

REDO-BENTALL OPERATION – ITERATIVE AORTIC ROOT RECONSTRUCTION – THERAPEUTIC DECISION-MAKING COMPLEXITY AND PROCEDURAL COMPLEXITY

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Abstract

We present the case of a 59-year-old woman who undergoes surgery 12 years after the Bentall-de Bono operation (replacement of the aortic valve and ascending aorta with valvular duct and direct reimplantation of the coronary ostia in the duct). For the acute aortic dissection of type I De Bakey (Stanford type A), diagnosed with subacute infectious endocarditis at the level of the aortic valvular duct with abscess in the aortic root.

Keywords: Redo-Bentall, aortic root reconstruction, heart surgery

Introduction

Infectious endocarditis on valvular prosthesis is a severe complication after valvular surgery, marked by high mortality and morbidity up to 17% and 25% respectively, with an incidence of 0.1% to 2.3% patients/year [4], incidence which might be undervalued in more studies due to its calculation based on retrospective studies or as a consequence of using some nonspecific diagnostic methods.

A retrospective study conducted at a prestigious clinic of cardiac surgery in the U.S.A. for a period of 10 years reveals that for 55 of the patients (33.5%) out of a total of 156 patients who underwent iterative aortic root reconstruction, the indication for further surgical intervention is given by infectious endocarditis, and, particularly, endocarditis following aortic valve and ascending aorta replacement by means of Bentall's method, when redo-Bentall was chosen despite its more

rare citation in the literature.

The surgical treatment of infectious prosthetic endocarditis often involves difficult and complex procedures, but the short and long-term results are better than those obtained by means of medical treatment alone.

Presentation of the case

A 59-year-old woman with infectious endocarditis and positive hemocultures of *Enterococcus Faecalis* (diagnosed a year before, with favorable evolution and negative post-antibiotherapeutical hemocultures after a 6-week period of vancomycin, ciprofloxacin, rifampicin and ampicillin administration) is admitted to our clinic for a cardiac re-intervention of iterative aortic root reconstruction. We notice from her hereditary history that the patient comes from a family with history of acute aortic

dissection (her father and a sister having Marfan's syndrome). From her personal pathologic history we notice: Acute aortic dissection type I De Bakey (Stanford type A) for which reason the patient underwent De Bono-Bentall operation which replaces the aortic valve, the ascendant aorta and partial Medtronic valve no. 25/28 followed by the reimplantation of the coronary ostia directly in the duct, Marfan's syndrome and reactive arthritis with Chlamydia.

On admission, the patient presents II-III class NYHA heart failure - dyspnea on average/mild physical effort and fatigue.

The physical examination on admission: marfanoid, dextroconvex scoliosis with dorsolumbar straightness of the vertebral column, no signs of systemic or pulmonary congestion; hemodynamically stable with BP of 120/60 mmHg, rhythmical cardiac sounds with a HR of 68 beats/min., clicks of the audible aortic prosthesis, 3/6 degree left parasternal systolic murmur, 2/6 degree aortic diastolic murmur in the aortic focal point, peripheral pulse present symmetrically bilaterally, normal uro-genital and digestive system examination.

Paraclinical findings: no hematologic, renal or hepatic dysfunction, mild inflammatory syndrome (ESR = 13 mm/h, LDH = 355 U/l), with coagulation values within therapeutic limits according to the guidelines for mechanical prostheses [7] and negative hemocultures. Electrocardiogram: sinus rhythm with ventricular extra systoles with right branch block (RBB) aspect, QRS axis at 0 degrees, voltage criteria for left ventricular hypertrophy (LVH) with secondary repolarization abnormalities. The transthoracic echocardiography scan is not conclusive for endocarditis injuries: normofunctional aortic mechanical prosthesis, mild mitral failure, segmental and global systolic dysfunction of moderate-severe sedimentation rate (sed rate) with LVEF = 30-35 %, with diastolic dysfunction of the late relaxation type for which we performed series of transesophageal echocardiographies (I class indication, C level of evidence in diagnosing endocarditis) exams which underline the progressive aspect of aortic valvular and aortic root lesions: postoperative state - Bentall's with valvular tube dehiscence - aortic root abscess look, normofunctional

mechanical aortic prosthesis with visible vegetation on the ventricular side of the aortic valve (newly emergent vegetation from the previous examination).

Coronary angiography reveals permeable epicardial coronary arteries.

