

Right anterior thoracotomy approach for isolated aortic valve replacement with sutured aortic valve prosthesis

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ABSTRACT

Minimally invasive aortic valve surgery is associated with less bleeding, shorter duration of mechanical ventilation, and reduced intensive care unit and hospital stays. Herein, we present a 85-year-old male case with minimal invasive sutured aortic valve replacement via right anterior thoracotomy. We also discuss the advantages of this method.

Keywords: Aortic valve prosthesis; minimally invasive surgery; right anterior thoracotomy.

Minimally invasive aortic valve replacement (AVR) performed through a right anterior thoracotomy (RAT) or upper hemisternotomy (UHS) is becoming a favored approach. Advantages of less bleeding and faster recovery due to the incision technique made the right anterior thoracotomy a preferable approach. We present a patient with minimal invasive sutured AVR via right anterior thoracotomy.

CASE REPORT

A 85-year-old male patient was admitted to our hospital with complaints of angina and dyspnea on exertion. His body mass index was 19 kg/m². Cardiac examination revealed a regular heart rate and rhythm with no rubs or heaves. A 3/6 late-peaking systolic murmur at the right second intercostal border was radiating to the carotid arteries and encroached on the second heart sound. Auscultation revealed normal lung sounds bilaterally and pulmonary function test results were normal. On preoperative assessment, there was no contraindication for single lung ventilation. After physical examination with suspected of valvular pathology, transthoracic echocardiography was performed. It showed severe aortic valve stenosis characterized by an aortic valve area of 0.8 cm², a mean aortic valve gradient of 45 mmHg, and a maximal aortic velocity of 4 m/sec. For further examination, thoracic computed tomography was performed without contrast enhancement to evaluate the aortic calcifications, as well as the relationship among the aortic valve, sternum, and intercostal spaces. It demonstrated

noncalcified ascending aorta with a diameter of 43 mm. The distance of annulus and ascending aorta to the right anterior thoracotomy incision were evaluated. Coronary angiography scans were normal and carotid Duplex ultrasound showed insignificant stenotic plaques. A written informed consent was obtained from the patient for surgery.

The patient underwent surgery with right anterior thoracotomy incision. After anesthesia induction, he was intubated with a double-lumen endotracheal tube for single lung ventilation and had intraoperative transesophageal echocardiography. On supine position, the external defibrillator pads were placed, and the skin incision and peripheral cannulation was performed. By peripheral cannulation via femoral artery and vein, a right anterior thoracotomy with a 5 cm skin incision from the third intercostal space near the sternal border was performed. The right internal thoracic artery and veins were ligated. A soft tissue retractor was inserted into the incision. Pericardial fat was excised and pericardiotomy was performed 4 cm anterior to the right phrenic nerve. The pericardium was retracted by passing sutures through the chest wall away from the incision. The operative field was insufflated with carbon dioxide. A 23 mm Medtronic Hancock bioprosthetic valve

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(Medtronic, Minneapolis, MN, USA) was implanted (Figure 1). Cross-clamp and cardiopulmonary bypass times were 83 min and 108 min, respectively. Postoperative course was uneventful.

DISCUSSION

In 1996, Cosgrove and Sabik^[1] introduced the first right parasternal approach to reduce the morbidity from valvular heart operations. Then, techniques encompassed a wide variety of incisions. Today, the RAT and UHS are the primarily minimal invasive AVR approaches.

Improved cosmesis, less pain and narcotic use, and rapid recovery have been reported, which offer more comfort to both patients and surgeons. Several studies address ministernotomy, while outcomes of minimally invasive valve replacement via RAT have not been well-defined, yet. Establishing the more comfortable way of operation for aortic valve surgery requires a coordinated effort by the surgeon, anesthesiologist, perfusionist, and nurses. Upper hemisternotomy may be applied by less experienced minimal invasive AVR

surgeons. However, stability of the manubrium is the weaker chain of the operation. The sternotomy is re-approximated using steel wires. Right anterior thoracotomy avoids sternotomy, while the integrity of the sternum minimizes the postoperative discomfort with a limited skin incision.^[1] Although, the surgical site is smaller and the aortic valve sits deeper within the wound. Exposure is facilitated by minimizing cannulation techniques within the incision, coupled with strategic placement of pericardial sutures.^[2] Most studies show that RAT is a safe procedure associated with low mortality and postoperative complications. The in-hospital mortality of 1.5% is lower than the recent mortality rate reported in the Society of Thoracic Surgeons Database.^[3] Although cross-clamp and cardiopulmonary bypass times were longer than in the standard approach, the low incidence of postoperative stroke, renal failure, atrial fibrillation, and blood transfusions, as well as the short postoperative recovery, are consistent with other minimally invasive approaches, highlighting the safety of this procedure.^[4] In addition, due to the psychological and cosmetic results, it is a preferable method.^[5]

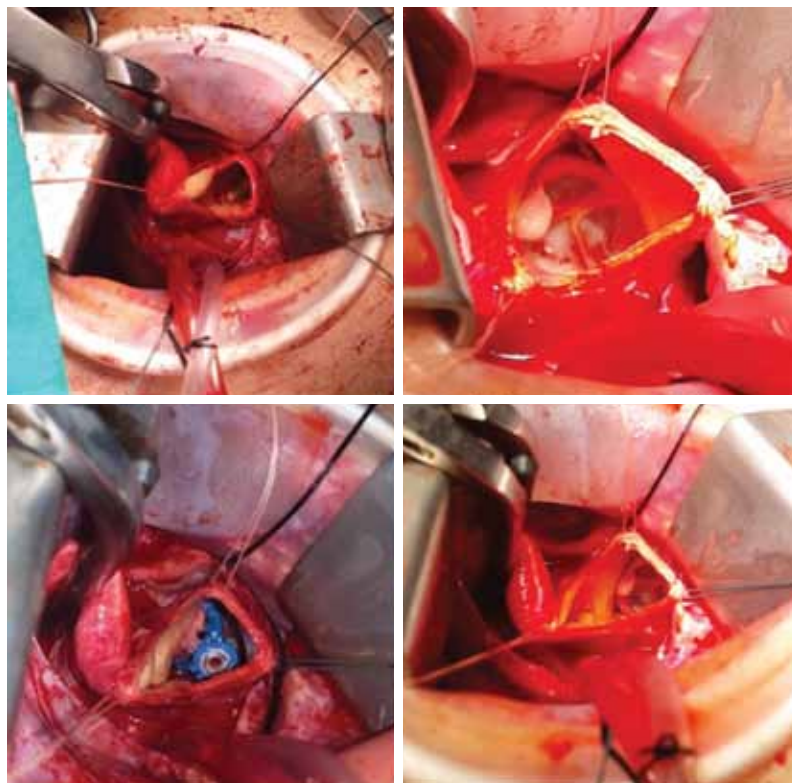


Figure 1. Sutured aortic bioprosthesis valve replacement via right anterior thoracotomy approach.

In conclusion, minimally invasive aortic valve replacement via a right anterior thoracotomy is a safe and effective method.

Declaration of conflicting interests

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