

IMAGES IN INTERVENTION

Percutaneous Closure of Paravalvular Leak After Transcatheter Aortic Valve Replacement

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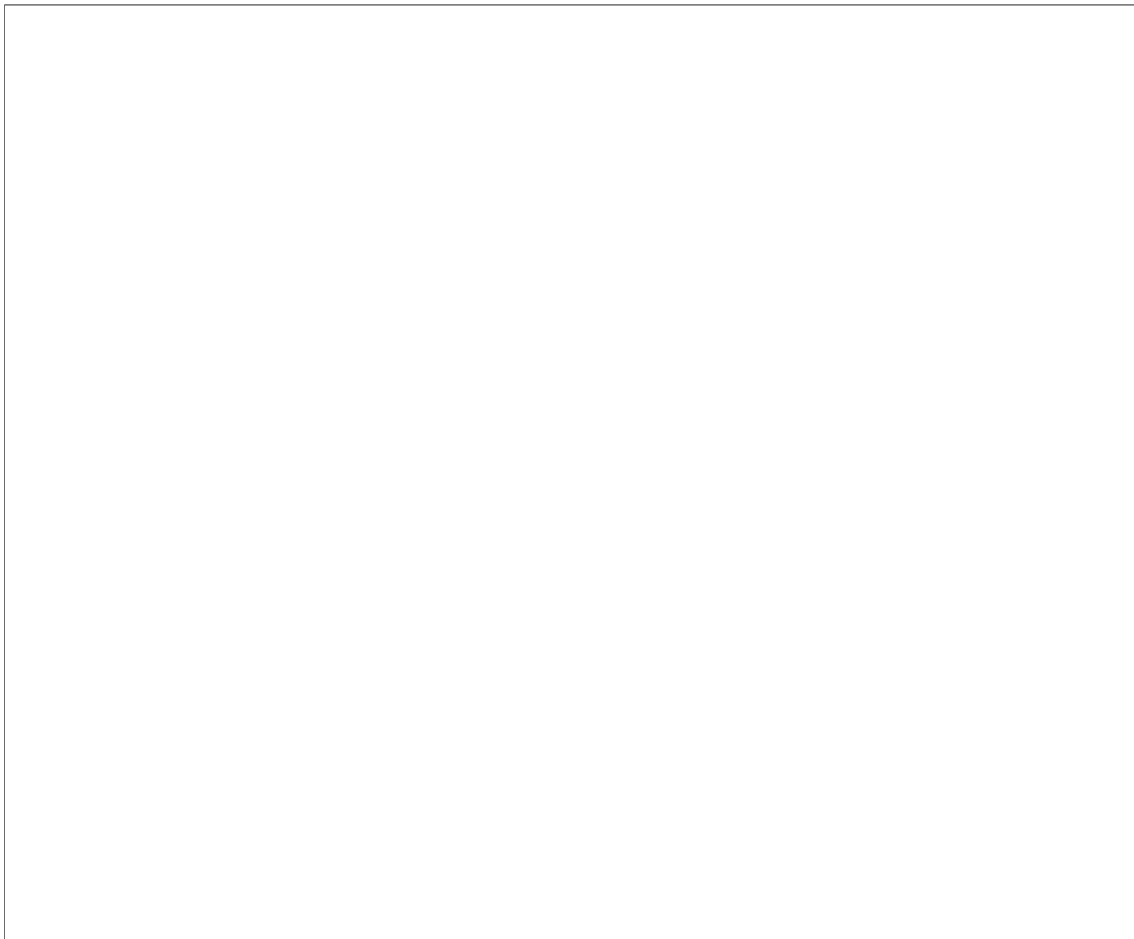


Figure 1. Percutaneous Closure of Paravalvular Leak After Sapien Valve-in-valve TAVR

