

Transcatheter Aortic Valve-in-Valve Implantation Technique for Treatment of the St. Jude Medical Portico Valve Migration During Procedure; as a Procedural Rescue Option: Case Report

Prosedür Sırasında Aortik St. Jude Medical Portico Kapağının Yer Değiştirmesinin Prosedür Kurtarma Seçeneği Olarak Transkateter Aortik Kapak İçine Kapak Tekniği ile Tedavisi

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ABSTRACT Malposition and migration of prosthesis are significant complications of transcatheter aortic valve implantation (TAVI). The valve in valve technique is a usefull “bail-out” option to cope with complications such as prosthesis malposition or migration. TAVI with 25 mm St Jude Portico valve was planned to a 80-year-old woman with severe symptomatic aortic stenosis who had high surgical risk. On the procedure, due to the valve migrated to ascending aorta and occluded to left main coronary artery after implantation, the valve was withdrawn to supracoronary position with snare catheter. Then, a second 25 mm St Jude Portico valve was implanted in the first valve on appropriate position, successfully. The first known case about implantation of second St. Jude Portico transcatheter heart valve during TAVI with using snare technique was reported as a valuable bailout strategy to deal with malposition after first implantation.

Key Words: Heart valve prosthesis implantation; aortic valve stenosis

ÖZET Kapağın yanlış konumlandırılması veya kapağın yer değiştirmesi transkateter aort kapak implantasyonunun (TAVI) önemli komplikasyonlarından olup 'kapak içine kapak' tekniği bu tip komplikasyonlarla başa çıkmakta iyi bir tedavi seçeneğidir. Kliniğimizde 80 yaşında açık cerrahi için yüksek riskli olup semptomatik ciddi aort darlığı olan hastaya 25 mm St Jude Portico kapak takılması planlandı. İşlem esnasında uygun pozisyonda kapak açıldıktan sonra asendan aortaya doğru yer değiştiren ve ana koroner arter ağzını tıkayan kapak snare kateteri kullanılarak yakalandı ve suprakoroner seviyeye çekilerek yerleştirildi. Sonrasında ikinci bir 25 mm St Jude Portico kapak ilk kapağın içerisine uygun pozisyonda başarıyla yerleştirildi. Bu vaka TAVI'nin önemli komplikasyonlarından olan kapak yer değiştirmesinde snare tekniğinin başarı ile kullanılmasında bilinen ilk vaka olması nedeniyle sunuldu.

Anahtar Kelimeler: Kalp kapağı protezi implantasyonu; aort kapak stenozu

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Malposition and migration of prosthesis are significant complications of transcatheter aortic valve implantation (TAVI). The valve in valve (VinV) technique is a usefull “bail-out” option to cope with complications such as prosthesis malposition or migration.¹ The previous studies demonstrated that VinV technique is effective percutaneous approach for dealing with complications after TAVI such as ventricular septal defect (VSD), dysfunctional leaflets, paravalvular leak (PVL) or too low placement of the first prosthesis.^{1,2} The first known case about implantation of second St. Jude Portico transcatheter heart valve (THV) as a VinV

technique during TAVI with using snare technique is reported as a valuable bail out strategy to deal with malposition after first implantation.

CASE REPORT

A 80-year-old woman was admitted to our hospital for worsening dyspnea caused by severe calcific aortic stenosis (AS). She was in New York Heart Association (NYHA) functional class III dyspnea. Echocardiographic examination revealed severe aortic stenosis with an aortic valve area of 0.8 cm² and a mean aortic pressure gradient of 45 mm Hg with a normal left ventricular ejection fraction of 50%. The distance of left main coronary artery (LMCA) ostium from the aortic root was measured 15 mm by multidetector computed tomography. The calculated logistic EuroSCORE and Society of Thoracic Surgery score (STS) were 24% and 12%, respectively. TAVI was performed with a 25 mm St. Jude Portico THV as previously described and

the procedure was performed without rapid right ventricular pacing.³ The position of the prosthesis was assessed by aortography an on the appropriate position the thumbwheel was fully rotated to release the THV (Figures 1A, B). Immediately after valve implantation, severe hypotension occurred on patient. A condition of shock and cardiac arrest had quickly begun, so that cardiopulmonary resuscitation was performed successfully. Migration of the prosthesis into the ascending aorta and occlusion of LMCA was seen aortography after first deployment (Figure 1C). THV was withdrawn up to LMCA successfully by using snares. THV was repositioned at supracoronary part into the ascending aorta and hemodynamic stability is achieved (Figure 1D). The second THV, which is the same size with the first one, was implanted successfully to a deeper into the left ventricular outflow tract passing through first prosthesis (Figures 1E, F). The early postoperative course was uneventful. Postop-

