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Conservative Management of Left Ventricular Pseudoaneurysm After Transfemoral Transcatheter Aortic Valve Implantation

Transfemoral Transkateter Aort Kapak Implantasyonu Sonrası Gelişen Sol Ventriküler Psödoanevrizmanın Konservatif Tedavisi

ABSTRACT

Left ventricular pseudoaneurysm is a rare complication, most commonly occurring after myocardial infarction or cardiac surgery. It carries a high risk of spontaneous rupture and may lead to ventricular arrhythmias, heart failure, or thromboembolism. Cases of left ventricular pseudoaneurysm following transcatheter aortic valve implantation (TAVI) are extremely rare, with most requiring emergency surgical intervention. We present a case of a patient who developed ventricular arrhythmia following transfemoral TAVI. Approximately one week after the procedure, the patient presented to the emergency department with ventricular tachycardia and was treated with amiodarone. A diagnosis of left ventricular pseudoaneurysm was established; however, the patient refused surgical treatment. Instead, an implantable cardioverter-defibrillator was placed, and the patient was managed with medical follow-up. The six-month follow-up period was uneventful.

Keywords: Aortic stenosis, TAVI, ventricular pseudoaneurysm

ÖZET

Sol ventriküler psedoanevrizma oldukça nadir görülen ve sıklıkla miyokardiyal enfarkt ya da kardiyak cerrahi sonrası görülebilen bir komplikasyondur. Kendiliğinden ruptür olabileceği gibi ventiküler aritmilere, kalp yetersizliğine ve tromboemboliye yol açabilir. Transkateter aortik kapak implantasyonu (TAVI) sonrası çok nadiren sol ventriküler psedoanevrizma olgusu bildirilmiştir ve bunların bir çoğu da acil cerrahi gerektirmişlerdir. Biz transfemoral TAVI sonrası ventiküler aritmi ile başvuran bir hastayı sunduk. Bu hasta işlemden yaklaşık bir hafta sonra ventiküler taşikardi ile acil servise başvurmuş ve sonrasında amiodaron ile tedavi edilmiştir. Sol ventriküler psedoanevrizma tanısı konan hasta cerrahiyi kabul etmemesi üzerine implante edilebilir kardiyoverter defibrilatör takılarak medikal takip ile izlenmiştir. Altı aylık takibi de olaysız bir şekilde sürmüştür.

Anahtar Kelimeler: Aort darlığı, TAVI, ventriküler psödoanevrizma

CASE REPORT
OLGU SUNUMU

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Transcatheter aortic valve implantation (TAVI) is an advanced and increasingly utilized procedure for the treatment of aortic valve disease. However, as the number of procedures rises, a broader range of complications may be encountered. Left ventricular pseudoaneurysm is a very rare but potentially fatal complication that can develop following TAVI. Here, we present a case of left ventricular pseudoaneurysm after a TAVI procedure that was managed conservatively.

Case Report

A 78-year-old male with severe aortic stenosis (mean gradient: 84 mmHg) presented with dyspnea and chest discomfort. The patient had undergone coronary artery bypass graft surgery 15 years prior. His medical history also included hypertension and diabetes mellitus. The logistic Society of Thoracic Surgeons (STS) risk score was calculated as 8.5%. Transfemoral TAVI was planned, and a 27 mm Portico valve prosthesis (Abbott Vascular, Santa Clara, CA, USA) was successfully implanted (Figure 1). During the procedure, an Amplatz right diagnostic catheter and a straight

