

IMAGES IN INTERVENTION



High-Risk Transcatheter Aortic Valve Replacement With Evolut-R CoreValve to Simultaneously Treat Severe Calcific Aortic Stenosis and a Large Aortic Root Pseudoaneurysm

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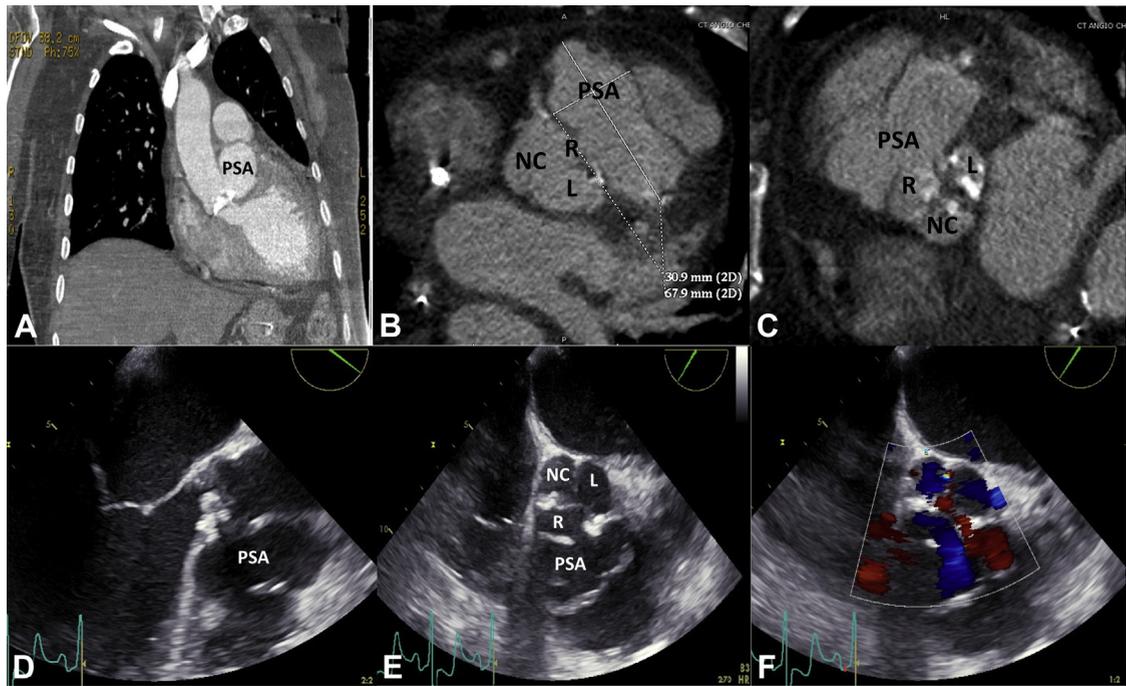
We present a case of an 81-year-old male patient with recurrent episodes of congestive heart failure. He has a medical history significant for end stage renal disease, ischemic cardiomyopathy, and severe aortic stenosis (peak/mean gradients 64/30 mm Hg, aortic valve area 0.6 cm²) with a recent episode of bacterial native aortic valve endocarditis complicated by pseudoaneurysm (PSA) formation in the ascending aortic root. He received appropriate antibiotic treatment, but was deemed inoperable for any surgical aortic valve replacement or aortic root replacement procedures.

Given his poor prognosis without any intervention and non-operable status, he was evaluated for transcatheter aortic valve replacement. He underwent a pre-procedure computed tomography angiogram of the chest (Figures 1A to 1C) and transesophageal echocardiogram (Figures 1D to 1F) demonstrating severe aortic stenosis, severe aortic regurgitation, and a 6.79 × 3.09 cm PSA arising from the right coronary sinus with flow into the defect both in systole and

diastole (Figures 1F and 2A). The position of the neck of the PSA suggested the possibility that deployment of the transcatheter valve may cause fixation of the native coronary leaflet to the aortic wall occluding the PSA.

