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Original Article

Transcatheter aortic valve implantation with Core Valve: First Indian experience of three high surgical risk patients with severe aortic stenosis

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ABSTRACT

The prevalence of aortic stenosis is increasing with aging population. However with multiple co-morbidities and prior procedures in this aging population, more and more patients are being declared unfit for the 'Gold Standard' treatment i.e. surgical aortic valve replacement (AVR). Among the patients who are unfit or high risk for aortic valve replacement (AVR) by open heart surgery, transcatheter aortic valve implantation (TAVI) has been proven to be a valuable alternative improving survival and quality of life. We report first Indian experience of Core Valve (Medtronic Inc.) implantation in three high surgical risk patients performed on 22nd and 23rd February 2012.

1. Introduction

Traditional aortic and mitral surgery have been the mainstay of treatment for valvular heart disease; prior to surgical techniques for valve replacement and repair, there were no effective therapies for patients with severe disease. In selected patients at experienced centers with expert surgeons, the results have generally been excellent with improved morbidity and mortality compared with medical therapy but at a cost of significant invasiveness and recovery time for the patient.[1] In clinical practice, at least 30% of patients with severe symptomatic aortic stenosis do not undergo surgery for replacement of the aortic valve, owing to advanced age, left ventricular dysfunction, or the presence of multiple coexisting conditions. For these patients, who are at high surgical risk, a less invasive treatment may be a worthwhile alternative. Transcatheter aortic valve implantation (TAVI) is a new procedure, in which a bioprosthetic valve is inserted through a catheter and implanted within the diseased native aortic valve. Since 2002, when the procedure was first performed, there has been a rapid growth in its use throughout the world for the treatment of severe aortic stenosis in patients who are at high surgical risk.[2]

2. Case 1

Mrs. AD, 80 years old lady, who had undergone coronary bypass grafting twelve years ago for unstable angina with

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triple vessel disease presented to us with history of exertional chest pain, CCS class III. On evaluation, she was found to have severe calcific aortic stenosis – aortic valve area by continuity equation as 0.5 cm^2, mean pressure gradient across aortic valve of 62 mmHg and mild aortic regurgitation. The left ventricular ejection fraction was 55%. CT coronary angiography revealed patent grafts and a Porcelain Aorta. EuroScore risk for AVR was 32.7%. Surgical AVR was refused on account of high surgical and anesthesia risks.

The evaluation for TAVI using Core Valve (Medtronic Inc.) was done according to the set guidelines of clinical and imaging work up protocols. Imaging by Transthoracic echocardiography, Transesophageal echocardiography and CT scan were performed apart from the invasive coronary angiography[3,4] (Figs. 1–5). Key parameters of Imaging from TAVI work up perspective include aortic valve and Root analysis, coronary ostia length and peripheral vascular access vessel anatomy. The Core Valve size selection depends mainly on the aortic annulus perimeter and diameter detected on CT Aortography as well as Transesophageal echocardiography. Based on these measurements, 26 mm Core Valve was chosen for this patient.

2.1. *The device*

Core Valve consists of three porcine pericardial tissue leaflets mounted on a self expanding nitinol frame. It is available in three sizes viz 26 mm, 29 mm and 31 mm. When appropriate size is chosen, it provides good hemodynamic in most of the diseased aortic valves with complex anatomies.

2.2. *Technique of implantation*[5–8]

The patient underwent TAVI through the transfemoral route. In this approach, the vascular access was taken via surgical cut down of the right common femoral artery and closure of the vascular access was also achieved surgically.

