Acute on chronic pulmonary autograft dissection

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Abstract

We report a case of combined acute and chronic dissection limited to the pulmonary autograft 10 years after a Ross procedure, managed by replacement with a stentless porcine bioprosthesis. Implications for timing and technique of reintervention for pulmonary autograft dilatation are discussed.

Keywords: Ross operation • Aortic dissection • Adult congenital

INTRODUCTION

Guidelines for the management of pulmonary autograft dilatation have largely focused on the effect of aneurysmal dilatation on valve function, and timing of reintervention remains controversial. Dissection of the pulmonary autograft is a rare event with only 4 reported cases to our knowledge [1–4]. We report a fifth case of chronic and acute pulmonary autograft dissection 10 years after operation for a congenitally insufficient, bicuspid aortic valve. Implications for reintervention and operative technique are discussed.

CLINICAL SUMMARY

In 1996, a 23-year old woman underwent an uneventful Ross procedure for a symptomatic, insufficient, congenitally bicuspid aortic valve. The pulmonary autograft was implanted using the free-standing root technique with felt strip reinforcement of the proximal valve. The pulmonary homograft was used to reconstruct the right ventricular outflow tract. Pathological examination of the native aortic valve leaflets demonstrated fibrosis and myxoid changes.

The patient did well clinically and was followed with serial echocardiograms. Mild autograft insufficiency developed, which remained stable until May 2006 when autograft dilatation was appreciated. Over the course of the ensuing 5 months, she developed progressive fatigue with intermittent chest pain. Cardiac MRI revealed moderate insufficiency of the autograft valve with a centrally located diastolic regurgitant orifice 6–7 mm in diameter. The autograft was dilated to 5.5 cm, and there was an unusual projection of tissue at the mid-level of the autograft sinuses (Fig. 1A and B).

On sternal re-entry, the autograft was appreciated to be thin-walled and aneurysmal. The aneurysm had an unusual fusiform shape, extending 1 cm beyond the anastomosis between the autograft and the native ascending aorta. The remaining aorta was normal in caliber and character. Inspection of the autograft revealed a chronic dissection of the non-coronary and right coronary sinuses of Valsalva. In addition, there was a fresh thrombus in the dissection area near the commissure between the right and left coronary cusps, consistent with acute extension of the chronic dissection. The autograft valve leaflets were thin and pliable, but there was lack of central coaptation and the annulus was dilated (Fig. 2). A valve-sparing procedure was considered, but due to anticipated technical difficulties the autograft valve was excised, the coronary ostia mobilized on generous buttons of tissue and all remaining sinus tissue was excised. A 27-mm Medtronic Freestyle porcine bioprosthesis was used to reconstruct the aortic root. Initial right ventricular function was diminished and a single saphenous vein bypass was placed to the proximal right coronary artery with improved right ventricular function. Pathological examination of the pulmonary autograft demonstrated areas of myxoid degeneration and fibrosis of the autograft leaflets. The autograft wall demonstrated dissection of the non-coronary and right coronary sinuses with marked cystic medial necrosis. The patient was eventually discharged in good health with a normally functioning bioprosthesis.

COMMENT

Pulmonary autograft root enlargement occurs at various intervals during long-term follow-up, and indications for surgical intervention are not completely defined. Most authors favour a cautious approach using autograft insufficiency, root diameter in excess of 55 mm or concomitant pulmonary homograft dysfunction as criteria for reoperation. As in the previously reported cases of autograft dissection, the patient in this report had a congenitally...
bicuspid, insufficient valve. This condition can be associated with intrinsic abnormalities of the aortic wall, including an increased rate of smooth muscle cell apoptosis and a decrease in collagen content [1, 2]. These findings are similar to patients with Marfan syndrome, a population recognized to be predisposed to dissection and aneurysm formation. Pathophysiological changes of the aortic wall associated with a bicuspid aortic valve may also be present in the main pulmonary artery—a phenomenon that is perhaps related to their common embryological origin, and is of unclear clinical significance [5].

The diagnosis of autograft dissection was not initially appreciated in the reported cases of autograft dissection, including this one. All patients were referred for surgical reintervention on the basis of autograft dilatation to greater than 5.5 cm. Potential advantages of aggressive treatment of autograft dilatation include increased likelihood of a valve-sparing operation and prevention of autograft dissection [4]. We recommend removal of all autograft tissues at reoperation to eliminate the possibility of re-dissection. Although the size threshold for reoperation is currently unknown, we favour earlier surgical treatment in order to improve the potential for a valve-sparing operation and to eliminate the possibility of autograft dissection.

Conflict of interest: none declared.

REFERENCES