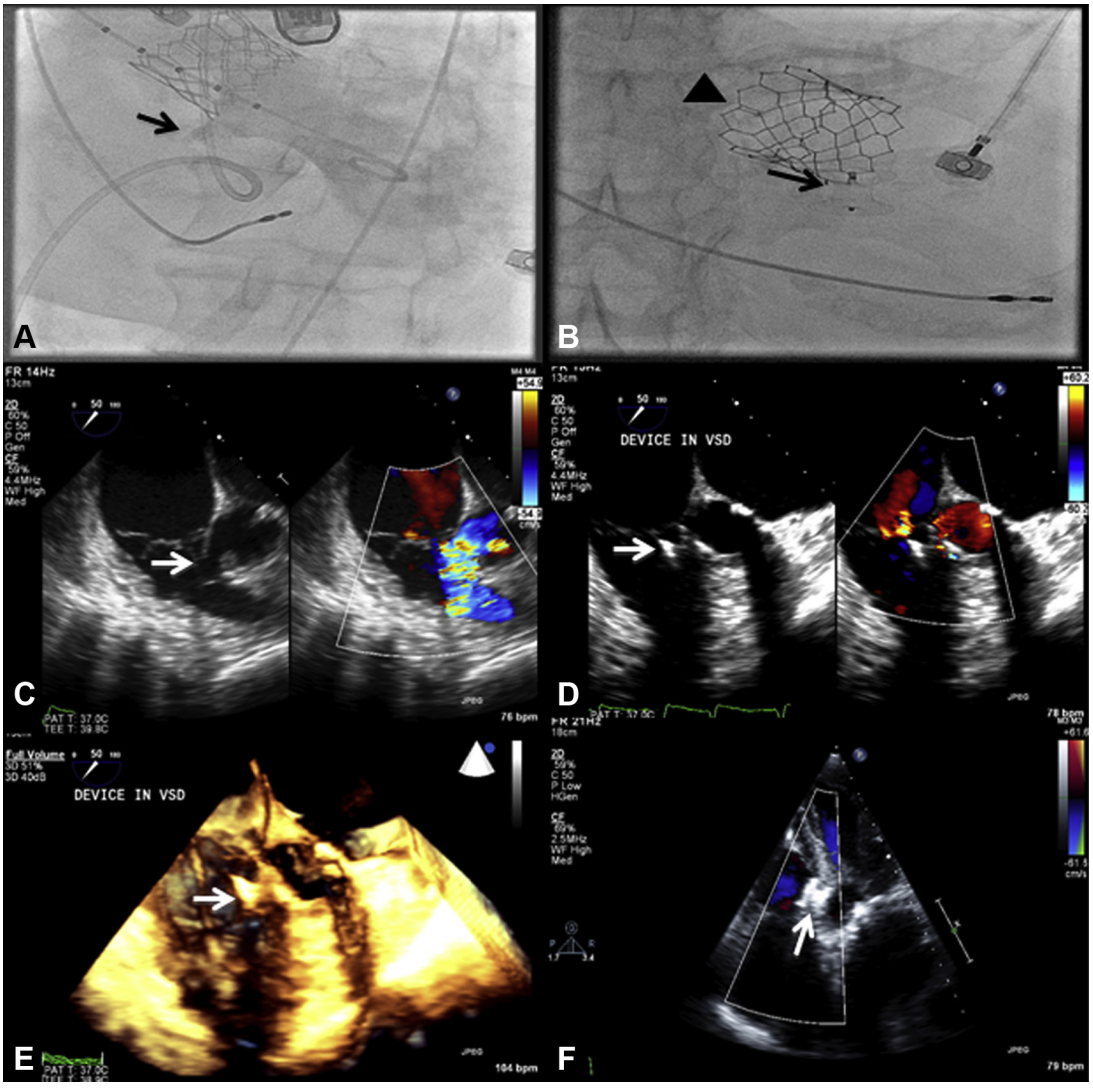
FIGURE 1 VSD Pre- and Post-Percutaneous Closure



(A) Anterior posterior left ventriculogram revealing contrast media shunted across the ventricular septal defect (VSD) **(arrow,** Online Video 1**). (B)** Left anterior oblique fluoroscopy with the Edwards Sapien 3 valve **(arrowhead),** and directly posterior to it sits the Amplatzer **(arrow,** Online Video 2**). (C)** Apical 4-chamber color transesophageal echocardiogram compared with 2-dimensional view, revealing a moderate-sized VSD **(arrow,** Online Video 3**). (D)** Post-Amplatzer revealing a small residual VSD **(arrow,** Online Video 4**). (E)** Post-Amplatzer transesophageal echocardiogram 3-dimensional reconstruction **(arrow,** Online Video 5**). (F)** Post-Amplatzer transthoracic echocardiogram apical 4-chamber color Doppler **(arrow,** Online Video 6**).**

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KEY WORDS complication, transcatheter aortic valve replacement, ventral septal defect

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