

Case Report

A Percutaneous Valve in an Aortic Valve Bioprosthesis through a Carotid Prosthesis

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Abstract

In recent years, transcatheter aortic valve implantation has become an emerging alternative for high-risk patients with severe aortic stenosis. A promising new indication in this modality could be the interventional treatment of degenerated bioprostheses. We used a vascular prosthesis access in our patient to facilitate the procedure in the absence of an adequate vascular access. (*Iranian Heart Journal 2015; 16 (1):42-45*)

Keywords: ■ Valve in valve; ■ Carotid bioprosthesis; ■ Percutaneous aortic valve

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Learning Objective

Patient selection for transcatheter aortic valve implantation without adequate access remains crucial. The case described herein demonstrates how we can face this challenge.

Introduction

The first percutaneous aortic valve replacement, performed by Dr. A. Cribier in 2002, created a new therapeutic approach to patients at high surgical risk for conventional surgery via sternotomy. In the short time since, the material has been improved and the procedure, approach, and implantation technique have been streamlined. Patient selection, however, still remains crucial to

guarantee a desirable outcome. We describe a percutaneous aortic valve implantation procedure (a Core Valve bioprosthesis) in a degenerated bioprosthesis without an adequate vascular access.

Clinical Case

Our patient was an 83-year-old man with a history of ischemic heart disease and moderate left ventricular dysfunction (ejection fraction=45%). Previously in 2009, he had undergone aortic valve bioprosthesis replacement (with a Mitroflow No. 23) due to gradual stenosis.

On admission, the patient had dyspnea (grade IV) refractory to medical treatment with severe decompensation. The logistic

EuroSCORE was calculated at 36%. Preoperative echocardiographic data objectified aortic stenosis with a mean gradient of 53 mmHg, a maximum gradient of 87 mmHg, and an aortic area of 0.8 cm^2 as calculated by the continuity equation. Preoperative computed tomography (CT) angiography showed that the diameters of the common iliac artery, left iliac artery, and subclavian arteries were 5 mm, 5 mm, and 6 mm, respectively. The findings demonstrated that the only solution was to use the carotid artery for a bioprosthesis implantation to facilitate the procedure. The intervention consisted of right carotid positioning with a Dacron prosthesis to facilitate the introduction

of a CoreValve, followed by the use of the right femoral small access (5 French) for the introduction of the probe aortography during the procedure. Figures 1 and 2 illustrate the development of the valve-in-valve procedure (CoreValve model 23) directly without prior dilation at the time of the deployment of a valve in another valve. In terms of localization, a site 4 mm below the position was considered ideal for implantation (Figure 3). This may explain the fact that in the immediate postoperative echocardiography, there was a persistent transaortic mean gradient of 20 mmHg, a maximum gradient of 42 mmHg, and a surface area of 1.1 cm^2 .

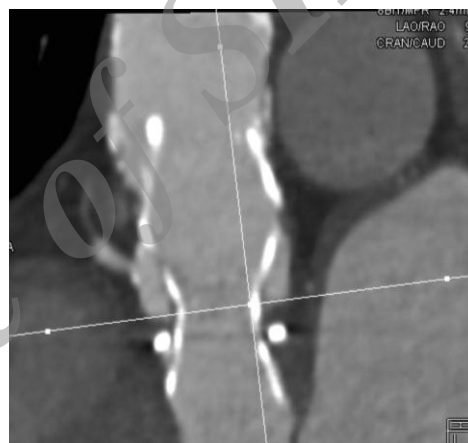
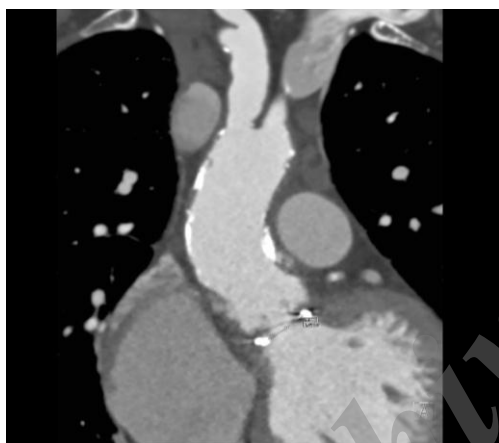


Figure 1. Computed tomography angiography, showing the aortic prosthetic ring with calcification before and after EndoValve implantation

