Endoscopic Assessment of Valve-Sparing Aortic Root Reconstruction: Root Aneurysm Versus Ascending Aneurysm

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Summary. Since 1995 we have utilized intraoperative endoscopic evaluation during valve-sparing root reconstruction for better intraoperative assessment; there have been 10 remodeling operations and 4 reimplantations. Perfusion of crystalloid cardioplegia enabled us to visualize the pressure-loaded valve in the closed position. Valve coaptation was observed directly before and after the valve-sparing procedure. The configuration of the ascending aortic dilatation was classified into two groups: those with ascending aneurysms (n = 3) and those with root aneurysms (n = 10). Acute aortic dissection has been excluded from the differentiation. A root aneurysm can be characterized as marked sinus dilatation. An ascending aneurysm is defined as dilatation predominantly above the sinotubular junction although the size of the sinuses remains nearly normal. Root aneurysms are often associated with significant elongation and prolapse of the aortic leaflets, contributing to aortic insufficiency (AI). In contrast, most ascending aneurysms have normal, symmetrical valves without prolapse or elongation. Postoperatively, AI was significantly reduced from grade 3.3 ± 0.7 to grade 0.6 ± 0.5. In conclusion, endoscopic evaluation provided detailed assessments of the valve-sparing operations. Valve preservation with both ascending and root aneurysms is possible, although it may be more difficult with root aneurysms because their valve morphology is more distorted.

Key words. Aortic insufficiency, Valve-sparing, Root aneurysm, Ascending aneurysm, Endoscopy

Introduction

It is clear that some patients who suffer not only mitral valve insufficiency but also aortic valve insufficiency with ascending aortic and root aneurysm can benefit from valve-sparing surgery. A procedure described by David and Feindel [1] excises the aortic sinuses and reimplants the skeletonized aortic root into the vascular graft, a technique he termed “reimplantation.” Another procedure proposed by Sarsam and

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Yacoub [2] restores the normal geometry of the root using a scallop-shaped vascular graft; this technique is termed "remodeling." Surgeons must have a thorough understanding of the functional anatomy of the aortic root and its individual diversity, and they must pay close attention to intraoperative valve inspection.

We have introduced aortic endoscopy into valve-sparing root reconstructive surgery for better intraoperative assessment. The use of endoscopy provides a pressure-loaded condition for observing the native and preserved valve by infusing crystalloid cardioplegia into the proximal aortic root. By macroscopic evaluation, after aortotomy the valves are seen to be unloaded and released from perfusion pressure; thus, coaptation is easily manipulated and so it is easy to overlook a prolapsed, stretched valve. Macroscopic evaluation may underestimate or overestimate the feasibility of valve-sparing.

The appearance of ascending aortic dilatation demonstrated by aortography can be classified into two groups: root aneurysm and ascending aneurysm. Root aneurysm can be characterized as marked sinus dilatation, which is typically associated with Marfan syndrome. Ascending aneurysm is defined as dilatation predominantly above the sinotubular junction, with the size of the sinus remaining nearly normal. Differences in endoscopic findings and the degree of aortic insufficiency (AI) after valve-sparing operations were investigated for these two conditions.

Patients and Method

Patients

Between April 1995 and October 1999 a consecutive series of 14 patients underwent valve-sparing aortic root reconstruction with endoscopic evaluation of the aortic root. All procedures were performed by one of the authors (T.I.). All patients had ascending aortic dilatation (mean diameter $65 \pm 14$ mm) with AI. The configuration of the ascending aortic dilatation was classified into two groups: ascending aneurysm ($n = 3$) and root aneurysm ($n = 10$). One patient with an acute aortic dissection was excluded from the study. With an ascending aneurysm the maximum diameter of the aortic sinuses was less than that of the ascending aorta (Fig. 1, left). With a root aneurysm the...