



Portico Transcatheter Implantation in a Patient with Mechanical Mitral Valve

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Abstract

Transcatheter aortic valves implantation (TAVI) is a valid treatment for high-risk surgical candidates with symptomatic severe aortic stenosis; the safety and effectiveness of TAVI have been demonstrated in numerous clinical studies, national registries and randomized trials. Nevertheless, from this cohort of patients have been often excluded patients with prior mitral valve surgery because concerns exist for possible interference between the trans-catheter aortic valve and the mitral prosthesis.

We describe a case of a Portico™ TAVI system (St Jude Medical, St Paul, MN, USA) made in an 83-year-old patient who previously underwent mitral valve replacement with a mechanical prosthesis.

Keywords: Aortic stenosis; Transcatheter valve replacement; Mitral valve replacement

Introduction

Transcatheter aortic valve implantation (TAVI) is the therapy of choice for inoperable or high-risk for surgery patients suffering from severe aortic stenosis [1,2].

The presence of a mitral prosthesis is considered an exclusion criterion for TAVI. This is because concerns exist about possible interference between the mitral prosthetic housing and transcatheter valve, or vice versa interference with TAVI and the prosthetic mitral leaflet motion [3].

We describe a case of a Portico™ TAVI system (St Jude Medical, St Paul, MN, USA) made through distal axillary artery in an 83-year-old patient affected by severe aortic stenosis, who previously underwent mitral valve replacement with a mechanical prosthesis.

Case Report

An 83-year-old male affected by severe aortic stenosis was admitted to our hospital for severe dyspnea. In February 1999 he underwent gastrectomy for stomach cancer. In November 1999 he underwent mitral valve replacement with a mechanical Sorin Bicarbon 27 mm (Sorin Biomedical Cardio S.p.A., Saluggia VC, (Italy) prosthesis to treat mitral valve endocarditis. After clinical stabilization patient underwent echocardiographic evaluation that confirmed a severe aortic stenosis with a mean gradient of 50 mmHg, with left ventricle (LV) ejection fraction (EF) 37% and normal mechanical mitral valve function. Coronary angiography was normal. An ECG-gated multislice computed tomography (MSCT) was performed and evidenced peripheral vascular disease with small size, calcified, femoral vessels; a tri-leaflet calcified aortic valve with annulus perimeter of 84.9 mm (30 mm x 22 mm). The distance between aortic virtual basal ring and mitral prosthesis was < 2 mm (Figure 1). After Heart Team evaluation a TAVI was preferred (Euroscore II: 16.2%; STS score Mortality: 8%). Due to peripheral vasculopathy, the presence of a mitral prosthesis with a short distance between aortic annulus and mitral valve a recapturable and resheathable valve and an alternative access was preferred. On the basis of MSCT scan evaluation the left distal axillary artery was considered the access of choice.

The procedure was performed in a hybrid OR by a team composed of interventional cardiologist, "hybrid" cardiac surgeon and cardiac anesthesiologist. Left distal axillary artery was exposed after skin and deep-tissue incision (Figure 1). Arterial cannulation was performed using the Seldinger technique through a double purse-string suture. A 9-Fr sheath was then inserted into the distal axillary artery, aortic valve crossed and then a 18-Fr sheath was inserted over a pre-shaped super stiff guide-wire. A pigtail catheter was placed in the non-coronary cusp via the left femoral access,

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Received Date: 13 Sep 2016

Accepted Date: 30 Sep 2016

Published Date: 21 Oct 2016

Citation:

Bruschi G, Colombo P, Merlanti B, Nava S, Belli O, Musca F, et al. Portico Transcatheter Implantation in a Patient with Mechanical Mitral Valve. *J Heart Stroke*. 2016; 1(1): 1003.

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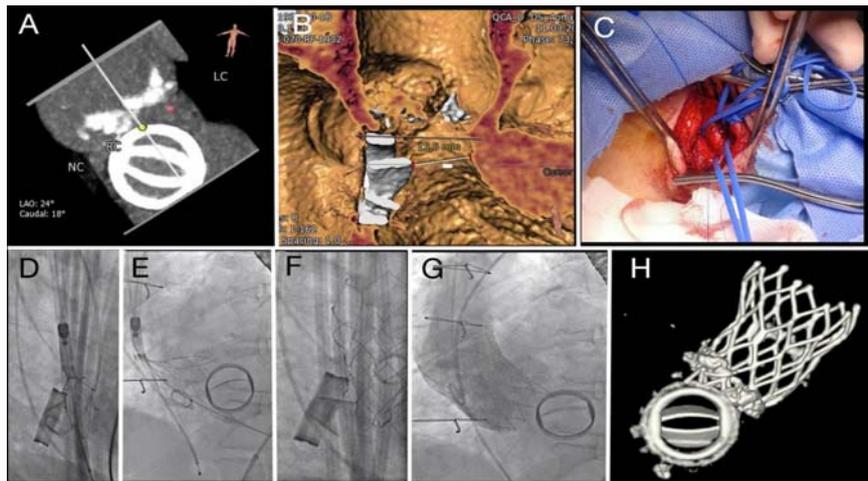