An 86-year-old male underwent TAVR with a 26 mm Sapien valve, complicated by central and paravalvular AI; after implantation of a second valve, moderate-to-severe paravalvular AI persisted. The patient quickly decompensated, presenting with multi-organ failure. A 4-F diagnostic catheter was advanced across the tract over a stiff angled guidewire; a 6 mm AVP4 was then advanced and deployed, resulting in substantial reduction of AI and rapid clinical recovery. (A) TEE long-axis and (B) short-axis views demonstrate moderate-to-severe AI. (C) RAO-cranial projection confirms the 4-F MP catheter has been advanced outside the struts of the Sapien valves. (D) A 6 mm AVP4 is advanced and (E) deployed (arrow), resulting in substantial reduction of AI by TEE in the (F) long-axis and (G) short axis. AI = aortic insufficiency; AVP = Amplatzer Vascular Plug; MP = multipurpose; RAO = right anterior oblique; TAVR = transcatheter aortic valve replacement; TEE = transesophageal echocardiography.

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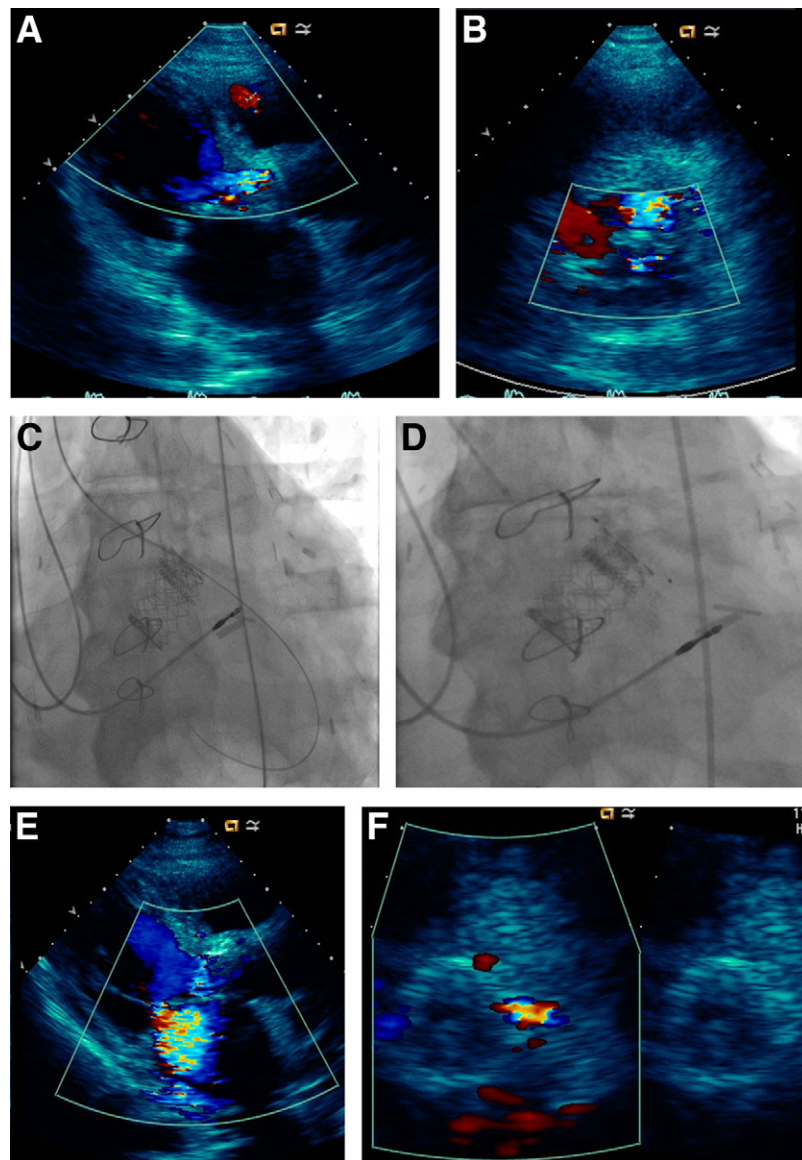