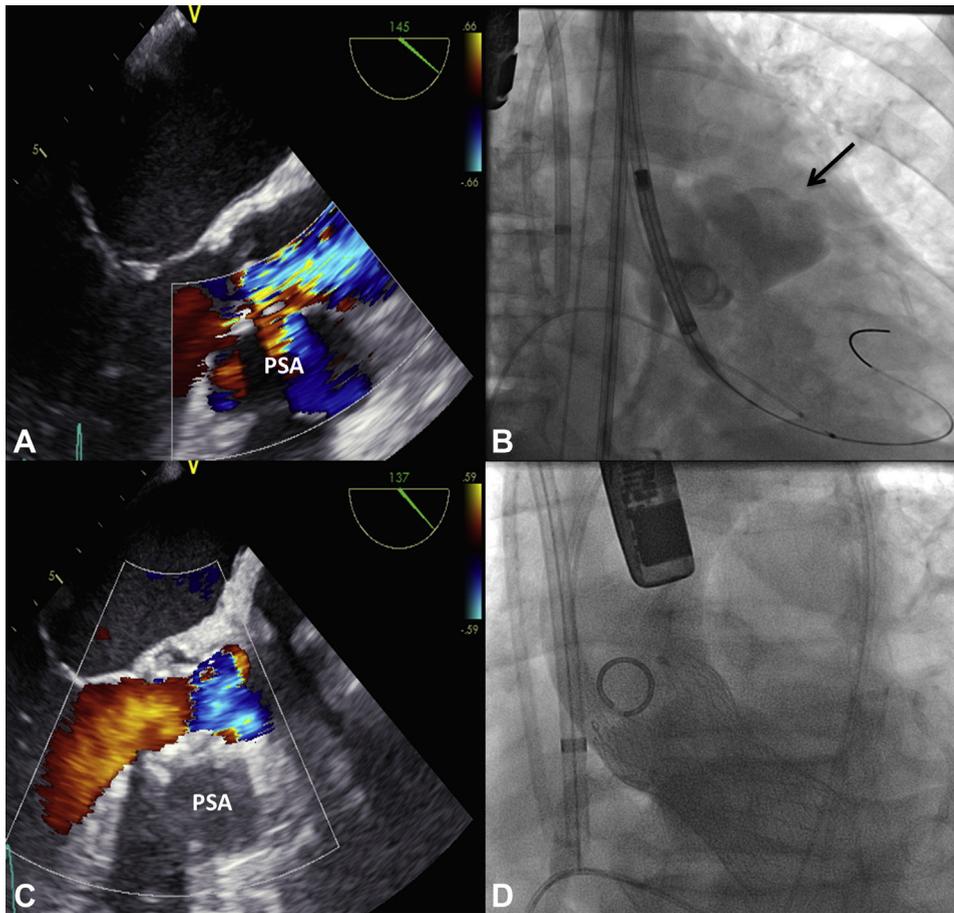
On the day of the procedure, bilateral femoral artery access was obtained (18-F on right and 6-F on left). A pigtail catheter was inserted into the aortic root and an aortogram was obtained demonstrating flow into the PSA (Figure 2B). The delivery system and the 29 mm Evolut-R CoreValve (Medtronic, Minneapolis, Minnesota) were then passed through the 18-F sheath into the aortic root. Rapid pacing was initiated and the valve was deployed without difficulty. Post-deployment transesophageal echocardiogram images demonstrated resolution of aortic stenosis, with no residual paravalvular leak, and occlusion of the neck and elimination of flow into the PSA (Figures 2C and 2D). The patient tolerated the procedure well and was discharged from the hospital on post-operative day 3 without complications.

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FIGURE 1 Pre-Operative Characterization of the Aortic Root PSA

(A) Coronal-oblique image of a computed tomography (CT) chest with contrast depicting the pseudoaneurysm (PSA) arising just distal to the heavily calcified native aortic valve. **(B,C)** Reconstructed CT images in the transverse plane demonstrating the relationship between the coronary cusps and the PSA as it arises from the right coronary sinus. **(D)** Long-axis transesophageal echocardiogram image confirming the CT findings. **(E)** Short-axis transesophageal echocardiogram redemonstrating the relationship to the right coronary sinus with **(F)** color Doppler flow into the PSA. L = left coronary cusp; NC = noncoronary cusp; R = right coronary cusp.

FIGURE 2 Intraoperative Imaging Before and After Deployment of the Valve



(A) Long-axis transesophageal imaging demonstrating color Doppler flow into the pseudoaneurysm (PSA). **(B)** Aortogram demonstrating the location of the PSA (arrow). **(C)** Long-axis transesophageal imaging demonstrating the loss of color Doppler flow into the PSA after deployment of the valve. **(D)** Repeat aortogram demonstrating a significant cessation of flow into the PSA after deployment and balloon valvuloplasty.

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KEY WORDS pseudoaneurysm, TAVR, transcatheter aortic valve replacement