Images in Cardiovascular Medicine

Transapical Implantation of Edwards SAPIEN XT Valve

to Close a Left Ventricular Outflow Tract Pseudoaneurysm

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A 58-year-old man presented with symptomatic high-degree atrioventricular block and congestive heart failure. His medical history included a bicuspid aortic valve (AV), aortic stenosis, and 3 bioprosthetic AV replacement operations—the last, 25 years before, to place a homograft. At the current admission, the patient underwent pacemaker implantation to treat the heart block. Then, a structural AV abnormality was detected. A transesophageal echocardiogram (TEE) showed paravalvular leak and a new finding: a 1.5 × 1.7-cm pseudoaneurysm at the base of the aortic root, adjacent to the fibrous trigone. The pseudoaneurysm, connected by a tract to the left ventricular outflow tract (LVOT), bulged into the left atrium and exhibited pulsatile expansion during systole (Fig. 1). A computed tomographic angiogram showed a 1.8 × 1.9-cm focal outpouching, inferior to the takeoff of the left main coronary artery and posterior to the aortic root. A 3- to 4-mm connection was identified at the 6 o'clock position with respect to the LVOT. The patient's heart failure was probably related to the structural defect. To avoid repeat sternotomy, we chose a percutaneous closure approach. Under diagnostic fluoroscopy (Fig. 2) and intraprocedural TEE (Fig. 3), the pulsatile defect was evident.

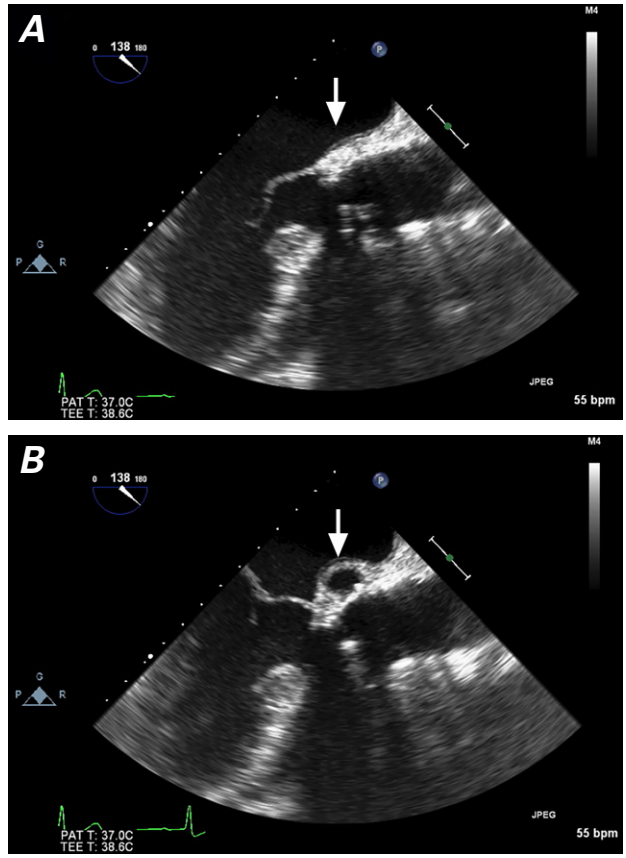

Fig. 1 *Preprocedural transesophageal echocardiograms obtained during **A**) diastole and **B**) systole show the bioprosthetic aortic valve homograft and a pseudoaneurysm (diameter, 1.5 × 1.7 cm) at the base of the aortic root, adjacent to the fibrous trigone. Pulsatile expansion of the pseudoaneurysm (arrow) occurred during systole.*

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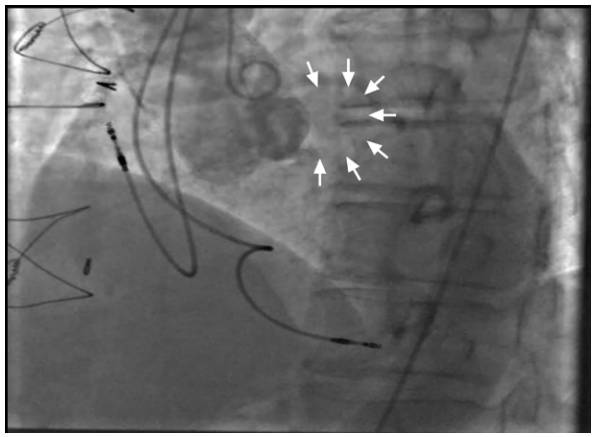


Fig. 2 *Diagnostic fluoroscopic image with contrast medium reveals the pulsatile defect during systole (arrows).*

Supplemental motion image is available for Figure 2.

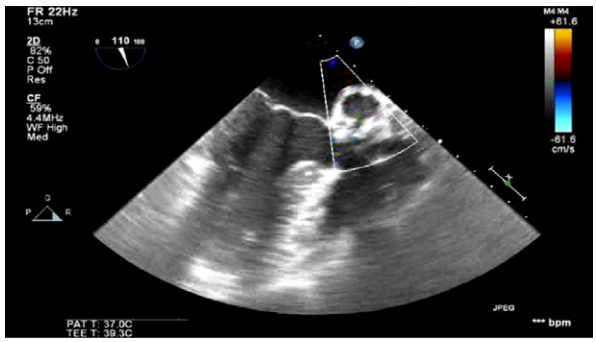


Fig. 3 *Intraprocedural transesophageal echocardiogram (color-flow Doppler mode) shows blood flow inside the lesion and expansion of the left ventricular outflow tract pseudoaneurysm during systole.*

Supplemental motion image is available for Figure 3.

