



Robotic Aortic Valve Replacement: New Approach to An Old Problem

Background

In recent years the management of aortic valve pathology has changed significantly with the introduction of transcatheter aortic valve replacement (TAVR), which initially was restricted to high risk patients, but that population is changing to include moderate and low risk patients. Despite the advancement of TAVR, there still a group of patients who are in need of surgical aortic valve intervention. It includes patients with bicuspid aortic valves, patients with aortic insufficiency without calcification and young patients (<65 years) with low surgical risk. Over the last two decades robotic cardiac surgery has been proven to be a safe and effective tool in cardiac surgery. Robotic aortic valve replacement (RAVR) has been recently introduced and reports on it are scarce but it appears to be safe and comparable to existing alternatives.

Methods

Between March 2022 and December 2022, 9 patients underwent RAVR, two of them had concomitant mitral valve procedure. All patients had aortic valve insufficiency except two who had aortic stenosis. One patient had aortic and mitral regurgitation due to infective endocarditis. All procedures were done utilising the Da Vinci XI robot through a 4 cm right mini-thoracotomy plus three port technique and peripheral cardiopulmonary bypass (femoral arterial access + femoro-jagular venous access). Standard surgical technique of valve implantation using interrupted braided pledgeted sutures was used on all patients.

Results

The median age of our 9 patients was 35 years and the average body mass index was 35 kg/m2. 77.8% of our group (7 patients) suffered from sever aortic insufficiency while the remaining two patients had sever aortic stenosis. The average ejection fraction was 53% with a mean society of thoracic surgeons (STS) score of 0.65%.

The average cross clamp time was 145 minutes, and the median ventilation time was 5 hours with 3 patients extubated on the operating table. The median length of stay was 6.5 days, and the median blood transfusion was 1 unit of red blood cells. There were two patients left open for bleeding and had to be taken back to the operating room for haemostasis and closure. During the post operative period 2 patient had acute kidney injury but did not require dialysis and 1 patient developed post operative atrial fibrillation. There were no wound complications, strokes, or 30-day operative mortality. Follow up echocardiogram showed well-functioning valves and a reduction of left ventricular diastolic diameter of an average of 0.86 cm.

Patients' Baseline Characteristics	
Viariable	Total Number= 9
Age, y	35 (20-56)
Gender	
Male	88.9 (8)
Female	11.1(1)
Comorbidities	
Diabetes mellitus	11.1(1)
Hypertension	33.3(3)
Chronic Kidney disease	0
Decompensated Heart Failure	11.1(1)
Pre operative Atrial Fibrillation	11.1(1)
Pre Operative Echocardiogram	
Ejection Fraction	53%
Aortic Valve Insufficiency	7(77.8%)
Aortic Valve Stenosis	2(22%)
Median Left ventricular Internal Diameter in Diastole, cm	6

Conclusion

RAVR is a new procedure that comes with its unique challenges, but it appears to be safe and comparable to conventional approaches to aortic valve replacement once the learning curve has been overcome