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CASE REPORT

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Use of rapid-deployment aortic valve prosthesis and patch reconstruction in 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.

KEYWORDS

infective endocarditis, patch reconstruction, rapid deployment

1 | 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.

The electrocardiogram showed sinus tachycardia. Lab-work revealed nothing but leukocytosis with white blood cell count of 16 000/mm^3. No other meaningful data were noted.

Transthoracic echocardiogram revealed normal left ventricular dimension and function, with an ejection fraction of 65% and no regional wall motion abnormalities. However, very large mobile vegetation was seen attached to the atrial side of the septal tricuspidal leaflet, causing moderate tricuspid valve regurgitation. Huge aortic vegetation and periannular abscess causing severe aortic valve regurgitation was also noticed.

Transesophageal echocardiogram (TEE) revealed a tunnel among the aortic valve, right atrium, and right ventricle, with a left to right shunt, and also confirmed the presence of voluminous masses attached to the tricuspid and aortic valves (Figure 1A).

During the following 2 days, despite antibiotic coverage with intravenous ampicillin, cefazolin, and gentamicin since admission, the patient rapidly worsened, requiring the support of high doses of inotropes and intubation. Moreover, she developed acute kidney injury and worsening anemia. A total body computed tomography 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.

2 | 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 (Figure 1B,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 interatrial septum, and the interventricular septum (Figure 1C).

The abscess was completely opened, cleaned, and closed with a double patch. From the right-atrial approach, the continuity between the interventricular septum and the interatrial septum was restored by using a pericardial patch. The septal leaflet of the tricuspid valve was reconstructed with a triangular pericardial patch. In a second step, through transaortic 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 (Figure 2A).

We then decided to implant Edwards Intuity Elite prosthesis for two main reasons. First, to avoid sutures, which could stretch the fragile annular tissue. Second, the subannular portion of the

Antonio Piperata and Tomaso Bottio contributed equally to this study.

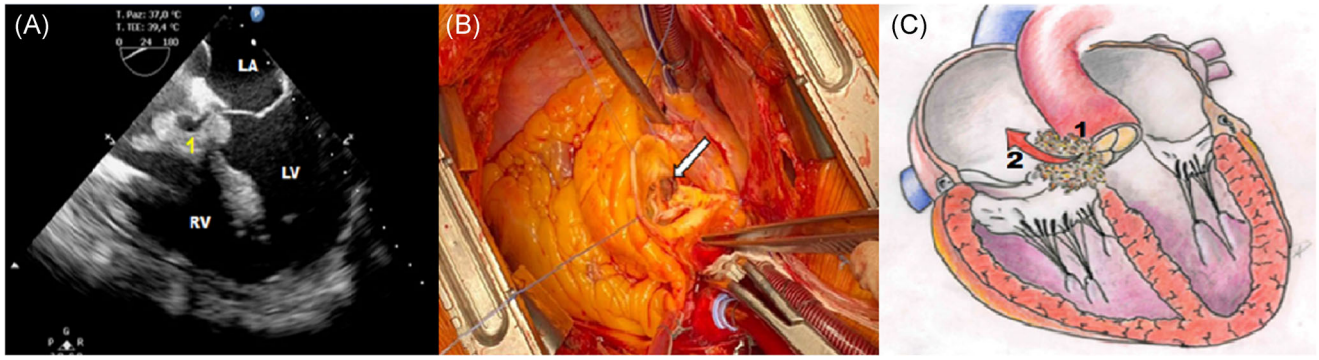

FIGURE 1 Preoperative presentation. A, Preoperative transesophageal echocardiogram; 1: abscess. LA, left atrium; LV, left ventricle; RV, right Ventricle. B, Intraoperative view; The arrow: through the aortic valve, it is possible to see the septum. C, 1: abscess and vegetation across interatrial and interventricular septum, 2: shunt from the aorta to right heart cavities

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 described.[1] 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 atrioventricular (AV) block. Postoperative TEE showed perfect competence of the prosthesis and absence of perivalvular leaks and interventricular septal defects (Figure 2B). The intensive care unit and total hospital stay were 2 and 8 days, respectively. The 6 months echocardiographic and clinical follow-up is uneventful, with normal transvalvular gradients and no appearance of perivalvular leaks.

3 | DISCUSSION

At present, surgical management of aortic valve endocarditis is based on the use of conventional stented mechanical, bioprostheses,[2-4] or when possible, stentless bioprostheses.[5]

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. In addition, 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 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.

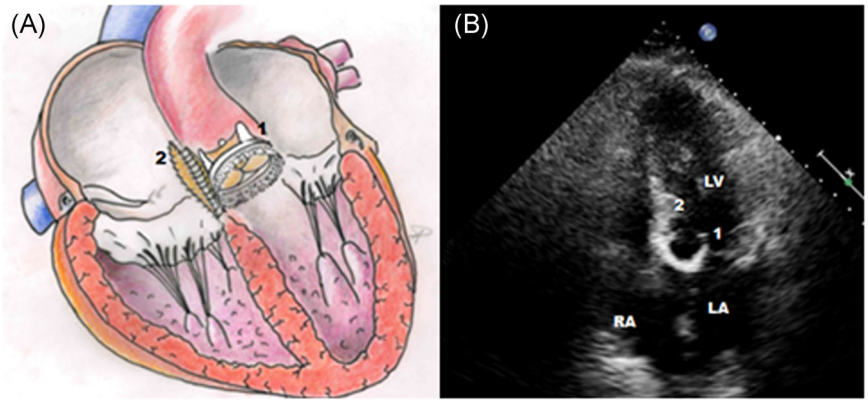

FIGURE 2 Postoperative result. A, 1: rapid-deployment aortic valve prosthesis; 2: double pericardial patch reconstruction. B, Echocardiographic control, 1: rapid-deployment prosthesis, 2: patch reconstruction. LA, left atrium; LV, left ventricle; RA, right atrium

4 | CONCLUSION

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

CONFLICT OF INTERESTS

The authors declare that there are no conflict of interests.

ETHICS STATEMENT

It is declared that every reasonable effort was made to obtain informed consent to participate in this study. However, it is noted that there is already mention of the use of data for scientific and research purposes in the current informed consent in use at our center. We also guaranteed the respect of anonymity and professional secrecy and used the collected data and the statistical analysis just for the scientific purposes granted in accordance with the law in force (GDPR).

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