Figure 2. Percutaneous Closure of Paravalvular Leak After Sapien TAVR

A 90-year-old male underwent TAVR with a 26 mm Sapien valve, complicated by moderate-to-severe paravalvular AI, leading to decompensated heart failure. (A) Long-axis and (B) short-axis views of the aortic valve, showing moderate-to-severe AI post-TAVR. (C) 5-F MP diagnostic catheter advanced over a guidewire into the LV chamber. (D) 8 mm AVP4 deployed and released within the paravalvular track (arrows). (E) Long-axis and (F) short-axis of the aortic valve 5 after occluder placement demonstrates significant reduction in AI. The patient had a rapid clinical recovery. Abbreviations as in Fig. 1.

Paravalvular leak (PVL) occurs more frequently after transcatheter aortic valve replacement (TAVR) than after surgical replacement (1). PVL may be due to prosthesis under-expansion, undersizing, impingement of calcium nodules interfering with stent expansion, or incorrect positioning so the valve skirt is not completely apposed to the aortic annulus. Even mild PVL is associated with increased late mortality (1). Clinical experience with percutaneous closure of PVL after TAVR is limited, but this could be a

reasonable strategy in these high-risk patients. Prior devices used for percutaneous closure have required delivery guide sheaths from 5- to 8-F (2). Two patients with severe aortic stenosis and New York Heart Association class IV symptoms underwent TAVR with a 26-mm Sapien valve (Edwards Lifesciences, Irvine, California) complicated by moderate-to-severe aortic insufficiency (AI) and acute heart failure. In both cases, the PVL was closed successfully with an Amplatzer Vascular Plug (AVP)-4 (St. Jude,

St. Paul, Minnesota) delivered through a 4- or 5-F diagnostic catheter, with subsequent resolution of symptoms (Figs. 1 and 2).

Figure 1 shows the percutaneous closure of paravalvular leak after Sapien valve-in-valve TAVR. An 86-year-old man underwent TAVR with a 26-mm Sapien valve, complicated by central and paravalvular AI; after implantation of a second valve, moderate-to-severe paravalvular AI persisted. The patient quickly decompensated, presenting with multiorgan failure. A 4-F diagnostic Multipurpose (MP) catheter was advanced across the tract over a stiff angled guidewire; a 6-mm AVP-4 was then advanced and deployed, resulting in substantial reduction of AI and rapid clinical recovery. TEE long-axis (Fig. 1A) and short-axis views (Fig. 1B) demonstrate moderate-to-severe AI. Right anterior oblique–cranial projection confirms the 4-F MP catheter has been advanced outside the struts of the Sapien valves (Fig. 1C). A 6-mm AVP-4 is advanced (Fig. 1D) and deployed (arrow) (Fig. 1E), resulting in substantial reduction of AI by TEE in the long-axis (Fig. 1F) and short axis (Fig. 1G) views.

Figure 2 shows the percutaneous closure of paravalvular leak after Sapien TAVR. A 90-year-old man underwent TAVR with a 26-mm Sapien valve, complicated by moderate-to-severe paravalvular AI, leading to decompensated heart failure. Long-axis (Fig. 2A) and short-axis (Fig. 2B) views of the aortic valve, showing moderate-to-

severe AI following TAVR. A 5-F MP diagnostic catheter advanced over a guidewire into the left ventricular chamber (Fig. 2C). An 8-mm AVP-4 was deployed and released within the paravalvular track (arrows) (Fig. 2D). Long-axis (Fig. 2E) and short-axis (Fig. 2F) views of the aortic valve after occluder placement demonstrates significant reduction in AI. The patient had a rapid clinical recovery.

These cases illustrate the morbidity associated with PVL after TAVR and demonstrate the feasibility of percutaneous closure using occluders that can be delivered through low-profile catheters. These low-profile systems greatly improve the ability to close PVL after TAVR. Whether this approach improves survival requires further study.

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Key Words: aortic regurgitation ■ paravalvular leak ■ transcatheter aortic valve replacement.