

Transcatheter aortic valve implantation with the CoreValve for the treatment of rheumatic aortic stenosis

Mehmet Bilge^{1,2}, Ayşe Saatçı Yaşar¹, Recai Alemdar¹, Sina Ali¹

¹Clinic of Cardiology, Atatürk Education and Research Hospital; Ankara-Turkey

²Department of Cardiology, Faculty of Medicine, Yıldırım Beyazıt University; Ankara-Turkey

Introduction

Transcatheter aortic valve implantation (TAVI) is a new therapeutic option for inoperable/high risk patients with severe symptomatic calcific aortic stenosis (AS). The only admitted indication for TAVI is the treatment of patients with symptomatic severe calcific AS. However, some reports suggested feasibility and good short-term results with “off-label” uses of TAVI in patients with degenerated aortic bioprostheses and aortic regurgitation (1-3).

Rheumatic AS is characterized by fusion of the commissures of the valve leaflets with little or no calcification. There is no information about TAVI in rheumatic AS. TAVI could be difficult in this population as the lack of calcium might increase the risks of misplacement and migration of the prosthesis. To the best of our knowledge, it is the first time TAVI was used for rheumatic AS in the literature. Here we present two cases with severe symptomatic rheumatic AS who underwent successful TAVI with CoreValve because of contraindication to surgery.

Case Reports

Case 1

A 72-year-old woman was admitted to our hospital for pulmonary edema caused by severe rheumatic AS. Her medical history included rheumatic aortic and mitral valvular disease, chronic pulmonary disease and operated colon cancer. Echocardiogram revealed severe aortic stenosis with an aortic valve area of 0.8 cm² and a mean aortic pressure gradient of 45 mm Hg. The aortic valve was thickened and little calcified and there was commissural fusion (Fig. 1, Video 1. See corresponding video/movie images at www.anakarder.com). She had also 2+ aortic insufficiency with a normal left ventricular ejection fraction of 50%. In addition, she had concomitant involvement of the mitral valve, which was mildly stenotic (Fig. 2, Video 2. See corresponding video/movie images at www.anakarder.com). Systolic pulmonary artery pressure was 60 mm Hg. With transthoracic echocardiography, the aortic annulus and sinuses of valsalva diameters were 21 and 29 mm, respectively. Coronary angiography showed normal epicardial coronary arteries, the calculated logistic EuroSCORE was 24%. She was declined for surgery on the basis of colon cancer and poor pulmonary function. The patient and her family were offered TAVI and informed consent was obtained.

Interventions were performed as previously described (4). But, during deployment, to prevent valve embolization and migration of the prosthesis, we performed accelerated right ventricular pacing with 180 bpm. Because the CoreValve prosthesis had to anchor solidly, an oversized (29 mm) CoreValve prosthesis was selected. But during the first deployment, pop out of the valve occurred. After reloading and repositioning of the CoreValve, the prosthesis could be implanted a little bit

deeper into the left ventricular outflow tract than the previous attempt in order to provide good stability and prevent embolization of the prosthesis. In the second attempt, we could achieve good deployment (Video 3, 4. See corresponding video/movie images at www.anakarder.com). Follow-up echocardiography showed a well functioning prosthesis, with a mean gradient of 10 mm Hg, respectively. Mild paravalvular leak was present. The patient was clinically stable at 30 days follow up after the procedure.

Case 2

A 62-year-old woman was admitted to our hospital for worsening dyspnea caused by severe rheumatic AS and moderate aortic regurgitation with an echocardiographic aortic valve area of 0.7 cm² and a mean aortic pressure gradient of 48 mm Hg with a depressed left ventricular function of 20%. Her medical history included rheumatic heart disease, atrial fibrillation and mitral valve replacement for mitral stenosis in 1998. She was in New York Heart Association functional class III dyspnea.



Figure 1. Transesophageal echocardiography demonstrates thickening and commissural fusion (shown with asteriks) of the aortic valve with little calcification in basal short axis view in case 1



Figure 2. Transesophageal echocardiography demonstrates concomitant rheumatic involvement of the mitral valve in long-axis view of the left ventricle in case 1

AS was of rheumatic cause, with commissural fusion and little calcification. The aortic annulus and sinuses of Valsalva diameters were 22 and 30 mm, respectively. Systolic pulmonary artery pressure was 60 mm Hg. Coronary angiography showed normal epicardial coronary arteries, the calculated logistic EuroSCORE was 21. She was declined for surgery on the basis of prior cardiac surgery and poor left ventricular function.

The technique was similar to that described by the previous case. During deployment, accelerated right ventricular pacing with 140 bpm and an oversized (29 mm) CoreValve prosthesis were used. Only one attempt was necessary to achieve the optimal result without any technical issues (Video 5, 6. See corresponding video/movie images at www.anakarder.com). Follow-up echocardiography showed a well functioning prosthesis, with a mean gradient of 8 mm Hg, respectively. Mild paravalvular leak was present. The patient was clinically stable at 30 days follow up after the procedure.