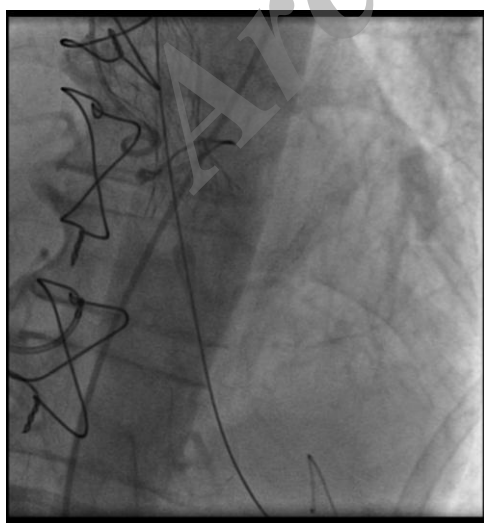


Figure 2. Angiography and Chest X-Ray of the patient

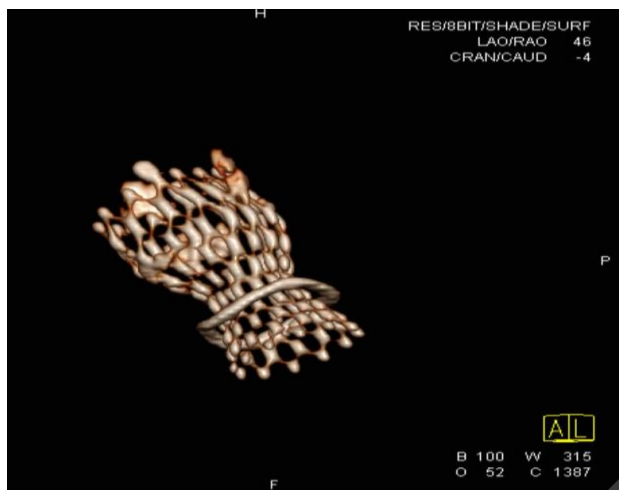


Figure 3. Computed tomography scan of the EndoValve Relative to the ring of the bioprosthesis

Postoperative follow-up was under inotropes with extubation performed on the first post-procedural day. Improvement in the signs of heart failure was observed in the first week. The patient was seen one month after the procedure with a clear clinical improvement and regression of his episodes of cardiac decompensation.

Discussion

When referring to us, our patient had already developed aortic stenosis in a previously implanted bioprosthesis and suffered from a refractory dyspnea. However, we had yet to determine whether it was technically possible to perform percutaneous aortic valve replacement via an angiographic evaluation of the vascular access. On transthoracic echocardiography and CT scan, the size of the ring can vary significantly depending on the selected imaging. The size, however, should not be generally less than 18 mm or greater than 29 mm. Additionally, the ring should be as close to the aortic annulus and the coronary ostium as possible.

In our patient, the incision in the right primitive carotid artery was facilitated by the introduction of a Dacron prosthesis, which to the best of our knowledge is the first procedure of its kind.³

Modine et al.² reported 12 cases of aortic valve implantation via the carotid access without prostheses. One patient suffered a transient ischemic stroke. It is, therefore, advisable that electroencephalogram monitoring be conducted in tandem with the procedure to monitor cerebral perfusion.³

The median time for the implantation of a valve in another valve is still about 120 minutes in the European registry.³ Our procedure time was 180 minutes with a fluoroscopy time of 36 minutes explained by the initial implantation of the carotid prosthesis.

For the valve-in-valve procedure, the most common risk is the wrong deployment of the percutaneous valve secondary to the calcification usually present on the bioprosthesis, especially if it is asymmetric.³ There is also often the need to implant a permanent pacemaker (5.7% to 20% for the CoreValve) 6 mm below the base of the aortic annulus, which remains the most common event described in the first 30 days. This may interfere with the atrioventricular node, located very close to the aortic region and submembranous septum.^{3,4}

Conclusion

Percutaneous aortic valve replacement on a degenerated bioprosthesis is a new option and

an alternative to surgery for patients at high surgical risk. This technique allows hemodynamic and functional improvement, which will persist in the medium term. Patient selection and multidisciplinary approach remain critical, and the surgical approach and vascular access should be meticulously analyzed to predict and, thus, avoid complications.

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