Ablation of ventricular tachycardia from the aortic root after transcatheter aortic valve replacement

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Introduction
Transcatheter aortic valve replacement (TAVR) is an increasingly common procedure for treatment of patients with severe symptomatic aortic stenosis who are at intermediate to high risk for traditional surgical valve replacement. Although conduction disturbances and the need for pacemaker implantation postprocedure are well-recognized complications, ventricular arrhythmias (VAs) have not been widely reported. We present a case of focal outflow tract tachycardia occurring late post-TAVR accessible from the left coronary cusp (LCC)/noncoronary cusp junction adjacent to the valve strut, which was treated successfully with radiofrequency (RF) ablation.

Case report
A 78-year-old Caucasian man with diabetes, hypertension, and previous coronary artery bypass surgery presented with complaints of progressive dyspnea on exertion and was found to have severe aortic valve stenosis. Transthoracic echocardiography revealed preserved left ventricular (LV) ejection fraction, with an estimated valve area of 0.8 cm² and mean gradient of 40 mm Hg. Because of the high surgical risk associated with redo sternotomy, the patient underwent successful transfemoral TAVR with a 26-mm Edwards SAPIEN valve (Edwards Lifesciences Corp, Irvine, CA), which resulted in improved symptoms and function. However, 3 years later, he complained of fatigue and palpitations. Electrocardiography showed frequent premature ventricular contractions (PVCs), and 24-hour monitoring revealed high PVC burden (53% of total beats) and 368 runs of nonsustained ventricular tachycardia. The patient did not improve on medical therapy with beta-blocker. Repeat transthoracic echocardiography showed frequent premature ventricular contractions (PVCs), and 24-hour monitoring revealed high PVC burden (53% of total beats) and 368 runs of nonsustained ventricular tachycardia. The patient did not improve on medical therapy with beta-blocker. Repeat transthoracic echocardiography showed frequent premature ventricular contractions (PVCs), and 24-hour monitoring revealed high PVC burden (53% of total beats) and 368 runs of nonsustained ventricular tachycardia. The patient did not improve on medical therapy with beta-blocker.

Discussion
VAs occurring post-TAVR are not commonly reported despite the increasing prevalence of the procedure. The feasibility and safety of RF ablation in the coronary sinuses or LVOT after TAVR have not been reported. The previous case reported in the literature was also suspected to be of LVOT origin based on surface ECG morphology but was treated medically without further evaluation by invasive electrophysiologic study. Here we report a successful case of RF ablation from the left coronary sinus of Valsalva, behind the...
Conduction disturbances post-TAVR are well-recognized complications and speculated to be due to local tissue injury of the proximal His–Purkinje system in the intraventricular septum. In the patient reported here, the development of VA occurred several years after TAVR placement and therefore was not due to acute tissue injury. The origin of the PVC is inconsistent with the right coronary cusp based on rS in lead V1 but is suggestive of an LCC origin based on the amplitude of leads II/III, although R in lead II is slightly taller in our case. We localized the PVC to the LCC on the septal end by activation mapping. The presence of a small focal scar was noted at the site of PVC localization, which may be consistent with remote injury. Early study of patients with aortic stenosis revealed a higher prevalence of PVCs, which was not lowered after surgical aortic valve replacement. Ventricular tachycardia after surgical aortic valve replacement has been shown to be due to reentry, bundle branch reentry, or triggered activity, and ablation has been successfully performed in these situations. In our case, the

KEY TEACHING POINTS
- Iatrogenic ventricular tachycardia can occur after transcatheter aortic valve replacement.
- The mechanism of this ventricular tachycardia likely is trigger or automaticity.
- Ablation is safely possible between the valve strut and the sinus of Valsalva.

Figure 1  A: Baseline 12-lead electrocardiogram reveals frequent premature ventricular complexes of left bundle branch morphology. B, C: Images of the left ventricular outflow tract (LVOT). Cusps are labeled. B: Intracardiac echocardiography. Green lines represent valve cusps. Red arrow indicates the valve strut. Red ablation tags (white location tags) are seen at the septal end of LCC. C: CARTO sound image of the LVOT. White arrow and black arrow indicate LCC and NCC, respectively. The ablation catheter can be seen. LCC = left coronary cusp; NCC = noncoronary cusp; RCC = right coronary cusp.
varying coupling intervals and rapid success of point ablation are suggestive of triggered activity or abnormal automaticity as a possible mechanism.

**Conclusion**

We report the first case of successful RF ablation of frequent focal LVOT PVCs from the LCC adjacent to the TAVR valve. Placement of the ablation catheter into the sinuses of Valsalva adjacent to the valve struts in post-TAVR patients is feasible, without causing damage to percutaneously placed aortic valve prostheses.

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