

Ten-Year Follow Up after Autologous Rectus Abdominis Fascia Sheath Patch Repair of Aortic Root Abscess

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The infection of aortic annular tissue is a life-threatening complication of aortic valve endocarditis, the survival of which is usually with immediate surgical intervention. Optimal surgical techniques include aortic valve replacement with an aortic or pulmonary homograft, and reconstruction of cardiac structures with autologous pericardium. Here, two cases are reported with extensive aortic root infection and partial left ventricular-aortic dehiscence, who underwent left ventricular outflow tract reconstruction using a rectus abdominis fascia patch and aortic valve replacement with a Carpentier-Edwards

Recent advances in medical and surgical therapy have improved the survival of patients with infective endocarditis. However, acute infection of aortic annular tissue remains a serious complication which may lead to aortic root aneurysmal formation, fistulous tracts with intracardiac or pericardial shunts, mitral valve destruction, and left-ventricular-aortic dehiscence. In the presence of these complications, survival requires undelayed eradication of infectious material by antibiotic therapy, and complete excision of infected tissue. Surgical strategies imply replacement of the aortic valve with a homograft or, alternatively, with a mechanical or stented bioprosthetic device (1-3).

Both, anchoring the valve prosthesis and preserving functional and anatomic integrity of the left ventricular outlet tract, may require complex reconstruction, and this is usually accomplished using Dacron patches or pericardium (1-3). Here, two cases of aortic root abscess are reported in which neither aortic and pulmonary homografts nor autologous pericardium were available. The patients underwent surgical repair using a rectus abdominis fascia patch, which was

porcine bioprosthetic graft. Both patients did well perioperatively and for 10 years postoperatively. The results may encourage alternative surgical strategies to be used when aortic valve homografts or autologous pericardium are unavailable. Notably, autologous rectus fascia patches showed excellent performance in the reconstruction of left ventricular outflow tract destruction associated with aortic root abscess.

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attached to a bioprosthetic aortic valve; both had an uneventful clinical and echocardiographic follow up over a 10-year period.

Case reports

Two patients (a 70-year-old male and a 73-year-old female) were referred to the authors' institution in August and September 1992, respectively. Both patients suffered clinical and serological signs of acute inflammation, with two consecutive blood cultures exhibiting *Staphylococcus aureus* infection. The infection was refractory to intravenous antibiotic therapy, and transesophageal echocardiography revealed endocarditis of the tricuspid aortic valve and periannular aortic root abscess aneurysm with partial left ventricular-aortic dehiscence in both cases. In addition, the female patient had mitral prosthetic valve endocarditis with destruction of the aortic-mitral intervalvular fibrosa.

Immediate surgical repair was initiated. However, neither an aortic nor pulmonary homograft were available, and autologous pericardium could not be obtained because of previous mitral valve replacement in the female patient and purulent pericarditis in the male. Both patients were operated on with cardiopulmonary bypass and mild systemic hypothermia. Cardioplegic arrest was achieved using antegrade

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cold crystalloid cardioplegia (Bretschneider's solution). The aortic root abscess cavities, which were located in the left or right and non-coronary sinus or in the aorticomitral junction, were thoroughly debrided with resection of necrotic tissue and cleaned with iodine solution. Subsequently, a mixture of antibiotics and fibrin sealant was injected into the abscess cavities. A left peritoneal-rectus fascia patch including the overlying posterior rectus sheath was then harvested through a lateral abdominal incision. The patch was trimmed to size and sutured in place using a continuous 5-0 polypropylene suture. Finally, the aortic valve was replaced in both patients using a Carpentier-Edwards porcine bioprosthesis (Edwards Life Sciences, Irvine, CA, USA). In addition, the female patient required replacement of her mitral valve device.

Both patients did well perioperatively and during their 10-year postoperative course. Patch dehiscence, patch aneurysm, bioprosthetic valve dysfunction or recurrent endocarditis were excluded on serial clinical and echocardiographic follow up examinations. Despite their advanced age, both patients currently lead an active life and are free from cardiac complaints.