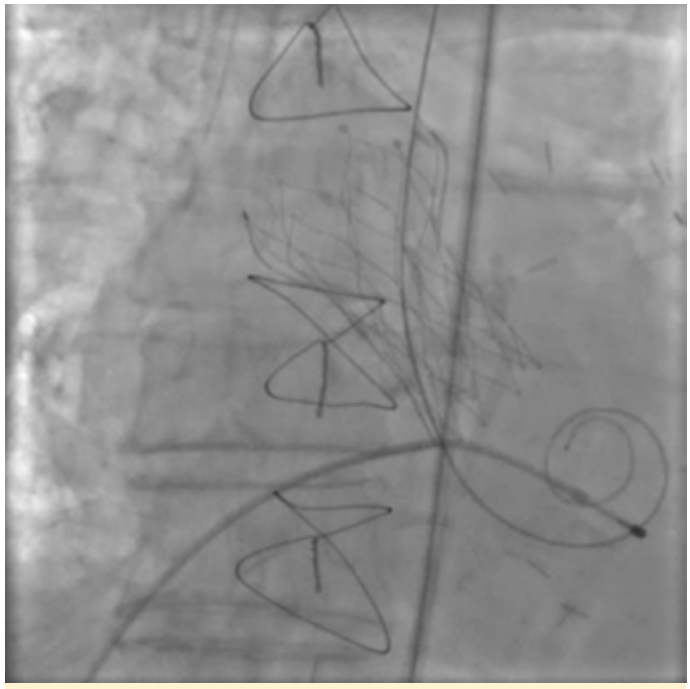

Figure 1. Anteroposterior (AP) projection showing the Portico aortic valve prosthesis and the Safari guidewire.

ABBREVIATIONS

LVPA	Left ventricular pseudoaneurysm
STS	Society of Thoracic Surgeons
TAVI	Transcatheter aortic valve implantation
TTE	Transthoracic echocardiography

wire were used to cross the aortic valve. The postoperative course was uneventful, and the patient was discharged two days after the procedure. However, six days later, he was readmitted to the emergency department with dyspnea and palpitations. The electrocardiogram revealed monomorphic ventricular tachycardia with a blood pressure of 100/60 mmHg (Figure 2). Intravenous amiodarone was administered upon detection of sustained ventricular tachycardia on the monitor. The patient was subsequently transferred to the intensive care unit for close observation. During the follow-up, transthoracic echocardiography (TTE) revealed a left ventricular pseudoaneurysm (LVPA) located in the inferolateral segment, with a tunnel-like neck measuring 4 mm in diameter (Figure 3, Video 1). Computed tomography also confirmed the presence of an LVPA with a narrow neck and a length of 25 mm (Figure 4). Transesophageal echocardiography demonstrated the LVPA, the aneurysm neck, and color Doppler flow between the left

Figure 2. Electrocardiogram showing nonsustained monomorphic ventricular tachycardia.

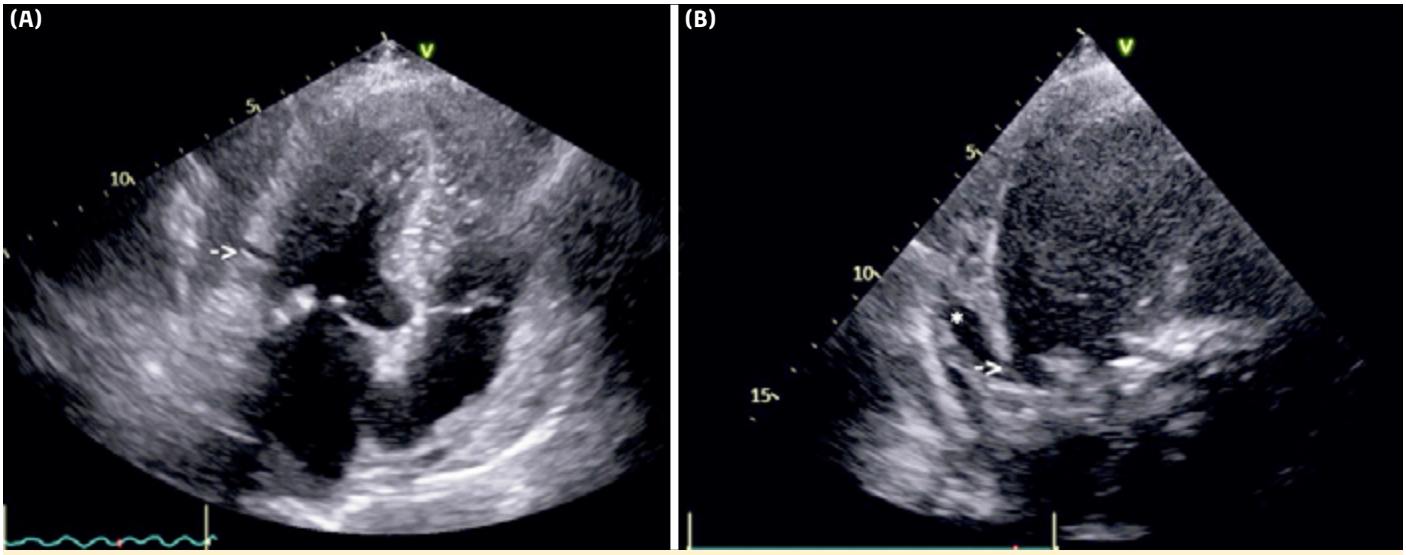

Figure 3. (A) Transthoracic echocardiography, apical four-chamber view, showing a left ventricular pseudoaneurysm in the inferolateral segment with a narrow neck (arrow indicates the neck of the pseudoaneurysm) (B) Modified image showing the left ventricular pseudoaneurysm (* indicates the pseudoaneurysm).

