SCIENTIFIC LETTER

VIDEO-ASSISTED ENDOSCOPIC TRANSAXILLARY APPROACH FOR SUTURELESS AORTIC VALVE REPLACEMENT: REPORT ON THE FIRST NATIONAL SERIES

ABSTRACT

We present the first national experience with endoscopic video-assisted transaxillary aortic valve replacement using the Perceval™ sutureless aortic prosthesis. Three consecutive patients with severe aortic stenosis were included, all of whom underwent successful valve implantation.

Keywords: *aortic valve replacement; minimally invasive surgery; transaxillary approach; sutureless valve; Perceval™.*

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INTRODUCTION

Aortic valve replacement (AVR) surgery has evolved toward minimally invasive techniques to reduce surgical trauma and optimize postoperative recovery. In this context, sutureless prostheses, such as the Perceval™ valve, have proven to be an effective alternative by simplifying valve implantation and significantly reducing cardiopulmonary bypass (CPB) and aortic clamping (Clp) times.[1] Furthermore, the video-assisted transaxillary (VAT) approach represents an emerging strategy that allows AVR to be performed without the need for sternotomy, while maintaining adequate surgical exposure and promoting faster recovery.[2] This study reports the first three cases of AVR using the VAT approach with the Perceval™ valve, along with a technical description of the transaxillary approach.

CLINICAL CASES

CASE 1

An 87-year-old male patient diagnosed with severe aortic stenosis (AS) and a history of non-insulin-dependent diabetes mellitus and Paget's disease. The Heart Team evaluated him; it was decided against endovascular treatment due to excessive calcification of the aortic annulus, which posed a high risk of paravalvular leak. Given his high surgical risk, it was decided to perform an AVR with a sutureless prosthesis. The preoperative echocardiogram showed a preserved left ventricular ejection fraction (LVEF), with maximum and mean gradients of 67 mmHg and 43 mmHg, respectively. Aortic valve replacement was performed via a VAT approach; a large-sized Perceval™ prosthesis was implanted. The final gradients were 15 mmHg (maximum) and 9 mmHg (mean), with no evidence of paravalvular leak. CPB and Clp times were 190 and 90 minutes, respectively.

The immediate postoperative course was favorable. As a complication, the patient developed nosocomial pneumonia requiring antibiotic therapy, followed by diarrhea with a positive culture for *Clostridioides difficile*, which prolonged the hospital stay. He was discharged on the tenth postoperative day.

CASE 2

A 71-year-old female patient diagnosed with severe AS and grade II obesity. The preoperative echocardiogram showed preserved ejection fraction, a bicuspid aortic valve with severe calcification of the aortic annulus and the mitral-aortic continuity, and a small aortic annulus (19 mm), with maximum and mean gradients of 140 mmHg and 58 mmHg, respectively.

A VAT approach to aortic valve replacement was performed, with implantation of a small-sized Perceval™ prosthesis. The final gradients were 24 mmHg (maximum) and 13 mmHg (mean), with no paravalvular leak. CPB and Clp times were 183 and 95 minutes, respectively. In this case, in addition to avoiding sternotomy in an obese patient, the use of a sutureless prosthesis enabled the avoidance of aortic ring enlargement or aortic root replacement (Bentall surgery) to prevent prosthesis-patient incompatibility. The patient was extubated 2 hours after the end of surgery without requiring a pacemaker or inotropic support and was discharged on the fourth postoperative day. As a technical detail, a temporary pacemaker was implanted before surgery to ensure electrical stimulation during the immediate postoperative period; it was removed on the second day.

CASE 3

A 69-year-old male patient, on anticoagulation, with a diagnosis of severe AS and a history of hypertension, diabetes mellitus, complete left bundle branch block, and atrial fibrillation. The preoperative echocardiogram showed preserved LVEF, with maximum and mean gradients of 140 mmHg and 58 mmHg, respectively. A VAT approach AVR was performed, with implantation of a large-sized Perceval™ prosthesis. Final gradients were 18 mmHg (maximum) and 11 mmHg (mean), with mild paravalvular regurgitation. CPB and Clp times were 185 and 86 minutes, respectively. The patient was extubated in the immediate postoperative period, without requiring vasopressors or a pacemaker. Discharge occurred on the seventh postoperative day due to the need to achieve the therapeutic range of anticoagulation indicated by his prior atrial fibrillation.

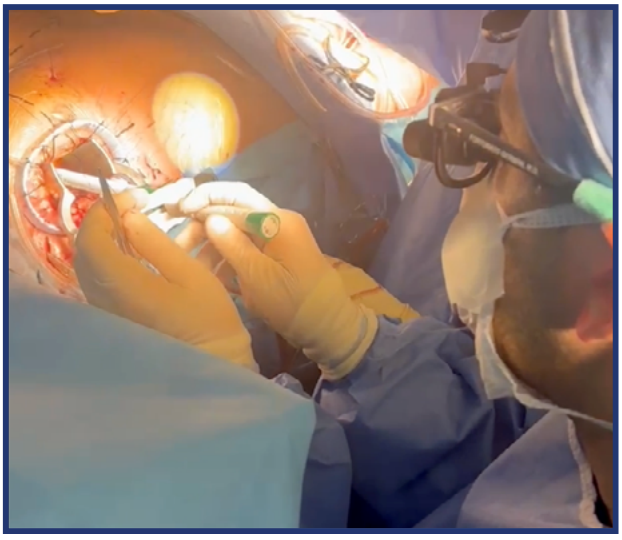

FIGURE 1. Initial set-up and surgeon's view.

