JACC: CARDIOVASCULAR INTERVENTIONS
VOL. 5, NO. 12, 2012

ISSN 1936-8798/$36.00
PUBLISHED BY ELSEVIER INC.
http://dx.doi.org/10.1016/j.jcin.2012.08.014

IMAGES IN INTERVENTION

Percutaneous Closure of a Left Ventricular Pseudoaneurysm After Sapien XT Transapical Transcatheter Aortic Valve Replacement

Anna E. Bortnick, MD, PhD,*† Emily Gordon, MD,‡ Jacob Gutsche, MD,‡ Saif Anwaruddin,* Wilson Y. Szeto, MD,§ Nimesh Desai, MD,§ Prashanth Vallabhajosyula, MD,§ Joseph E. Bavaria, MD,§ Howard C. Herrmann, MD*

Philadelphia, Pennsylvania; and New York, New York

An 87-year-old woman with severe aortic stenosis (aortic valve area: 0.6 cm^2, mean gradient: 60 mm Hg, ejection fraction: 80%) was referred for transcatheter aortic valve replacement. She was high risk for

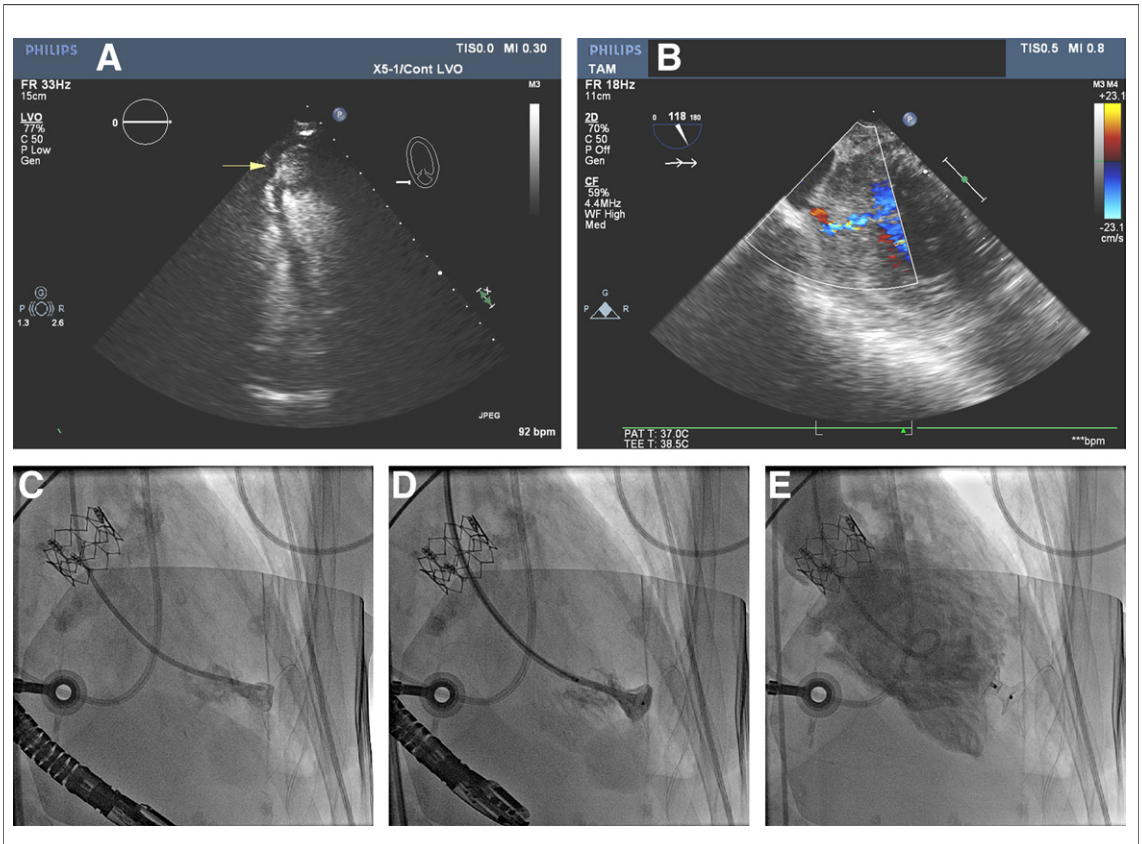

Figure 1.

(A) Transthoracic echocardiogram with contrast in the three chamber view demonstrating the presence of a left ventricular pseudoaneurysm at the site of the transapical puncture. **(B)** Transesophageal echocardiogram with color Doppler demonstrating flow into the pseudoaneurysm. **(C)** Selective angiography of the pseudoaneurysm was performed through a multipurpose diagnostic catheter. There was a short communication from the left ventricle into a complex pouch which had upper and lower chambers. **(D)** The first disc of a 6mm Amplatzer muscular Ventricular Septal Defect Occluder was deployed across the tract. Static flow was seen in the lower portion of the pseudoaneurysm on selective angiography. **(E)** Ventriculography showed complete occlusion of the pseudoaneurysm.