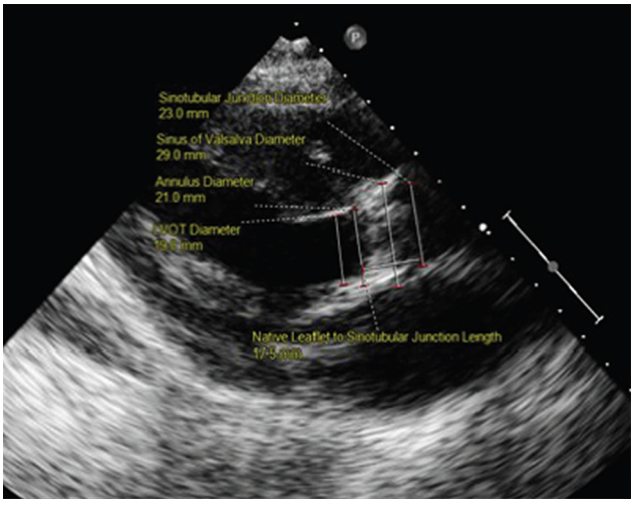

Fig. 1 – PLAX view in Transthoracic echocardiography for making different measurements at the aortic root and annulus.

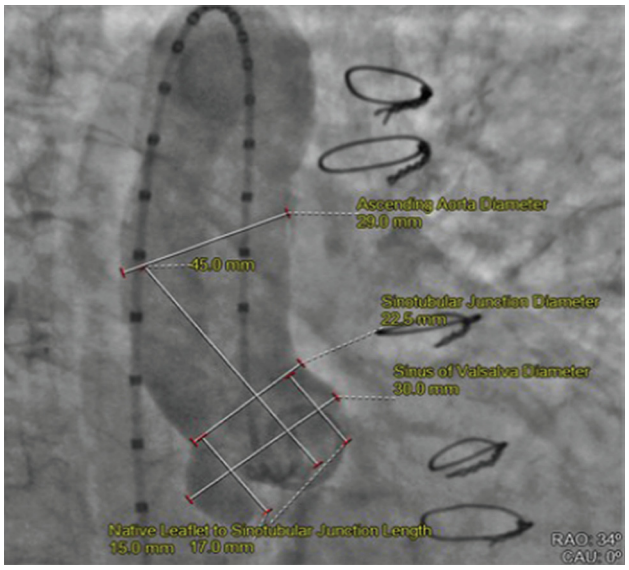

Fig. 2 – Marker PigTail used for measurements of aortic root, annulus and height of coronary ostia during Aortography (RAO caudal).

Two teams worked during the procedure simultaneously, one team prepared the Core Valve (crimping the valve under ice cold water and mounting it on the delivery catheter) to be ready for implantation while the operating team indulged in obtaining access, valvuloplasty and finally valve deployment. The procedure was carried out under general anesthesia. The deployment steps include the crossing of aortic valve, balloon aortic valvuloplasty to dilate the native valve and positioning the prosthesis at the level of the aortic valve. It is important to perform valvotomy only after confirmation from the team who is mounting the Core Valve that they are ready with the valve as sometimes during valvotomy, patient may develop acute severe aortic regurgitation with hemodynamic compromise necessitating urgent valve deployment. The

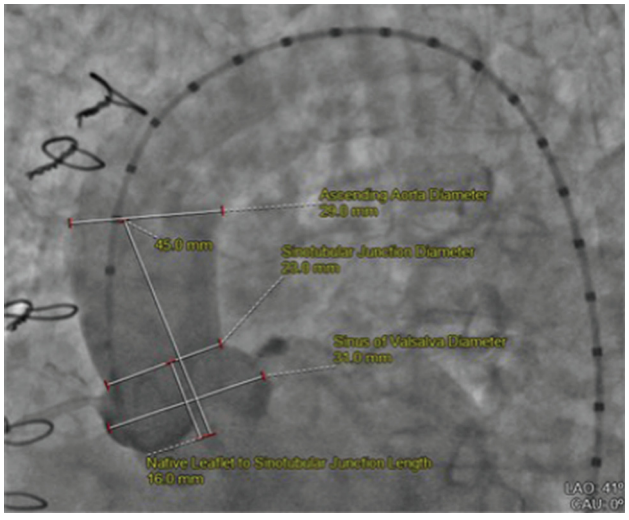

Fig. 3 – Marker PigTail used for measurements of aortic root, annulus and height of coronary ostia during Aortography (LAO cranial).