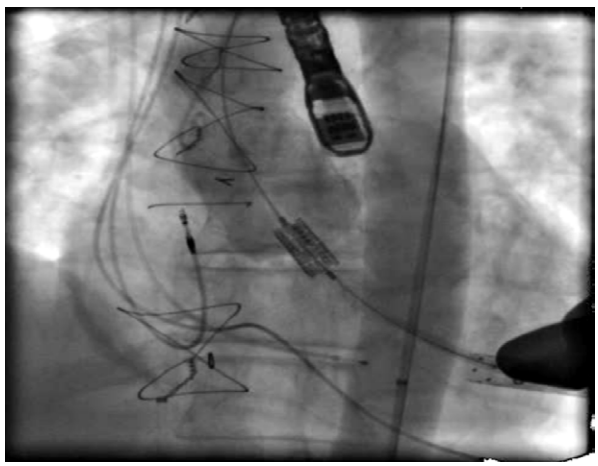


Fig. 4 *Intraprocedural fluoroscopic image shows deployment of a 26-mm Edwards Sapien XT transcatheter heart valve to occlude the communication between the pseudoaneurysm and the left ventricular outflow tract.*

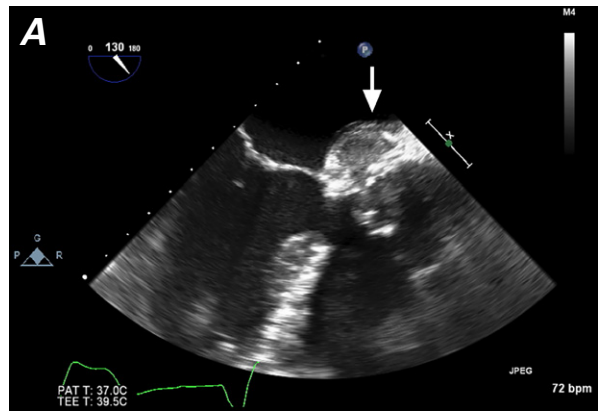
Supplemental motion image is available for Figure 4.

A linear approach into the LVOT seemed feasible, so we attempted to deploy an Amplatzer plug (Abbott) into the pseudoaneurysm through transapical access; however, wire access was unsuccessful. Because transapical access had been established and the pseudoaneurysm contributed to regurgitant blood flow, we decided to implant an Edwards Sapien XT transcatheter heart valve (Edwards Lifesciences Corporation) in valve-in-valve fashion. Expanding the bioprosthetic valvular ring mechanistically closed the pseudoaneurysm neck (Fig. 4). A TEE showed markedly decreased aneurysmal blood flow.

At one-month evaluation, the patient had substantial symptom relief, and TEE showed a normally functioning bioprosthetic valve and the thrombosed pseudoaneurysm (Fig. 5). Eight months postprocedurally, the patient's condition was satisfactory.

Comment

Pseudoaneurysms of the LVOT can develop after surgical AV replacement.[1] High-risk surgical repair was one



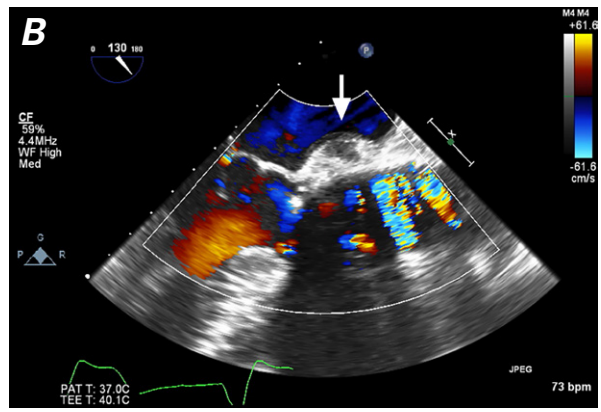


Fig. 5 *One month postprocedurally, transesophageal echocardiograms in **A**) standard and **B**) color-flow Doppler modes show normal bioprosthetic valve function. The thrombosed pseudoaneurysm (arrow) is visible in the fibrous trigone.*

Supplemental motion image is available for Figure 5.

of few options for treating these defects. More recently, percutaneous techniques associated with lower risks than those of surgery have been used.[2,3] Treatment options include Amplatzer devices, vascular plugs (for moderate- to large-sized pseudoaneurysms with narrow necks), and coil embolization (for small- to moderate-sized pseudoaneurysms with narrow necks, and for cases that raise concern about the compressive effects of occluder devices).[4] Our patient was eligible for percutaneous closure, but placing an Amplatzer plug was not technically feasible. Placing an Edwards Sapien XT transcatheter valve enabled thrombosis of the pseudoaneurysm. To our knowledge, this is the first reported use of transcatheter AV implantation to manage an LVOT pseudoaneurysm.

References

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