Figure 1: A) computed tomography evaluation of anatomical relations between aortic valve and mechanical mitral valve. B) ECG-gated computed tomography 3-d evaluation of the distance between aortic valve and mitral prosthesis. C) Left distal axillary artery exposure. D) Fluoroscopy evidenced interference between distal nitinol Portico frame and mitral valve leaflet, with reduced opening. E and F) Different fluoroscopic evaluation after Portico valve was partially reseathed and repositioned in an upper position, with evidence of normal mitral leaflet opening. G) Final aortography evidenced normal Portico function with no interference on mitral leaflet motion. H) Pre-discharge ECG-gated computed tomography evidenced full Evolut R expansion with no interference with mitral mechanical leaflet opening.

in order to mark the position of the lowest point of this cusp. Pre-TAVI balloon aortic valvuloplasty was performed under rapid pacing using a 23 mm balloon. A 29 mm Portico™ bioprosthesis was advanced through the aortic valve and slowly deployed. First Portico™ position was too low and fluoroscopy evidenced interference between distal nitinol Portico™ frame and mitral valve leaflet (Figure 1). Transcatheter valve was partially reseathed and positioned in an upper position, different fluoroscopic projections and transesophageal echocardiography were used to confirm normal leaflet mitral valve function (Figure 1); then full TAVI deployment was completed with normal mitral valve function. Echocardiographic, hemodynamics and angiographic evaluation evidenced transvalvular mean gradient of 6 mmHg, normal mitral leaflet motion and trivial paravalvular leak (Figure 1). Axillary access was closed with a linear suture. Patient had an uneventful hospital course and discharged home on 6th post-operative day.

Pre-discharged echocardiography showed improved LV function with ejection fraction of 50%, normal aortic valve function with mean gradient of 8 mmHg, trivial posterior para-valvular regurgitation. A MSCT without contrast was performed and evidenced full Portico expansion and normal opening of mitral leaflet (Figure 1).

Comment

We reported the case of Portico TAVI made in a patient with mechanical mitral prosthesis through the distal axillary artery. Very few distal axillary TAVI cases have been reported in literature [4]. Distal axillary approach, as subclavian one, provides a closer TAVI placement and high deployment control with one to one transmission of forces.

Our patient underwent prior mitral mechanical valve replacement; the presence of a mitral prosthesis is considered exclusion criteria for TAVI. This is because the presence of a mechanical valve in the mitral position reduces the mitro-aortic space to accommodate the transcatheter valve. Moreover, concerns exist about possible interference between the mitral prosthetic housing and transcatheter valve, that might interfere with optimal valve deployment, and frame expansion, increasing the risk of prosthesis shift and misplacement;

or vice versa interference between TAVI device and the prosthetic mitral leaflet motion [3]. Few single center experiences have been published in the literature on TAVI in patients with biological or mechanical mitral valve prostheses [5-7].

In our patient the space between aortic virtual basal ring and mitral prosthesis was < 2 mm determined the exclusion of the majority TAVI devices on the market. We decided to implant a Portico™ TAVI system considering that the valve is designed to function at the annular level upon deployment, leaving the time to evaluate mitral valve function before full TAVI deployment, and also considering that large cell frame design theoretically could reduce the risk of interference within mitral valve leaflet. Moreover, the possibility of reseath and redeploy successfully the valve was essential in our case. Pre-procedural multislice computed tomography that is useful in all TAVI patient is essential in planning a TAVI in patient with mechanical mitral prosthesis, furthermore, intra-procedural multidisciplinary assessments using echocardiography and fluoroscopy is important to evaluate potential interference between the transcatheter device and the mitral prosthesis before full valve deployment.

Our experience characterized by a heart team approach and multidisciplinary patient care demonstrated the safety and feasibility of Portico implantation in a very complex case through distal axillary artery.

References

1. Adams DH, Popma JJ, Reardon MJ, Yakubov SJ, Coselli JS, Deeb GM, et al. Transcatheter aortic-valve replacement with a self-expanding prosthesis. *N Engl J Med.* 2014; 370: 1790-1798.
2. Leon MB, Smith CR, Mack MJ, Makkar RR, Svensson LG, Kodali SK, et al. Transcatheter or Surgical Aortic-Valve Replacement in Intermediate-Risk Patients. *N Engl J Med.* 2016; 374: 1609-1620.
3. Vavuranakis M, Vrachatis DA, Kariori MG, Moldovan C, Kalogeris K, Lavda M, et al. TAVI in the case of preexisting mitral prosthesis: tips & tricks and literature review. *J Invasive Cardiol.* 2014; 26: 609-613.
4. Ussia GP, Cammalleri V, Marchetti AA, Sarkar K, De Vico P, Muscoli S, et al. Transcatheter aortic valve implantation through distal axillary artery: novel option for vascular access. *J Cardiovasc Med.* 2015; 16: 271-278.

5. Bruschi G, De Marco F, Oreglia J, Colombo P, Fratto P, Lullo F, et al. Percutaneous implantation of CoreValve aortic prostheses in patients with a mechanical mitral valve. *Ann Thorac Surg.* 2009; 88: 50-52.
6. Bruschi G, De Marco F, Barosi A, P Colombo, L Botta, S Nonini, et al. Self-expandable transcatheter aortic valve implantation for aortic stenosis after mitral valve surgery. *Interact Cardiovasc Thorac Surg.* 2013; 17: 90-95.
7. Barbanti M, Ussia GP, Latib A, De Marco F, Fiorina C, Santoro G, et al. Transcatheter aortic valve implantation in patients with mitral prosthesis. *J Am Coll Cardiol.* 2012; 60: 1841-1842.