Concomitant aortic valve-sparing operation and closed biatrial radiofrequency ablation for annuloaortic ectasia and paroxysmal atrial fibrillation

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Abstract A 53-year-old woman was admitted for annuloaortic ectasia with moderate aortic valve insufficiency (AI) and paroxysmal atrial fibrillation. Concomitant aortic root replacement with a valve-sparing technique and closed biatrial procedure using bipolar radiofrequency ablation was performed successfully. Postoperative echocardiography showed trivial AI with regular sinus rhythm, which meant she could avoid anticoagulation therapy.

Key words Annuloaortic ectasia · Paroxysmal atrial fibrillation · Aortic valve-sparing operation · Closed biatrial procedure using bipolar radiofrequency ablation

Introduction

Antiarrhythmic surgery to treat atrial fibrillation (AF) is mostly performed with mitral valve surgery. The advent of alternative sources of energy, such as radiofrequency (RF) ablation, has facilitated the surgical technique to perform it concomitantly with a nonmitral valve procedure.1 We used RF ablation to create linear lesions to abolish AF without any incision in the atria.

Case

A 53-year-old woman (non-Marfan syndrome) who presented with frequent palpitation was admitted to our hospital. The patient was in New York Heart Association (NYHA) functional class II. A grade 3/6 diastolic murmur was audible at the third left sternal border. Holter monitoring revealed frequent paroxysmal atrial fibrillation. Chest computed tomography demonstrated that the diameter of the aortic Valsalva was 45 mm, with prominent enlargement of noncoronary sinus of Valsalva.

On transthoracic echocardiography, an asymmetrically enlarged sinus of Valsalva (noncoronary sinus was larger than the others), tricuspid aortic valve, moderate aortic insufficiency (AI), and a moderately dilated left ventricle with mild impairment (51% ejection fraction) were demonstrated. Aortography showed a piriform aortic root aneurysm with moderate AI. The cause of AI was thought to be redundancy of the right coronary cusp and annular dilatation. Thus, we decided to perform valve-sparing aortic root reimplantation2 for the annuloaortic ectasia and bipolar RF ablation for her paroxysmal atrial fibrillation.3

Creation of the right atrial lesions and isolation of the right pulmonary veins (PVs) were performed before establishing cardiopulmonary bypass (CPB); the left atrial lesions and isolation of the left PVs were performed during CPB. Before left atrial ablation, the absence of a left atrial thrombus was confirmed with intraoperative transesophageal echocardiography. To isolate the PVs, the rim of atrial tissue around the PVs was clamped and ablated as the device was passed around the PVs. To create the other lesions, the device was introduced through purse-string sutures in the atrial wall.
and was manipulated such that the interposing tissue between the inner and outer jaws was ablated (Fig. 1). The clamp was applied twice each time. Pacing to document transmural conduction block in the ablated lesions was not performed. All ablation lines were performed along Cox-Maze III except for the lesion to the mitral annulus (Fig. 2). The entire process using the bipolar RF device was completed in less than 30 min.

The enlarged aortic root was incised. On inspection of the aortic valve, all three cusps were seen to be extremely thin and redundant with particular enlargement of the noncoronary cusp. The root aneurysm was excised, leaving a 5-mm remnant of the arterial wall attached to the aortic valve. Both coronary ostia were isolated with a 4-mm margin of the aortic wall. The aortic valve was reimplanted inside a collagen-impregnated tubular Dacron graft (28 mm Hemashield woven double velour grafts; Medadox Medicals, Oakland, NJ, USA) which was calculated using a modification of David’s original formula.

After reimplantation, cusp coaptation was tested by normal hydrostatic pressure with saline, resulting in no insufficiency. Each coronary ostium was anastomosed to the prosthetic graft by the Carrel patch method, and the distal anastomosis to the ascending aorta was performed subsequently. Intraoperative transesophageal echocardiography revealed trivial central regurgitation of the aortic valve. The CPB time, aortic cross-clamping time, and operating time were 254 min, 203 min, and 420 min, respectively. The postoperative course was uneventful, and trivial AI was confirmed by transthoracic echocardiography. Holter electrocardiography after the operation revealed the absence of paroxysmal atrial fibrillation. She was treated with oral warfarin and bepridil hydrochloride (200 mg/day) at discharge.

At the last follow-up 30 months after the operation, the patient was free from warfarin and bepridil hydrochloride. Regular sinus rhythm and trivial AI are maintained in NYHA class I.

Discussion

Aortic valve-sparing reimplantation for aortic root aneurysm has been widely accepted, and the long-term result is favorable. This procedure allows avoidance of anticoagulation therapy unlike the composite valve graft procedure. In cases of paroxysmal or chronic atrial fibrillation, however, anticoagulation therapy is required for long periods.

David and associates reported that 10 (4.5%) of 220 patients (during 1988–2005) who had undergone aortic