Figure 4. Computed tomography image showing a left ventricular pseudoaneurysm (arrow indicates the pseudoaneurysm).

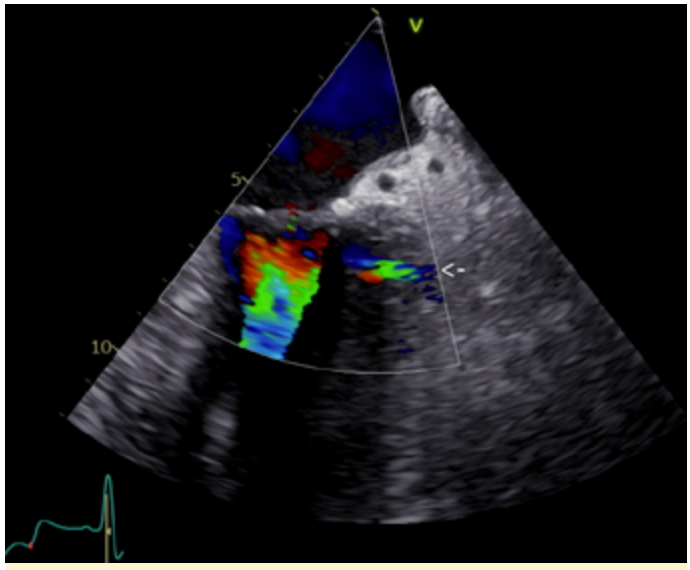

Figure 5. Transesophageal echocardiography showing the left ventricular pseudoaneurysm in the inferolateral segment and color Doppler flow.

ventricle and the pseudoaneurysm (Figure 5, Video 2). Surgical treatment was recommended by the Heart Team due to the high risk of spontaneous rupture. However, the patient declined the operation. A repeat CT scan performed one week later showed no changes in the size or length of the pseudoaneurysm. While on amiodarone therapy, the patient did not experience any further episodes of ventricular arrhythmia. Subsequently, an implantable cardioverter-defibrillator was implanted, and the patient was discharged. At the one-month follow-up, both transthoracic echocardiography and computed tomography were repeated and showed no change in the size or length of the LVPA (Video 3). The patient remained asymptomatic. At the six-month follow-up, TTE revealed that the LVPA size remained unchanged, and no arrhythmic events were recorded during pacemaker interrogation.

Discussion

Left ventricular (LV) pseudoaneurysms are uncommon, and most cases are associated with myocardial infarction or cardiac surgery.[1] LVPA may remain asymptomatic and be discovered incidentally. However, some patients may present with recurrent ventricular tachyarrhythmias, heart failure, or thromboembolic events. Spontaneous rupture may occur in approximately one-third of patients with LV pseudoaneurysm. LVPA due to infective endocarditis is rare and typically results from abscess formation in the left ventricular myocardium.[2]

Transcatheter aortic valve implantation is a specialized therapeutic option for patients with severe aortic stenosis. According to the literature, LVPA has been reported in two cases following a transapical TAVI procedure. However, only one case of LVPA following transfemoral TAVI has been documented, in 2013.[3] In that case, postoperative emergency sternotomy was required due to tamponade, and the pseudoaneurysm was repaired with sutures.

In our case, the LVPA was located in the inferolateral segment. We believe the pseudoaneurysm may have been caused by the use of the straight wire while crossing the aortic valve. We believe this because the neck of the pseudoaneurysm was only 4 mm, and its location was consistent with this hypothesis. Fortunately, the patient's prognosis was favorable, and the pseudoaneurysm did not progress over time.

In conclusion, LVPA should be considered as a potential complication following TAVI, especially in patients presenting with ventricular arrhythmia after the procedure.

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Video 1. Transthoracic echocardiography showing a left ventricular pseudoaneurysm (LVPA) in the inferolateral segment on parasternal long-axis images.

Video 2. Transesophageal echocardiography showing the left ventricular pseudoaneurysm (LPVA) and color Doppler flow.

Video 3. Transthoracic echocardiography showing the left ventricular pseudoaneurysm (LVPA) with unchanged size at the one-month follow-up.

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