From the *Division of Cardiovascular Medicine, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania; †Department of Cardiology, Montefiore Medical Center, Bronx, New York; ‡Department of Anesthesiology, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania; and §Division of

open aortic valve replacement (Society of Thoracic Surgeons class 10.6) due to a history of chronic hepatitis on azathioprine, coronary artery disease, atrial fibrillation, multiple falls with hip and clavicular fractures, and frailty (body mass index: 15.6 kg/m^2). The procedure was performed transapically due to poor peripheral access. She underwent a left mini thoracotomy and a 23-mm Sapien XT prosthesis (Edwards Lifesciences, Irvine, California) was inserted via the Ascendra 2 delivery system (Edwards Lifesciences). Two perpendicular, pledgeted horizontal mattress sutures were placed in the muscular portion of the anterior left ventricular (LV) apex. The pledgeted sutures were tied down under rapid ventricular pacing at completion of the procedure and after removal of the sheath. There was satisfactory hemostasis, a third anchoring suture was placed as a precaution, and chest closure was performed. The patient was discharged on post-operative day 6.

Two weeks after the procedure, the patient presented to an outside hospital with left-sided abdominal pain and bilious vomiting. Computed tomography demonstrated a small bowel obstruction. There was an incidental finding of a 19 × 31 × 27 mm contrast-filled structure adjacent to the LV, and she was transferred for further management. A transthoracic echocardiogram with contrast confirmed the presence of an LV pseudoaneurysm with a 3.5-mm neck (Fig. 1A) (Online Video 1). LV pseudoaneurysm is a recognized but rare complication and has implications for the delivery of other devices through the LV apex (1–3).

After discussion with the patient and her family, a decision was made to proceed with percutaneous closure of the pseudoaneurysm using a 6-mm Amplatzer muscular Ventricular Septal Defect Occluder (St. Jude Medical Inc., St. Paul, Minnesota) via a retrograde approach from the right femoral artery. The procedure was performed in a hybrid operating room with fluoroscopic and transesophageal echocardiographic guidance (Fig. 1B) (Online Video 2).

The tract was crossed with a 6-F multipurpose diagnostic catheter and a 0.035-inch Terumo Glidewire (Terumo Medical Corp., Somerset, New Jersey). A complex structure, consisting of a small upper pouch communicating with a lower, larger pouch was seen on selective angiography (Fig. 1C). A 0.035-inch exchange length Amplatz Extra Stiff wire (Cook Medical, Bloomington, Indiana) was advanced through the multipurpose diagnostic catheter and used to exchange for an 8-F multipurpose guide catheter. The muscular Ventricular Septal Defect Occluder device was deployed and released (Fig. 1D). Final ventriculography showed no flow into the pseudoaneurysm and a stable muscular Ventricular Septal Defect Occluder closure device in the wall of the LV (Fig. 1E) (Online Video 3). The patient tolerated the procedure and was discharged 5 days after procedure once the small bowel obstruction resolved.

Reprint requests and correspondence: Dr. Howard C. Herrmann, Interventional Cardiology and Cardiac Catheterization Laboratories, Hospital of the University of Pennsylvania, 34th and Spruce Streets, Philadelphia, Pennsylvania 19104. E-mail: howard.herrmann@uphs.upenn.edu.

Cardiovascular Surgery, Hospital of the University of Pennsylvania, Philadelphia, Pennsylvania. Dr. Bortnick has received partial salary support from a grant to her department by Abbott Vascular. Drs. Anwaruddin, Szeto, and Desai have served as subprincipal investigators of the PARTNER trial. Dr. Szeto has served on the PARTNER Trial Steering Committee, as a consultant for Microinterventional Devices and received a research grant from Edwards LifeSciences. Drs. Bavaria and Herrmann have served as principal investigators of the Edwards Lifesciences PARTNER trial. Dr. Herrmann has received research funding from the institution and speaking honoraria from Edwards Lifesciences, consulting fees from St. Jude Medical and Paeion, and has equity in Microinterventional Devices. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received July 17, 2012; accepted August 2, 2012.

REFERENCES

1. Vanezis AP, Baig MK, Mitchel IM, et al. Pseudoaneurysm of the left ventricle following apical approach TAVI. J Cardiovasc Magn Reson 2011;13:79.
2. Kumar PV, Alli O, Bjarnason H, et al. Percutaneous therapeutic approach to closure of cardiac pseudoaneurysms. Catheter Cardiovasc Interv 2012;80:687–99.
3. Vignati G, Bruschi G, Mauri L, et al. Percutaneous device closure of iatrogenic left ventricular wall pseudoaneurysm. Ann Thorac Surg 2009;88:e31–3.