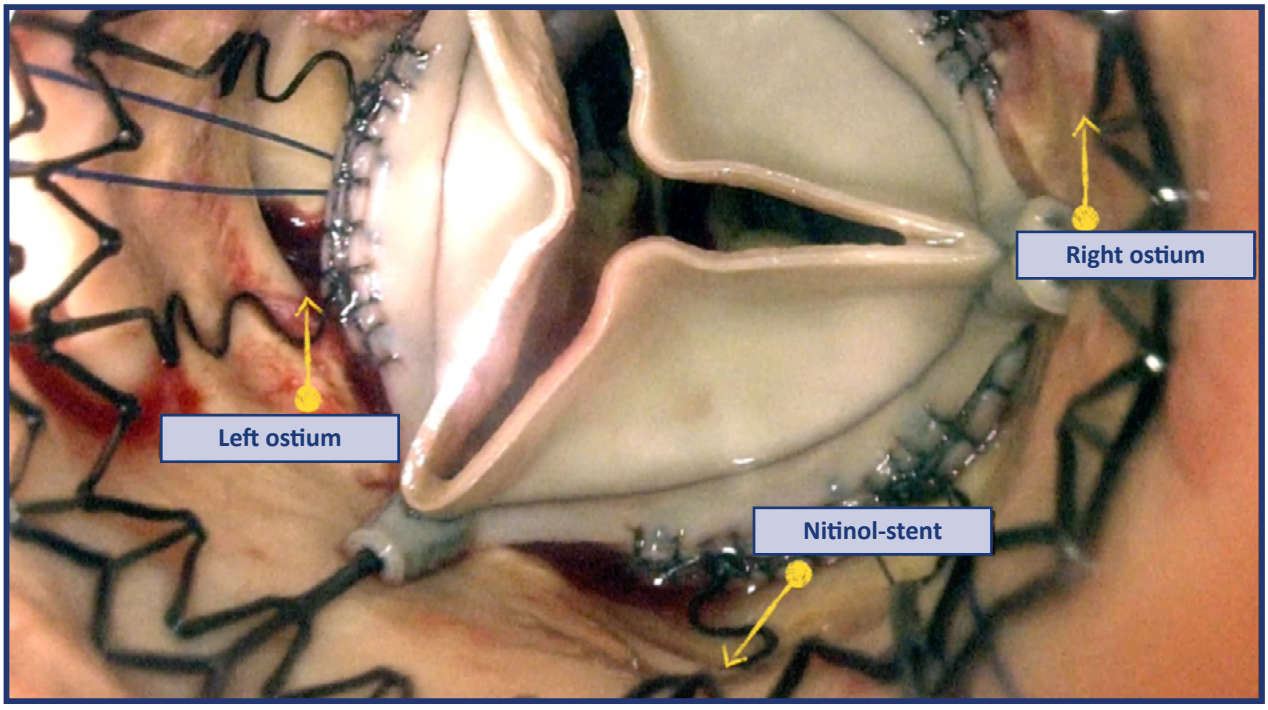

FIGURE 2. Final valve implantation under endoscopic visualization; the correct annular implant and the nitinol stent are visible. The coronary ostia are ensured to be free of obstruction.

DISCUSSION

The development of minimally invasive cardiac surgical techniques for mitral valve repair has expanded surgical options for selected patients, allowing for reduced surgical aggression without compromising hemodynamic outcomes. In this context, sutureless prostheses facilitate alternative approaches by simplifying valve implantation. The surgical technique and setup for the minimally invasive transaxillary approach (*Figure 1*) have been described.[3] For the implantation of the Perceval™ valve, certain technical aspects must be considered.[4] The aortotomy should be transverse and high (approximately 2 cm above the aortic pericardial fold) to avoid interference of the nitinol stent with the aortorrhaphy. Decalcification of the aortic annulus is necessary, though without excessive resection. Ring sizing with the sizers must be performed carefully: the transparent tip should pass easily into the left ventricle, while the white tip should do so with slight resistance. If there is uncertainty between two sizes, it is recommended to choose the smaller prosthesis. Three guide sutures are placed at the nadir of each coronary sinus to facilitate the descent of the prosthesis. After deployment, balloon dilation is performed at 4.5 atmospheres for 30 seconds, while the nitinol stent is irrigated with warm saline solution.

Upon completion of the implantation, a video camera was used to verify the correct position in the annular plane, the relationship with the coronary *ostia*, and the expansion of the stent (*Figure 2*). The VAT approach enabled successful AVR in all cases, without the need for conversion and with satisfactory hemodynamic outcomes. Although CPB and clamping times were longer than in conventional surgery, postoperative transvalvular gradients were low, and no significant paravalvular leaks were observed. However, the advantages of sutureless prostheses over traditional ones include faster implantation, improved transprosthetic gradients, and lower mortality, as we have demonstrated in a recent publication with statistically significant results.[5] The clinical outcome was favorable, with early extubation and no operative mortality.

CONCLUSION

The VAT approach, combined with sutureless valves, may be a safe, effective, and reproducible alternative for centers experienced in minimally invasive cardiac surgery. The main limitations of this study are its small sample size and descriptive nature.

Declaration

The authors have no conflicts of interest with Corcym or its product Perceval™.

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