Novel Percutaneous Apical Exclusion of a Left Ventricular Pseudoaneurysm After Complicated Transapical Transcatheter Aortic Valve Replacement

Soraya Merchan, MD,* Chi-Hion Li, MD,† Francisco Javier Martinez, MD,‡ Chad Kliger, MD,§ Vladimir Jelnin, MD,∥ Gila Perk, MD,∥ Derek Brinster, MD,∥ Itzhak Kronzon, MD,∥ Carlos E. Ruiz, MD, PhD∥

A 78-year-old woman with a history of coronary artery bypass grafting underwent transapical transcatheter aortic valve replacement with a Sapien XT (Edwards, Irvine, California) prosthesis that was complicated by an apical left ventricular pseudoaneurysm (LVPA). Unsuccessful attempts at closure included percutaneous, retrograde transaortic placement of a 12-mm Amplatzer Ventricular Septal Defect occluder (St. Jude Medical, Minneapolis, Minnesota) and surgical CorMatrix (CorMatrix, Roswell, Georgia) patch repair on cardiopulmonary bypass, both with residual expanding and/or recurrent LVPA. A novel transcatheter approach was performed to exclude the left ventricular apex and flow into the LVPA. Using computed tomography–fluoroscopy fusion imaging (HeartNavigator, Philips, Best, the Netherlands), percutaneous transapical access was performed adjacent to the true apical site of the LVPA. The 26-mm Amplatzer septal and 35-mm Amplatzer cribriform occluders were positioned and deployed with the distal disks overlapping, excluding the apical cavity, and the proximal disks positioned on the epicardial surface. Residual flow was noted through the polyester fabric of the devices, and an additional percutaneous transapical access through the LVPA exit site was performed with placement of a 4-F sheath. Three 0.052-inch 10 × 15-mm coils (Cook Medical, Bloomington, Indiana) soaked in thrombin were placed within the excluded apical segment. Echocardiography revealed no further flow into the LVPA, with increased echogenicity of the sac suggesting thrombosis. Computed tomography performed prior to discharge confirmed total occlusion of the LVPA with complete apical exclusion (Figure 1).

Apical left ventricular pseudoaneurysm is an infrequent complication after transapical transcatheter aortic valve replacement (TAVR). They have been traditionally surgically repaired (1), however, patients who undergo TAVR have high operative-risk with multiple comorbidities, increasing significantly the risk of surgical repair. Some cases of percutaneous closure have been reported (2), but the experience with this procedure is limited. We describe the first case of percutaneous closure guided by a novel system of image fusion using computed tomography and fluoroscopy.

REPRINT REQUESTS AND CORRESPONDENCE: Dr. Carlos E. Ruiz, Hackensack University Medical Center and the Joseph M. Sanzari Children’s Hospital, 30 Prospect Avenue, Hackensack, New Jersey 07601. E-mail: CRuiz@StructuralHeartCenter.org.

From the *Department of Cardiology, Hospital Universitario de Salamanca, Salamanca, Spain; †Department of Cardiology, Hospital de la Santa Creu i Sant Pau, Barcelona, Spain; ‡Department of Cardiology, Hospital Costa del Sol, Marbella (Malaga) Spain; and the ∥Hackensack University Medical Center and the Joseph M. Sanzari Children’s Hospital, Hackensack, New Jersey. Dr. Li has served as a proctor/consultant for Abbott. Dr. Kliger has received speakers honoraria from Philips and St. Jude Medical. Dr. Kronzon has received consulting fees and speakers honoraria from Philips. Dr. Ruiz has received research grants and speakers honoraria from Philips and St. Jude Medical. All other authors have reported that they have no relationships relevant to the contents of this paper to disclose.

Manuscript received June 3, 2015; accepted June 23, 2015.
REFERENCES


KEY WORDS LV pseudoaneurysm, percutaneous closure, transapical TAVR