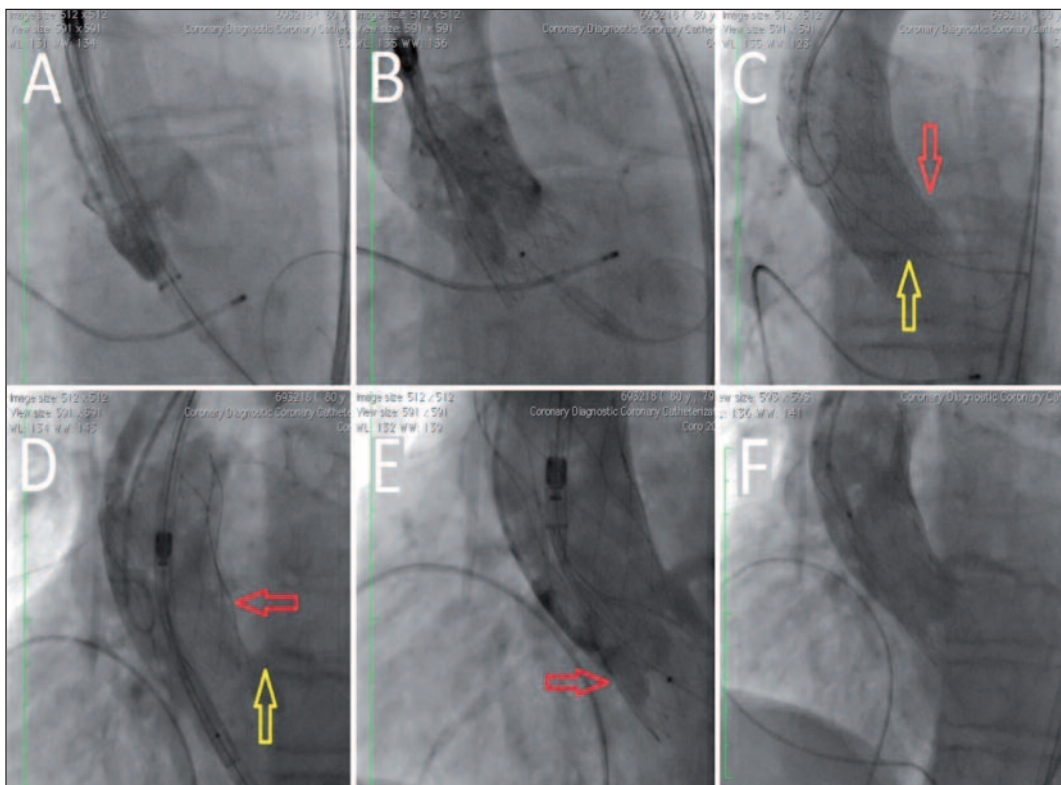


FIGURE 1: (A,B) Stepwise implantation of the valve-in-valve procedure with Portico ValveTM prosthesis. (C) Left main coronary artery (red arrow), Portico prosthesis (yellow arrow); (D) Left main coronary artery (yellow arrow), Portico prosthesis (red arrow); (E) Second prosthesis during opening (red arrow); (F) Final aortography.

erative echocardiography showed a well functioning prosthesis with a mild paravalvular leakage and a mean gradient of 14 mm Hg. Two days after procedure, the patient required implantation of a permanent pacemaker due to left bundle branch block with sinus bradycardia. The patient was clinically stable at 10 days follow up after the procedure.

DISCUSSION

According to our knowledge it is the first case that used snare during VinV implantation with Portico self-expanding bioprosthesis. Malposition and migration of THV is the main reasons of implantation of second valve in first valve and they are associated with poor procedural and clinical outcome.^{2,4} So, it is essential for operators to develop strategies to cope with these complications in the catheterization laboratory to avoid bail out cardiac surgery. The VinV technique is important interventional option to manage device malposition. Rate of a valve-in-valve implantation due to malposition of first prosthesis differs between 3-6%.¹ To date, the literatures reported that the VinV technique is an effective percutaneous approach that may be accomplished with encouraging acute and midterm outcomes when severe PPL occurs after TAVI.²

In the first human trial of Portico valve system, Willson et al. reported a second Portico THV implantation within the first valve (VinV) due to recurring post-procedure severe transvalvular regurgitation intermittently.³ The difference of our case was using of the snare technique to pull back of the malpositioning THV before implantation of the second valve. There is no literature on this topic.

The one of the reason of migration is an inadequate rapid ventricular pacing with balloon-expandable THV. In our case, we implanted a self-expandable THV without rapid ventricular pacing. The possible reason of migration of the first valve in our case might be underexpansion of the prosthesis. Some degree of underexpansion at the inflow level is expected with self-expandable prostheses. In addition to annulus-THV mismatch, other mechanisms for failing THV are high and low implants with significant PVL due to insufficient annular seal or overhanging native leaflets causing “frozen leaflets” of the bioprosthesis. The completeness of THV expansion and residual eccentricity of the Portico THV appeared similar to that of the self-expandable CoreValve device.⁵

Ussia et al. demonstrated that the incidence of atrioventricular block requiring definitive pacing was higher in the non-VinV group.² Likewise, our patient required permanent pacemaker implantation due to left bundle branch block with sinus bradycardia on two days after from operation. To the best of our knowledge, our report is the first description of a VinV procedure with a Portico device implanted into a failing Portico bioprosthesis with using snare catheter. In spite of intra-procedural pitfalls, the final result was satisfactory, with relatively low transvalvular gradients and avoidance of coronary obstruction. Malposition or migration of prosthesis can complicate the TAVI procedure, but it can be managed safely and effectively with bail out transcatheter techniques, avoiding surgery, with good early and mid-term clinical and echocardiographic results.

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