Discussion

Infective endocarditis of the aortic valve with paravalvular destruction and aortic root abscess requires urgent operative intervention with the goals of: (i) debriding infected tissue to eradicate the infectious focus; (ii) excluding abscess cavities from the circulation to prevent infective embolization; (iii) preserving or restoring ventricular-aortic continuity; (iv) providing an anchorage for the valve prosthesis; and (v) preventing any local recurrence of infection. These goals have been attained by using a variety of surgical strategies, including closure of fistulous tracts with a suture or with a Dacron patch, reconstruction of the left ventricular outflow tract with autologous pericardium, implantation of aortic or pulmonalis homografts and pulmonalis autografts (Ross procedure), implantation of a composite prosthetic valve conduit, translocation of the aortic valve, and extra-anatomical bypass of the aortic root (1-3).

An aortic valve homograft is currently considered the optimal approach for treating aortic root abscess, as this graft is more resistant to infection than any other valve substitute. In addition, homografts permit complete exclusion of an abscess cavity from the circulation, thus obviating the use of artificial prosthetic material. However, the availability of homografts is particularly limited in patients requiring urgent surgery. As an alternative, pulmonary autografts or

homografts and free-standing glutaraldehyde-preserved stentless valves have been utilized for aortic root abscess repair, but the long-term performance of these devices is largely unknown. Consequently, their use is currently not recommended as surgical routine (1). In the present patients, a Carpentier-Edwards standard porcine bioprosthesis with well-established long-term performance was implanted (4). However, it is likely, that any recurrence of endocarditis was prevented by radical resection of the abscess rather than by using a specific valve device (3).

Both, Dacron patches and autologous pericardium or bovine pericardium have been used to reconstruct infected structures of the heart comprising the fibrous skeleton, the left ventricular outlet tract and the mitral valve annulus (1-3). As yet, autologous rectus fascia patches have not been used in the surgical repair of aortic root abscess, but they have been used for the closure of a pulmonary artery window, and for secundum atrial septal defects and pericardial defects (3,5,6). In addition, the thoracic aorta has been successfully replaced with autologous rectus sheath grafts in growing dogs, and microscopic evidence of graft vascularization and no calcification, thinning or aortic wall weakness over a period of 6 to 22 months has been found postoperatively (7). Thus, the present results with reconstruction of the left ventricular outflow tract extend these favorable experiences with autologous rectus sheath patches to patients with life-threatening aortic root abscess. In addition, the use of an antibiotic fibrin compound may have contributed to the eradication of endocarditis (8).

It is concluded that long-term survival of aortic root abscess supports the concept of immediate surgical intervention as a prerequisite for survival (1-8). In addition, the present results may encourage the use of alternative surgical strategies in patients for whom neither an aortic valve homograft nor autologous pericardium is available. Notably, an excellent performance was observed for autologous rectus fascia patches in the reconstruction of left ventricular outflow tract destruction associated with aortic root abscess.

References

1. Brecker SJD, Pepper JR, Eykyn SJ. Aortic root abscess. *Heart* 1999;82:260-262
2. Aagaard J, Andersen PV. Acute endocarditis treated with radical debridement and implantation of mechanical or stented bioprosthetic devices. *Ann Thorac Surg* 2001;71:100-103
3. d'Udekem Y, David TE, Feindel CM, Armstrong S, Sun Z. Long-term results of operation for paravalvular abscess. *Ann Thorac Surg* 1996;62:48-53
4. Jamieson WRE, Munro AI, Miyagishima RT, Allen P, Burr LH, Tyers GFO. Carpentier-Edwards stan-

- dard porcine bioprosthesis: Clinical performance to seventeen years. *Ann Thorac Surg* 1995;60:999-1006
5. Wijnberg DS, Ebels T, Robinson PH. Innervated rectus abdominis myofascial flap for dynamic cardiomyoplasty. *Ann Thorac Surg* 1994;58:1131-1134
 6. Pacholewicz JK, Daloisio C, Shawarby OA, Dharan SM, Gu J, McGrath LB. Efficacy of autologous peritoneum as a biological membrane in cardiac surgery. *Eur J Cardiothorac Surg* 1994;8:563-565
 7. Anagnostopoulos CE, Beere PA, Athanasuleas CL, et al. Autologous rectus sheath grafts. V. Growth in aortic grafts. *J Thorac Cardiovasc Surg* 1979;78:784-791
 8. Watanabe G, Haverich A, Speier R, Dresler C, Borst HG. Surgical treatment of active infective endocarditis with paravalvular involvement. *J Thorac Cardiovasc Surg* 1994;107:171-177