Surgical intervention becomes mandatory due to the cardiac failure phenomena and the evolutionary paraclinical data of the inflammatory process.

Surgery is needed and the following procedures are performed: Redo Bentall operation for the iterative replacement of the aortic valve and ascending aorta with ATS valvular duct no. 23/26, with re-implantation of the coronary trunks through several segments of the internal saphenous vein into the valvular duct and aortic arch replacement with a intravascular collagenous prosthesis no. 28.

We further on describe the surgical protocol:

After discovering the right axillary artery and right common femoral vein, in order to ensure an arterial and venous approach in case of an emergency institution of extracorporeal circulation (ECC), a medio-sternal incision is performed with thorough dissection of parietal-pleural-pericardial-cardiac adherential processes. The aneurysmal dilation of the aortic prosthesis at the level of the distal anastomosis determines the insertion of a cardiopulmonary bypass through the axillary arterial approach and venous drainage through the right atrium, venting through RSPV and retrograde cardioplegia cannula. The systemic cooling to 19° Celsius is begun concomitant with the administration of cold retrograde hematoplastic cardioplegia with progressive bradichardia until asystole. After the transverse aortotomy is performed in the prosthesis and ECC cessation is possible, selective antegrade cerebral perfusion is inserted within the arterial brachiocephalic trunk and the left carotid artery. Excision of the dilated aneurysmal prosthesis and the inspection of the aortic arch with normal morphology without vegetation, the performance of the distal anastomosis of an intervacular collagenous prosthesis no. 28 proximal to the arterial brachiocephalic trunk, the suppression of the cerebral perfusion and the clamping of the prosthesis are followed by restarting the ECC. Sawing the aortic root and the inspection of aortic valvular prosthesis -

which reveals paraprotetic leak and minimal vegetation on paraprotetic disks, which are sent to microbiology, a positive result within 24 hours with CGP – the excision of the duct and the reinsertion of the aortic ring of an ATS valvular duct no. 23/26 on the wire crown with a patch, which undergoes distal anastomosis with the intervacular prosthesis no. 28. Due to tight adherential processes of coronary ostia pills and the inability to obtain a coronary "tension-free" anastomoses, it is necessary to re-implant them in the duct through the interposition of several segments of the internal saphenous vein. Systemic warming is initiated and next the ECC withdrawal with cessation in good hemodynamic conditions, under minimum inotropic and vasopressor support, followed by the last surgical stage of hemostasis and parietorrhaphy in anatomical layers.

Immediately after surgery, the patient found in the intensive cardiac care unit shows a slow favorable recovery, marked by early postoperative complications: acute perioperative cardiac failure with remitted cardiogenic shock with needs for inotropic and vasopressor support, inferior STEMI with EKG criteria, enzymatic criteria of myocardial necrosis, and positive echo-cardiographic criteria, which require emergency coronary angiography that reveals epicardial coronary arteries and grafts permeability, and the insertion of the IACB withdrawn in the 5th postoperative day, and atrial arrhythmias converted therapeutically to SR. Subsequently, the clinical and paraclinical evolution of the patient is favorable under treatment with digitalis, diuretics and beta-blockers. The patient will return to the ward after 11 days of intensive cardiac care and will be discharged hemodynamically and respiratorily balanced after 21 days of postoperative care.

Discussions

We have chosen this case because of its complexity of diagnosis, surgical technique and postoperative intensive care management.

The specialty literature mentions a series of surgical techniques for the reimplantation of the coronary ostia pills into the duct which might avoid a tension anastomosis, which might

eventually lead to complications such as anastomotic dehiscence or aneurysmal dilations, thus compromising the arterial lumen and leading to myocardial infarction in the subsequent area. These techniques involve the interposition of some separate segments of 8-10 mm from the polytetrafluoroethylene (PTFE) prosthesis between the pill of each coronary ostium and the valvular duct (Piehler's method) [11], the interposition of single prosthetic segment of 8-10 mm which anastomoses at the level of the left and right coronary ostia in the valvular tube (Cabrol's technique) or the technique that we chose, Piehler's method, but with the replacement of the prosthetic segments of PTFE with internal saphenous venous graft.

Infectious endocarditis is a pathology with increased morbidity and mortality, especially post-prosthetic valvular endocarditis, which requires the widespread awareness of this problem even beyond the limits of cardiology and cardiac surgery.

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