THE TREATMENT OF THE AORTIC ROOT ABCESS LEADING TO FISTULA AND PSEUDOANEURYSM FORMATION AFTER AORTIC VALVE REPLACEMENT UTILIZING THE BENTALL TECHNIQUE

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Prosthetic aortic valve endocarditis complicated with destruction of the aortic annulus and perivalvular abcess formation is a fatal pathology.

A patient with infective endocarditis occurring just after aortic valve replacement and fistula formation due to abcess formation of the aortic root and pseudoaneurysm was admitted to our hospital, and was operated on after two weeks of antibiotic treatment. After the resection of the prosthetic valve and the debridement of the infected tissues, aortic valve replacement was made utilizing the composite graft technique. The patient was discharged after a four week treatment of antibiotic therapy. He is doing well.

Key words: Prosthetic valve endocarditis, aortic abcess, pseudoaneurysm.

The treatment consists of resection of the infected and necrotic tissue and re-replacement of the prosthetic valve in prosthetic valve endocarditis. The success rate is fairly low with medical treatment alone [1-3]. The debridement of the infected tissues may well lead to large defects in the LVOT, aortic root and the proximal aorta. An extremely destructed aortic root, makes the graft replacement very difficult. Favorable homografts or xenografts may be chosen for aortic root replacement. Prosthetic material may also be used when needed [4]. This reconstruction technique along with all these graft materials and the aortic root replacement, is an extremely difficult procedure, requiring skilled hands and experience.

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In this report, we report the surgical treatment and outcomes of the surgical technique, the Bentall procedure, which we applied for the surgical treatment of the aortic root replacement due to prosthetic aortic valve endocarditis and fistula and pseudoaneurysm formation as a complication of periannular abcess formation.

CASE

A patient, being followed with the diagnosis of Marfan syndrome, aortic insufficiency and infective endocarditis, diagnosed at another center, has underwent right brachial embolectomy and aortic valve replacement (21 St. Jude bileaflet valve) in January 2001. An echocardiography performed 2 days after the valve replacement demonstrated hemodynamicaly significant aortic paravalvular leak, and the patients was reoperated on. During the operation, a thrill was felt during the palpation of the noncoronary cusp, and since it was seen that the thrill ceased after 3 separate pledgeted sutures which were placed outside the aorta, and the patient was discharged. But the control echocardiography demonstrated that the leak remained and a periannular abcess formation was seen, so the patient was referred to our clinic.A transesophageal echocardiography performed in our center, showed abcess formation in the aortic root. The aortic diameter was measured at the sinotubuler junction including the abcess, and was found to be 8 cm, along with an aortic insufficiency of third degree. (Figure 1) The hemodynamically, stable patient was treated with vancomycin. 2 g/day and gentamycin 160 mg/day for two weeks and then was operated on.

Fig 1: Preoperative echocardiyography

The Surgical Technique

After the cannulation of the left femoral artery and vein, the sternum was opened with an aerosaw, and the paracardium and the paraaortic tissues were dissected with sharp and blunt dissections. During the exploration, an aneurysm of 6x8 cm dimension was seen on the aortic root in the noncoronary cusp localization, encroaching on the right atrium which was exerting pressure on the nearly entire right atrium. After the dissection of the cross clamped aorta during the 23°C hypothermia, a pseudoaneurysm sac of 4x6 cm dimensions was seen neighbouring the native aortic tissue in the right superior lateral region. (Figure 2) The pseudoaneurysm was seen to be in continuation with the left atrium with a 1 cm fistula. A 2x2 cm abcess was detected in the roof of the right atrium neighbouring the pseudoaneurysm, and since there was no invasion of the right atrial wall, the abcess was debrided. The defect causing the leak in the prosthetic valve was in the noncoronary cusp. The valve, along with the root, was resected to leave no infected tissue behind. After the resection, it was seen that the aortic annulus was grossly destructed due to the infection. After the resection of the infected tissues, there was no healthy tissue left in the aortic root. The ostia of the coronary arteries were prepared for the button anastomosis.

The diameter of the LVOT was found to be 45 mm after the resection, due to an annuloaortic ectasia was present in the patient due to the Marfan's syndrome. This region was reconstructed using a 30 mm tubular graft-25 mm St Jude bileaflet aortic mechanical valve, which was prepared to form a composite graft with a 1,5 cm flange. Utilizing the continous suture technique the aortic root replacement was done with the composite graft. No morbidities were observed after the operation. The vancomycin plus gentamycin regimen was continued for another 4 weeks. The echocardiographic evaluation of the patient during the operation showed neither endocarditis nor recurrent abcess formation. The reconstructed aortic root was visualized using the electron beam tomography, (Figure 3) and no pathologies were observed. The patient was discharged on the postoperative 35 th day.

Fig 2: Pseudoaneurysm sac that is lying along the right side of true lumen of ascending aorta

Fig 3: Electron beam tomography in the postoperative period: Image of the reconstructed aorta

DISCUSSION

There is an indication for surgical treatment along with antibiotic therapy in prosthetic valve endocarditis cases. The infected and necrotic tissues should almost always be resected and a re-replacement of the prosthetic valve is required. Medical treatment alone leads to a very low success rate [1-3].

The operation performed for the treatment of prosthetic valve endocarditis has a high morbidity and mortality rate. The tissue destruction following aggressive surgical debridement may lead to important complications [4]. Complete AV block and permanent pacemaker implantation, reconstruction of the LVOT, and fistula formation to the neighbouring tissues are some of these complications [4]. Due to the femoral cannulation, dissection of the mediastinal bands, isolation of the surrounding tissues and aggressive surgical debridement which are done in the second operation, the postoperative morbidity rate is augmented. But none of these complications are as serious as endocarditis secondary to incomplete debridement of the infected tissues. 2,1-4% of the patients who have undergone surgical treatment go through a phase of recurrent endocarditis and 59% of these patients require a new operation [5].

The most complicated operations involve the LVOT and the associated aggressive debridement which destroys the morphology of the aortic root. These patients require a reconstruction of the aortic root. The utilization of grafts prepared from the pericardial patches are encouraged in cases of complete destruction of the surgical aortic annulus. It is speculated that the usage of biological grafts for aortic root reconstruction may lead to a lesser rate of recurrent endocarditis. For this reason, allografts and xenografts are selected more than the other graft types [1, 6]. However, it is not contraindicated to utilize prosthetic material in the reoperation of mechanical valve endocarditis patients [4]. Successful results have been reported with the usage of prosthetic material in mechanical valve endocarditis patients.

In our patient, the completely destroyed aortic root is replaced by the composite graft. Along with the fact that the surgical annulus is completely destructed in this patient, the annuloaortic ectasia that was present in this patient required the performance of a replacement technique which led to the appearance of a large LVOT. For this reason a 34 mm tubuler graft was used as a composite graft as using the described tenchnique before [7,8]. The grafts's flanged region was left as a 1.5 cm, different from the standart 0.5 cm length in other operations. Because of this longer length, the replacement of the highly destructed and fragile aortic root was easier to perform. We can conclude that in flanged technique of Bentall, which we use in our clinic as a routine technique, the flange length can be modified according to the patients needs and can be used with high patient satisfaction.

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