

IMAGES IN INTERVENTION

First Experience With Transcatheter Valve-In-Valve Implantation for a Stenotic Mitral Prosthesis Within the United States

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A 72-year-old woman with coronary artery bypass graft surgery (CABG) with mitral valve replacement (MVR) using a 27-mm Carpentier-Edwards bioprosthesis (Edwards Lifesciences, Irvine, California) 6 years earlier was referred to our institution with severe, symptomatic prosthetic valve mitral stenosis. Her clinical history was otherwise significant for recent percutaneous coronary intervention, bilateral renal artery stenting, and cerebrovascular disease with a 90% stenosis of the left internal carotid artery (ICA) and moderate stenosis of the right ICA. Prior CABG/MVR was complicated by sternal wound

dehiscence necessitating complex reconstruction. In preparation for surgery, stenting of the left ICA was performed without complication. The patient was then taken to the operative suite for MVR via a right anterior thoracotomy; however, the surgery was aborted because of profound adhesions with obliteration of the pericardial space and patient intolerance to single lung ventilation. Consequently, the patient was brought to the cardiac catheterization laboratory for transcatheter valve-in-valve (VIV) implantation in the mitral position. Transesophageal echocardiography confirmed severe prosthetic valve mitral stenosis

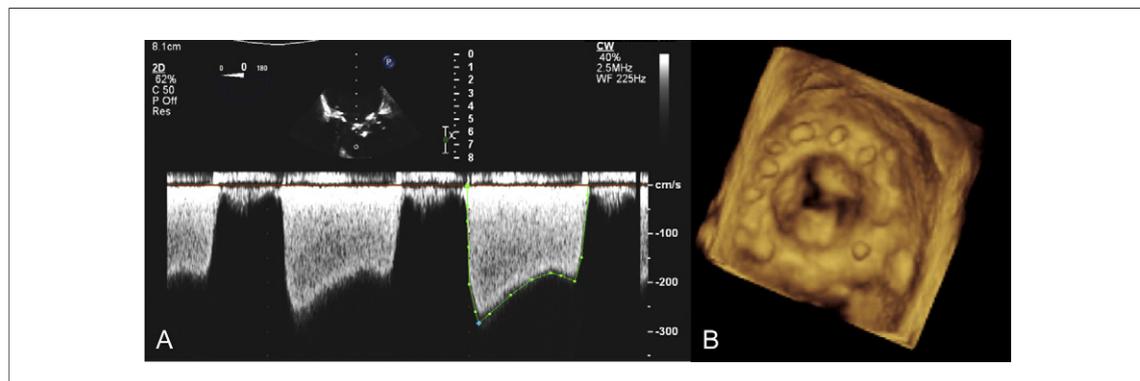


Figure 1. Severe Prosthetic Mitral Valve Stenosis

(A) Transesophageal echocardiographic image demonstrating continuous wave Doppler through the prosthetic mitral valve. Peak and mean gradients across the valve measured 32 and 18 mm Hg, respectively. (B) A 3-dimensional reconstruction of the short-axis view demonstrates restricted valve leaflet mobility with severe stenosis. See Online Video 1.

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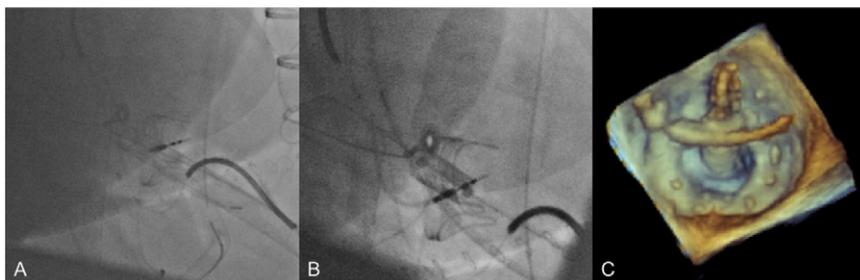


Figure 2. Positioning of Transcatheter Heart Valve Across the Mitral Prosthesis

(A) Fluoroscopic images in the right anterior oblique projection showing the 26-F Ascendra delivery system advanced via a transapical approach across the prosthetic mitral valve into the left atrium. (B) The transcatheter heart valve was then desheathed in the left atrium and pulled back into the mitral prosthesis. (C) Transesophageal echocardiography confirmed appropriate transcatheter heart valve positioning.

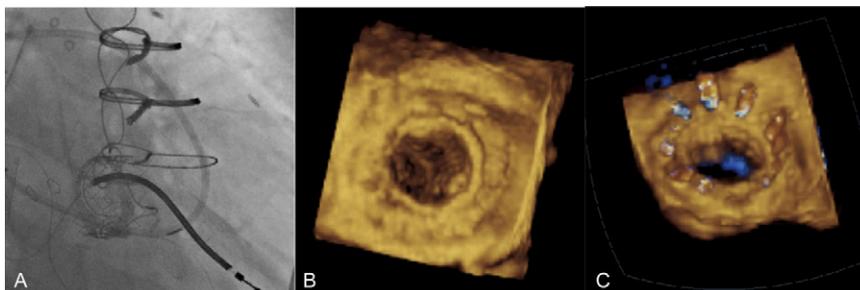


Figure 3. VIV Implantation in the Mitral Position

(A) A 26-mm Edwards SAPIEN transcatheter heart valve is depicted within a mitral prosthesis. (B) Transesophageal echocardiography demonstrated a well-expanded SAPIEN prosthesis, here in systole, with (C) mild, circumferential paravalvular regurgitation and mean transvalvular gradient = 2 mm Hg. VIV = valve-in-valve. See Online Video 2.

(Fig. 1, Online Video 1). A 26-F Ascendra delivery system (Edwards Lifesciences) was placed in the left ventricular apex and then advanced to the left atrium (Fig. 2A). A 26-mm Edwards SAPIEN heart valve (Edwards Lifesciences) was carefully positioned within the mitral prosthesis under fluoroscopic and echocardiographic guidance (Figs. 2B and 2C) and slowly deployed during rapid right ventricular pacing and reduced pump flows. Only minimal paravalvular regurgitation was noted at the end of the procedure, and there was no evidence of residual mitral stenosis (Fig. 3, Online Video 2). Transcatheter VIV implantation within a failed mitral prosthetic valve has been described as feasible and reproducible via the apical approach (1). Here, we present the first such case to our knowledge performed in the United States in an elderly woman not amenable to redo surgical MVR.

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REFERENCE

1. Webb JG, Wood DA, Ye J, et al. Transcatheter valve-in-valve implantation for failed bioprosthetic heart valves. *Circulation* 2010;121:1848-57.

▶ APPENDIX

For accompanying videos, please see the online version of this article.