ARTIGO ORIGINAL ORIGINAL ARTICLE

CONCOMITANT ASCENDING AORTIC REPLACEMENT AND AORTIC VALVE REPLACEMENT USING RAPID DEPLOYMENT BIOPROSTHESIS

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Abstract

Introduction: The association between aortic valve disease and dilatation of the ascending aorta is well known and concomitant surgery is recommended when the aortic diameter is higher than 45mm. The use of the rapid deployment valves allows less cross-clamping and cardiopulmonary bypass times for both isolated and combined procedures in comparison to regular valves.

We describe our initial experience of concomitant aortic valve and the ascending aortic replacement, using the rapid deployment valve Edward Intuity EliteTM.

Case presentation: All patients were male, with a mean age of 72-years-old. The mean cross-clamping time was 48 minutes, with a mean cardiopulmonary time of 61 minutes. The mean time of ICU stay was 4 days. All the patients had follow-up 1 and 3 months after discharge and were doing well.

Conclusions: The rapid deployment aortic valves have recognized advantages in aortic valve replacement. Our small experience reinforces that replacement the ascending aortic and aortic valve with this prothesis is one procedure that can benefits from generalization without increased risks and with potentially better clinical outcomes. Larger cohort studies would allow clarification over this subject.

INTRODUCTION

The association between aortic valve disease and dilatation of the ascending aorta is well known and concomitant ascending aortic replacement is recommended at the time of aortic valve replacement surgery if the diameter is greater than 45mm.[1,2,3]

Among the numerous advantages associated to the use of the rapid deployment valves, cross-clamp time (CXT) and cardiopulmonary bypass time (CBPT) reductions, for both isolated and combined procedures is of paramount importance.[4]

The ability to use this device in complex composite grafts or separated grafts for addressing concomitant ascending aortic pathology seems particularly helpful and allows important time reductions in comparison to regular valves.[5,6,7]

We describe our initial experience of aortic valve replacement and ascending aortic replacement, using the rapid deployment valve Edward Intuity Elite™.

CLINICAL CASES

Since the beginning of our rapid deployment bioprosthesis program, three patients were submitted to separated aortic valve replacement and ascending aortic replacement, using the valve Edward Intuity Elite™ and Dacron tube, in the same surgical procedure (Table 1 and 2).

CASE 1

A 64 years-old male, with hypertension as sole comorbidity, presented with dyspnoea of progressive worsening with efforts. Coronary angiography was normal. Echocardiogram showed: normal left ventricular function (LVF); aortic orifice area of 0.9cm^2; peak gradient of 85mmHg and medium gradient of 54mmHg; without any other valvular abnormalities. Thoracic computed tomography (CT) scan revealed the following aortic dimensions: root 34mm; ascending 47mm; arch 43mm.

Table 1 **Preoperative demographics for patients undergoing aortic valve replacement with Intuity prothesis and aorta replacement.**

Patient	Age	BMI	EF	Euroscore II	Aortic valve Patology	Aneurism (mm)
1	64	29,4	>50%	1,84	Stenosis	47
2	80	32,7	35%	3,90	Stenosis	53
3	72	30	>50%	2.30	Stenosis	48

BMI - Body mass index; EF - Ejection Fraction;

Table 2 **Intraoperative demographics for patients undergoing aortic valve replacement with Intuity prothesis and aorta replacement.**

Patient	1	2	3
Aortic prosthesis/tubular	25/ 26	27/ 30	23/ 28
CPBT[1]	51	69	63
CXT[1]	39	54	52
UCI[2]	2	7	3
Aminergic support	No	Yes	No
Drainage 24h[3]	300	1100	100
Hospital stay[2]	6	10	6
Complications	AF	Hemostasis review; AF	No
Follow-up	OK	OK	OK

1 – Min; 2 – Days; 3 – mL; CPBT - Cardiopulmonary bypass; CXT – cross-clamp time; AF – Atrial fibrillation.

