

Use of rapid deployment aortic valve prosthesis and patch reconstruction in a complex endocarditis.

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Abstract

We describe the case of a 59-year old female affected by aortic extensive endocarditis with communication between aortic annulus and right cavities, treated with double pericardial patch reconstruction and rapid-deployment aortic valve prosthesis implantation.

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Short title: Rapid deployment in endocarditis

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ABSTRACT

We describe the case of a 59-year old female affected by aortic extensive endocarditis with communication between aortic annulus and right cavities, treated with double pericardial patch reconstruction and rapid-deployment aortic valve prosthesis implantation.

KEYWORDS: Rapid deployment, Infective Endocarditis, Patch Reconstruction

Case Report

We describe the case of a 59 year old female with a history of insulin dependent type 2 diabetes and obesity, admitted to our hospital with severe metabolic acidosis. She appeared neurologically oriented, pyretic (38°C), with very low diastolic blood pressure values and significant contraction of diuresis.

Electrocardiogram showed sinus tachycardia. Lab-work revealed nothing but leukocytosis with white blood cell count of 16,000/mm³. No other meaningful data was noted .

Trans-thoracic echocardiogram (TTE) revealed normal left ventricular dimension and function, with ejection fraction (EF) of 65% and no regional wall motion abnormalities. However, very large and mobile vegetation was seen attached to the atrial side of the septal tricuspidal leaflet, causing moderate tricuspid valve regurgitation. A huge aortic vegetation and periannular abscess causing severe aortic valve regurgitation was also noticed.

Trans-Esophageal Echocardiogram (TEE) revealed a tunnel among the aortic valve, right atrium, and right ventricle, with left to right shunt, and also confirmed the presence of voluminous masses attached to the tricuspid and aortic valves (Fig I A).

During the following two days, despite antibiotic coverage with intra-venous ampicillin, cefazolin and gentamicin since admission, the patient rapidly worsened, requiring support of high doses of inotropes and intubation. Moreover, she developed acute kidney injury and worsening anemia.

A total body CT scan was performed to exclude possible peripheral embolization and identify possible sites of infection. The test gave negative results.

Thus, we decided to perform urgent surgery.

Technique

During surgery, two vegetations were seen on the septal leaflet of the tricuspid valve and were removed immediately after the heart arrest. In this way, the direct communication among the right atrium, the aorta, and the right ventricle could be clearly seen (Fig I B, C). It was caused by an enormous abscess which had destroyed not only the aortic annulus, but also the junction between the aortic annulus, the inter atrial septum and the interventricular septum (Fig IC).

The abscess was completely opened, cleaned, and closed with a double patch. From right-atrial approach, the continuity between the interventricular septum and the interatrial septum was restored by using pericardial patch. The septal leaflet of the tricuspid valve was reconstructed with triangular pericardial patch. In a second step, through trans-aortic approach, we restored the continuity between the interventricular septum, the anterior leaflet of the mitral valve and the aortic annulus using a second pericardial patch. Then we reconstructed the aortic annulus with the same patch (Fig II A).

We then decided to implant Edwards Intuity Elite prosthesis for two main reasons. Firstly, to avoid sutures, which could stretch the fragile annular tissue. Secondly, the subannular portion of the prosthesis might protect the repaired septum from the high-velocity jet coming from the left ventricle.

The implantation technique of Edwards Intuity Elite was performed as previously described¹.

The total CPB and cross-clamp times were 102 and 163 minutes, respectively.

The microbiological test on the explanted valve showed the presence of staphylococcus aureus.

At the end of the procedure, permanent pacemaker leads were implanted because of atrio-ventricular (AV) block. Post-operative TEE showed perfect competence of the prosthesis and absence of perivalvular leaks and inter-ventricular septal defects (Fig II B)

The ICU- and total hospital stay were 2 and 8 days, respectively.

The six months echocardiographic and clinical follow-up is uneventful, with normal transvalvular gradients and no appearance of peri-valvular leaks.

Discussion

At present, surgical management of aortic valve endocarditis is based on the use of conventional stented mechanical, bioprostheses^{1,3}, or when possible, stentless bioprostheses⁴.

In this case, the choice of this prosthesis was related to the poor quality of the aortic annulus. The reconstruction with the pericardial patch started deep within the interventricular septum and then covered and anchored the anterior mitral valve leaflet to the aortic wall. This was because of a gap generated by the deficiency of the deteriorated annulus. For this reason, we preferred not to use sutures with pledgets to pass in the area recently reconstructed with the patch, but instead we preferred to exclude this area using a rapid deployment bioprosthesis.

The subvalvular skirt of Intuity stabilized the prosthesis to the aortic annulus and excluded our reconstructed zone from the left ventricular outflow, with the aim of reducing the chance of interventricular defect reopening due to the left ventricle outflow blood jet. Additionally, the radial force could transmit solidity to the surrounding tissues and ensure more stability to the reconstructed structures

Finally, soon after the heart was reperfused, and an AV complete block was evident, we preferred to implant two definitive epicardial leads (atrial and ventricular) convenient for A-V pacing, avoiding intravascular leads that have more chances to complicate new cases of endocarditis in presence of positive blood cultures.

The patient continued the antibiotic therapy for 6 weeks following surgery. She was screened again after 6 months and she did not show any recurrences of endocarditis, prosthetic dysfunctions, or intracardiac shunts.

Conclusion

In conclusion, we described the case of an active infective endocarditis complicated by an extensive aortic annulus abscess with three cardiac chamber communication. It was successfully repaired with double pericardial patch and completed with the implantation of a rapid deployment prosthesis.

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Figure Legends

FIGURE I: Pre-operative presentation

A: Intraoperative view. The arrow: Through the aortic valve it is possible to see the septum

B: Abscess and vegetation across interatrial- and interventricular- septum

1: Abscess and vegetation across interatrial- and interventricular- septum, 2: Shunt from aorta to right heart cavities

C: Preoperative Trans-Esophageal Echocardiogram. LA: Left Atrium, LV: Left Ventricle, RV: Right Ventricle, 1: Abscess

FIGURE II: Post-operative result

A: 1: Rapid-Deployment aortic valve prosthesis; 2: Double pericardial patch reconstruction.

B: Echocardiographic control, LA: left atrium, LV: Left ventricle, RA: Right atrium, 1: rapid deployment prosthesis, 2: patch reconstruction.

