Case report - Aortic and aneurysmal

Extensive aneurysms of sinuses of Valsalva precluding valve sparing aortic root reimplantation (David procedure)

Ahmed Ashoub*, Augustine Tang, Sameer Shaktawat

Department of Cardiothoracic Surgery, Victoria Hospital, Blackpool, Lancashire FY3 8NR, UK

Received 24 August 2010; received in revised form 4 November 2010; accepted 8 November 2010

Abstract

A 55-year-old female noticed worsening exertional dyspnoea for two years. She was born with cleft palate and profound deafness. Significant physical findings included dysmorphism with micrognathia and acrocephaly and congenital deafness. Transthoracic echocardiogram revealed aneurysms involving the right and the non-coronary sinuses of Valsalva. Despite that, the native aortic valve retained preserved geometry. Computed tomography (CT)-scan demonstrated multiple aneurysms arising from all three sinuses of Valsalva. This displaced the right ventricle (RV) caudally and indented the RV outflow tract. A valve-sparing root reimplantation was planned. However, intraoperatively the root aneurysms were found to be very extensive such that no healthy tissue remained along the insertion lines of the aortic valve leaflets. The aortic annulus was not dilated (2 cm) and the left ventricular outflow tract was not involved in the disease process. Consequently, despite the presence of macroscopically normal leaflets and relatively undisturbed annular geometry, we were unable to reimplant the native aortic valve and proceeded to a modified Bentall procedure. Histologically, significant medial degeneration with loss of elastin and muscle was identified in the aortic sinus wall. Similar changes were also found affecting the native leaflets coupled with increased fibrous thickening.

Keywords: Aortic aneurysm; Aortic valve; Sinus of Valsalva; David procedure

1. Discussion

Composite valve graft (CVG) replacement has become an established surgical technique for the treatment of aortic root pathologies with acceptable perioperative mortality rate and good long-term results as confirmed in many centres [1–8]. However, whilst eliminating pathologies affecting the aorta and sinuses such as aneurysm, dissection or abscess formation this technique also mandates replacement of the native aortic valve. Both mechanical and biological prostheses have been used in this situation with excellent outcome [1]. Although this may be desirable when the native valve is significantly diseased, substitution of otherwise normally functioning leaflets with a prosthesis will impose the inherent long-term prosthesis-related complications on the recipient, such as endocarditis. Furthermore, mechanical valves are associated with anticoagulant-related morbidities whilst structural deterioration in biological prostheses is inevitable. To overcome such deficiencies, a valve-sparing root re-implantation approach had been advocated since the early 1990s [5]. Excellent early outcome has been documented along with sustained long-term freedom from significant aortic regurgitation and redo surgery [9]. In this procedure, the diseased aorta and sinuses are replaced by a Dacron conduit whilst the relatively healthy native valve is re-implanted within the prosthetic root along with a thin rim of sinus wall tissue. The importance of good leaflet tissue quality for procedural success has long been recognized [9, 10]. Extremely attenuated leaflets often found in massively dilated root aneurysms (>6.5 cm) with multiple fenestrations, particularly away from the peri-commissural areas are unlikely to be salvageable even with complex additional repair techniques. The recognition of such gross leaflet pathology would technically preclude a valve-sparing approach. Instead the gold standard – modified Bentall CVG will be the technique of choice in this situation. However, the quality of the sinus wall tissue immediately adjacent to the line of leaflet insertion has received less attention. As valve reimplantation mandates a 3–5 mm rim of healthy sinus wall next to the leaflets to be available for suturing, the absence of such good quality tissue may well preclude this approach technically (Fig. 1). In the vast majority of aortic root aneurysms including well-recognized connective tissue syndromes, such as Marfan syndrome, there is almost invariably sufficient sinus wall of acceptable quality to enable native valve reimplantation. Unfortunately, this was not the case in our patient who had a rather unique root pathology and an as yet unrecognized systemic connective tissue disorder as evidenced by her extra-cardiac manifestations. The histological findings of significant leaflet
doi:10.1510/icvts.2010.249045
In summary, modified Bentall procedure remains as the gold standard treatment for extensive aneurysms of sinuses of Valsalva where valve-sparing reimplantation (David procedure) is technically precluded by a lack of usable sinus wall tissue. In unrecognized systemic connective tissue disorders an inherent biological defect resulting in microscopic degeneration of the aortic leaflets may jeopardize the long-term durability of a valve-sparing approach in cases where this may be technically feasible. Only advances in our knowledge on the biology of such disorders would improve the choice of surgical techniques in this patient cohort as well as an earlier diagnosis would have changed the type of procedure.

References