The patient was submitted to an aortic valve and ascending aorta replacement, by median sternotomy. Under cardiopulmonary bypass, the distal ascending aorta was cross clamped. After aortotomy, the dilated aortic segment and the calcified and stenotic tricuspid aortic valve were removed. A biological rapid deployment aortic valve Edward Intuity Elite™ 25 was implanted followed by a Dacron tubular prosthesis number 26.

The CXT was 39 min with a CBPT of 51 min. Intraoperative transesophageal echocardiogram demonstrated normofunctional prosthesis, no paravalvular leak and a mean gradient of 5 mmHg.

In the post-operative the patient had one episode of atrial fibrillation (AF), converted to sinus rhythm with medical therapy, without other events.

CASE 2

80-years-old male, with hypertension, persistent AF and COPD, with recurrent hospitalizations for decompensated heart failure. Echocardiogram showed severe aortic stenosis, with moderate LVF (35%). The CT revelled an ascending aortic aneurysm with 53mm, with calcification but able for clamping. The coronarography was normal.

He was submitted to aortic valve replacement and replacement of the ascending aorta using the same method described in the Case 1, but instead we used an aortic valve Edward Intuity Elite™ 27 and a tubular prosthesis 30. The CXT time was 54 min with a total CBPT of 66 min. Intraoperative transoesophageal echocardiogram demonstrated well positioned prosthesis, no paravalvular leak and a mean gradient of 3 mmHg.

The patient had a significant loss of blood in the immediate post-operative, and went back to the operation room for haemostasis due to bleeding. After, the patient had an uneventful recovery.

CASE 3

A 72-years-old male, with diabetes and high blood pressure, presented with 2 recent syncopal episodes. Coronary angiography showed a lesion of 50% in the circumflex artery, without other lesions. Echocardiogram showed a normal biventricular function and an aortic valve with severe aortic stenosis with moderate insufficiency. CT scan showed a tubular thread ascending with 48mm.

The patient was submitted to an aortic valve and ascending aorta replacement, using a biological rapid deployment aortic valve, Edward Intuity Elite™ 23 and a Dacron tube 28.

The CXT was 52 min with a CBPT of 63 min. Intraoperative transesophageal echocardiogram demonstrated preserved biventricular function and a well-positioned prosthesis without leaks.

The patient had an uneventful recovery.

All the patients had *follow-up* at 1 and 3 months after discharge and were doing well.

DISCUSSION AND CONCLUSION

The development of rapid deployment aortic valves proved to be a great advancement for aortic valve surgery. Reduced CXT and CBPT for both isolated or combined procedures, superior hemodynamic performance, facilitator of broader minimally invasive procedures and reduced aortic manipulation are some of the recognized advantages of this device.[3,4]

If these advantages are well established should we not explore them to their full potential?

Although with some described drawbacks such as, paravalvular leaks and higher pacemaker implantation rates, from a conceptual point of view, separated ascending aortic replacement and aortic valve replacement using Edward Intuity Elite™ is one of the procedures that can benefit from generalization without increased risks. In fact, such procedures or even other more complex evolving the aortic root have already been successful performed before.[6,7]

Our small experience reinforces that option as a fast and safe way to simplify these complex procedures with potentially better clinical outcomes. The mean CXT and CBPT were 48 and 61 minutes, respectively and the bioprosthesis hemodynamic performance was excellent. There were no paravalvular leaks or permanent conduction disorders leading to pacemaker implantation. Nevertheless, these operative results did not translate in reduced ICU stay. At 1 and 3-months *follow-up* after hospital discharge all the patients were doing well, with echocardiogram without abnormalities and with normal valve function.

In conclusion, aortic valve and ascending aortic replacement, using a rapid deployment bioprosthesis might be a safe and useful approach.

Our study has several limitations, including the small sample size, short follow-up, and retrospective nature. Future investigations with more patients and a longer follow-up will be required to confirm the outcomes of this approach.

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