

SUTURELESS AORTIC VALVE REPLACEMENT – THE FIRST EXPERIENCE IN TRAKYA UNIVERSITY

Kübra Gökçe¹, Furkan Yiğitbilek¹, Volkan Yüksel², Suat Canbaz²

¹Trakya University Faculty of Medicine, Edirne, TURKEY

²Department of Cardiovascular Surgery, Trakya University Faculty of Medicine, Edirne, TURKEY

ABSTRACT

Introduction: We present the first experience of sutureless aortic bioprosthesis valve replacement in Trakya University Cardiovascular Surgery Clinic.

Case report: A 71 year-old female patient with shortness of breath admitted to the cardiology clinic. In physical examination, there was a 3/6 systolic murmur on aortic area spreading to the neck. In the echocardiography, severe aortic stenosis and mild aortic insufficiency was found. In coronary angiography, 90% stenosis was found on proximal portion of left anterior descending coronary artery. Aortic valve replacement and coronary artery by-pass operation was planned.

Results: The first sutureless aortic valve replacement in Trakya University Hospital was performed successfully and the patient was discharged from the hospital without any complication.

Key Words: : Aortic valve stenosis, replacement, sutureless aortic valve

INTRODUCTION

Aortic valve replacement is still the gold standard for critical aortic stenosis treatment. Operation related mortality and morbidity rate after surgery for aortic valve insufficiency or aortic valve stenosis increases with procedural time such as aortic cross-clamping time, total perfusion time and operation time (1). In this study, we present the first experience of sutureless aortic bioprosthesis valve replacement that was performed in Trakya University Cardiovascular Surgery Clinic.

CASE REPORT

A 71 year-old female patient with shortness of breath admitted to the cardiology clinic. In physical examination, there was a 3/6 systolic murmur on aortic area spreading to the neck. In the echocardiography, severe aortic stenosis and mild aortic insufficiency

was found. In echocardiographic examination of the patient, aortic root was measured as 18 mm, aortic valve velocity as 3,5 m/s, maximum gradient as 49 mm Hg, mean gradient as 28 mm Hg and an ejection fraction was %64. In coronary angiography, 90% stenosis was found on proximal of left anterior descending coronary artery. In risk scoring of the patient, EuroSCORE was calculated as 6 points and it was evaluated as medium-high risk. Aortic valve replacement and coronary artery by-pass operation was planned for the patient.

In cardiopulmonary by-pass, number 21 nitinol framed self expandable Medtronic (Minnesota - USA) 3F Enable® Trileaflet Aortic Bioprosthesis valve replacement and left anterior descending coronary artery by-pass grafting operation was performed on aorta with saphenous vein graft. In intraoperative transesophageal echocardiography, no paravalvular leak was found on aortic valve and minimal traces of central leaks were found. Aortic cross-clamping time was 40 minutes, total perfusion time was 55 minutes

and the operation time was 155 minutes. No paravalvular leak was present on aortic bioprosthesis valve on the transthoracic echocardiography before discharge. Patient was discharged in good health after having been followed 2 days in intensive care unit and 7 days as in-patient clinic.

DISCUSSION

The first aortic valve replacement was performed in 1960 and until then, it has been the gold standard for treatment of critical aortic stenosis. The main technique in the operation is to remove the aortic valve under cardiopulmonary by-pass and to replace the new valve prosthesis. Extracorporeal circulation is used during the operation because the heartbeats are stopped completely and aorta is cross-clamped. The major part of aortic cross-clamping time is spent on the removal of the valve and replacing of the new valve. Prosthetic valve implantation might be very hard for the surgeon especially in patients with narrow aortic root. Such difficulties led researchers to look for new techniques. Sutureless aortic valve replacement is one of the promising techniques. In this technique, cross-clamping time is shorter because no sutures are used as the new valve is implanted. Functional valve diameter is bigger because there is no suture ring. Technically, it is easy and it has advantages in the operation. In addition, with its changeable sizes, it is more compatible with patient's heart which causes better hemodynamics. (2)

In sutureless aortic valve replacement surgery, aortotomy incision must be done in a higher level than the standard aortic valve replacement surgery. By preferring the sutureless aortic valve, there is no need to use aortic root widening procedures which increase the morbidity and mortality of the patients who are suffering from narrow aortic root. In the study carried on by Pollari et al.; it was found out that in the aortic valve replacement operations with sutureless aortic valve, aortic cross-clamping time, cardiopulmonary by-pass time and operation time are significantly shorter (1). In this group of patients, the need of blood transfusion, the length of stay in intensive unit and in hospital is less. The results of the study carried on by Gilmanov et al. supported the findings of Pollari. According to the findings of the multicenter study that analyzed 314 patients' results, this technique had successful results in high risk patients in both short term and intermediate term follow up.(3) Although successful results have been reported with early and

intermediate outcome, long-term follow-up results are necessary.(4,5)

With the new techniques and equipments in cardiovascular surgery, the morbidity and mortality rates are decreasing. The first operation of sutureless aortic valve replacement in Trakya University Hospital has been successfully performed and the patient was discharged at ninth postoperative day in good health. We think sutureless aortic bioprosthetic valve can be used in appropriate cases with narrow aortic root that are going to have aortic valve replacement.

REFERENCES

1. Pollari F, Santarpino G, Dell Aquila AM, Alhanas H, Vogt F, Pfeiffer S, Fischlein T. Better short term outcome by using sutureless valves: a propensity matched score analysis. *Ann Thorac Surg* 2014;98(2):611-7.
2. Concistre G, Santarpino G, Pfeiffer S, Farneti P, Miceli A, Chiaramonti F, Solinas M, Glauber M, Fischlein T. Two alternative sutureless strategies for aortic valve replacement: a two center experience *Innovations (Phila)* 2013;8(4):253-7.
3. Gilmanov D, Miceli A, Ferrarini M, Farneti P, Murzi M, Solinas M, Glauber M. Aortic valve replacement through right anterior minithoracotomy: Can sutureless technology improve clinical outcomes *Ann Thorac Surg* 2014 (Epub ahead of print) doi: 10.1016/j.athoracsur.2014.05.092
4. Shrestha M, Maeding I, Höffler K, Koigeldiyev N, Marsch G, Siemeni T, Fleissner F, Haverich A. Aortic valve replacement in geriatric patients with small aortic roots: are sutureless valves the future? *Interact Cardiovasc Thorac Surg* 2013;17(5):778-82.
5. Rubino AS, Santarpino G, De Praetere H, Kasama K, Dalen M, Sartipy U, Lahtinen J, Heikkinen J, Deste W, Pollari F, Svenarud P, Meuris B, Fischlein T, Mignosa C, Biancari F. Early and intermediate outcome after aortic valve replacement with sutureless bioprosthesis: Results of a multicenter study. *J Thorac Cardiovasc Surg* 2014;148(3):865-71.