Discussion

The use of TAVI is considered a relative contraindication in non-calcified valves (5). Calcium seems mandatory for anchoring the stent-valve and prevent pop-out, dislocation and migration of the prosthesis. In rheumatic AS, there is little or no calcification. However, our cases show that TAVI could be safe, feasible and effective treatment in patients with rheumatic AS.

The concept of TAVI is based on crushing the usually heavily calcified native valve leaflets against the aortic wall by implanting a metallic stent-frame. Since calcification of the native valve leaflets is presumably essential for fixation of the stent-frame, TAVI is indicated in patients with calcified AS. Indeed, TAVI in patients with only marginal annular calcifications may lead to dislocation of the bioprosthesis into the left ventricle (2, 4). The unique pathological features of rheumatic AS, with lack of calcium, commissural fusion and pliable leaflets, can make it unsuitable to TAVI.

The CoreValve prosthesis might anchor solidly even in the absence of calcification when oversized due to engineering properties (2), and may offer treatment for rheumatic AS without dislocation and migration of the prosthesis. During deployment, to prevent pop-out, embolization and migration of the prosthesis we performed accelerated right ventricular pacing between 140-180 bpm. In addition, oversized, self-expandable (CoreValve) valves were selected.

Conclusion

This report shows that TAVI could be safe, feasible and effective treatment in patients with rheumatic AS in selected no-option patients. Embolization of the valve may become an issue, and could be a drawback to this approach.

Video 1. Transesophageal echocardiography demonstrates thickening and commissural fusion of the aortic valve with little calcification in basal short-axis view in case 1

Video 2. Transesophageal echocardiography demonstrates thickened and little calcified aortic valve and concomitant rheumatic involvement of the mitral valve in long-axis view of the left ventricle in case 1

Video 3. Positioning of the CoreValve in the aortic valve annulus in case 1

Video 4. Aortography shows mild aortic regurgitation after deployment of the CoreValve in case 1

Video 5. Positioning of the CoreValve in the aortic valve annulus in case 2

Video 6. Aortography shows mild aortic regurgitation after deployment of the CoreValve in case 2

References

1. Sarkar K, Sardella G, Romeo F, De Benedictis M, Tarsia G, Iadanza A, et al. Transcatheter aortic valve implantation for severe regurgitation in native and degenerated bioprosthetic aortic valves. *Catheter Cardiovasc Interv* 2013; 81: 864-70. [CrossRef]
2. Hildebrandt HA, Erbel R, Kahlert P. Compassionate use of the self-expandable Medtronic CoreValve prosthesis for the treatment of pure aortic regurgitation in a patient at prohibitive risk for surgical valve replacement. *Catheter Cardiovasc Interv* 2013; 82: 939-43. [CrossRef]
3. Roy DA, Schaefer U, Guetta V, Hildick-Smith D, Möllmann H, Dumonteil N, et al. Transcatheter aortic valve implantation for pure severe native aortic valve regurgitation. *J Am Coll Cardiol* 2013; 61: 1577-84. [CrossRef]
4. Grube E, Buellesfeld L, Mueller R, Sauren B, Zickmann B, Nair D, et al. Progress and current status of percutaneous aortic valve replacement: results of three device generations of the CoreValve Revalving system. *Circ Cardiovasc Interv* 2008; 1: 167-75. [CrossRef]
5. Joint Task Force on the Management of Valvular Heart Disease of the European Society of Cardiology (ESC); European Association for Cardio-Thoracic Surgery (EACTS), Vahanian A, Alfieri O, Andreotti F, Antunes MJ, Barón-Esquivias G, Baumgartner H, et al. Guidelines on the management of valvular heart disease (version 2012). *Eur Heart J* 2012; 33: 2451-96. [CrossRef]

Address for Correspondence: Dr. Ayşe Saatçı Yaşar, Atatürk Eğitim ve Araştırma Hastanesi, Kardiyoloji Kliniği; 06530, Bilkent, Ankara-Türkiye
Phone: +90 312 291 25 25
E-mail: drasaatciyasar@yahoo.com

Available Online Date: 19.03.2014

©Copyright 2014 by Turkish Society of Cardiology -

Available online at www.anakarder.com

DOI:10.5152/akd.2014.5226



A case of unusual looking prosthetic mitral valve thrombosis treated with low dose slow infusion tPA

Nermin Bayar, Şakir Arslan, Erkan Köklü, Görkem Kuş
Clinic of Cardiology, Antalya Education and Research Hospital;
Antalya-Turkey

Introduction

Prosthetic mitral valve thrombosis (PVT) is a serious complication of valve replacement which carries a high risk of mortality. However, the optimal treatment method for PVT remains controversial. Here, we report a case of PVT with an echoluscent-structured thrombus diagnosed on a mechanical mitral valve and the use of a low-dose tissue plasminogen activator (tPA).

Case Report

A 37-year old woman was admitted to our clinic with complaints of respiratory distress and fatigue. Her history included mitral valve replacement surgery a year ago due to rheumatic heart disease. The