

Aortic Regurgitation Secondary to Back-and-forth Intimal Flap Movement of Acute Type A Dissection

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We present an unusual case of acute type A dissection complicated with severe aortic valve insufficiency caused by prolapse of the tubular intimal flap into the left ventricular outflow tract, which was shown legibly by transesophageal echocardiography in the diastolic phase and by intraoperative macroscopic findings. The dissected ascending aorta was excised completely and replaced without any repairing of the aortic valve, resulting in a favorable outcome for the patient. Prolapse of an intimal flap from the aorta into the left ventricle represented a rare pathophysiology of aortic regurgitation in patients with aortic dissection. (Ann Thorac Cardiovasc Surg 2004; 10: 54–6)

Key words: acute type A dissection, aortic valve regurgitation, back-and-forth intimal flap movement

Introduction

An acute type A aortic dissection involving the ascending aorta disrupts aortic wall architecture including the aortic root. Aortic regurgitation is also frequently developed in patients with type A aortic dissection, secondary to downward displacement of one or more leaflets due to tearing of annular support. In this report, a case of an acute type A aortic dissection, in which back-and-forth movements of the proximal intimal flap caused severe aortic regurgitation, is presented.¹⁾

Case Report

A 57-year-old man who suddenly suffered congestive heart failure was referred to Hyogo Brain and Heart Center 15 days after onset of severe back pain. The computed tomographic scan revealed dissection of DeBakey type II, and color Doppler imaging by transthoracic echocar-

diography showed severe aortic regurgitation of grade 4. He underwent an emergency operation. After the induction of anesthetics, transesophageal echocardiography showed back-and-forth movements of the dissected intima which flew completely freely. The proximal intimal flap was ejected into the ascending aorta in the systolic phase (Fig. 1A), and was inverted and swayed back into the outflow tract of the left ventricle through the aortic valve in the diastolic phase (Fig. 1B). These movements of the intimal flap affected coaptation of the aortic valves, and resulted in severe aortic regurgitation (Fig. 1C).

At the time of surgery, cardiopulmonary bypass was instituted with the right axillary and left femoral arterial cannulation, and bicaval venous drainage. When the rectal temperature reached 20°C, the ascending aorta with the dissection lesion was opened by using retrograde cerebral perfusion. The intima lesion of the ascending aorta was excised circumferentially. The transversal intimal tear extended all the way around about 3.5 cm above the sinotubular junction. The dissected tubular intimal flap was inverted to the left ventricular outflow tract, as shown in Fig. 2. The aortic valve leaflets appeared to be normal and were not prolapsed, because the commissure attachment was not dissected. The partially dissected right sinus of Valsalva was consolidated using gelatin-resorcin-formalin (GRF) glue, and ascending aorta replacement was carried out. The distal end of vascular prosthesis (26

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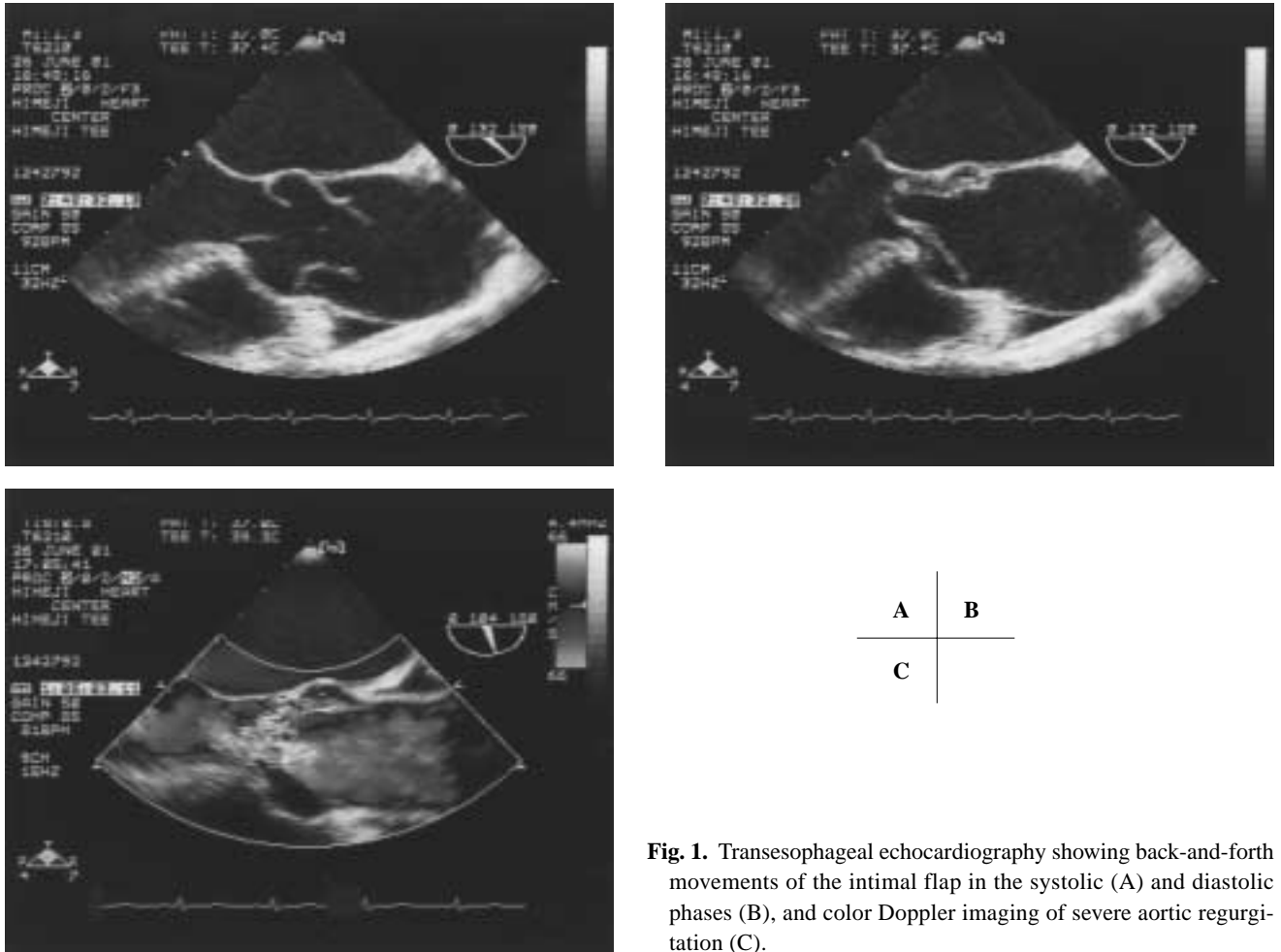


Fig. 1. Transesophageal echocardiography showing back-and-forth movements of the intimal flap in the systolic (A) and diastolic phases (B), and color Doppler imaging of severe aortic regurgitation (C).

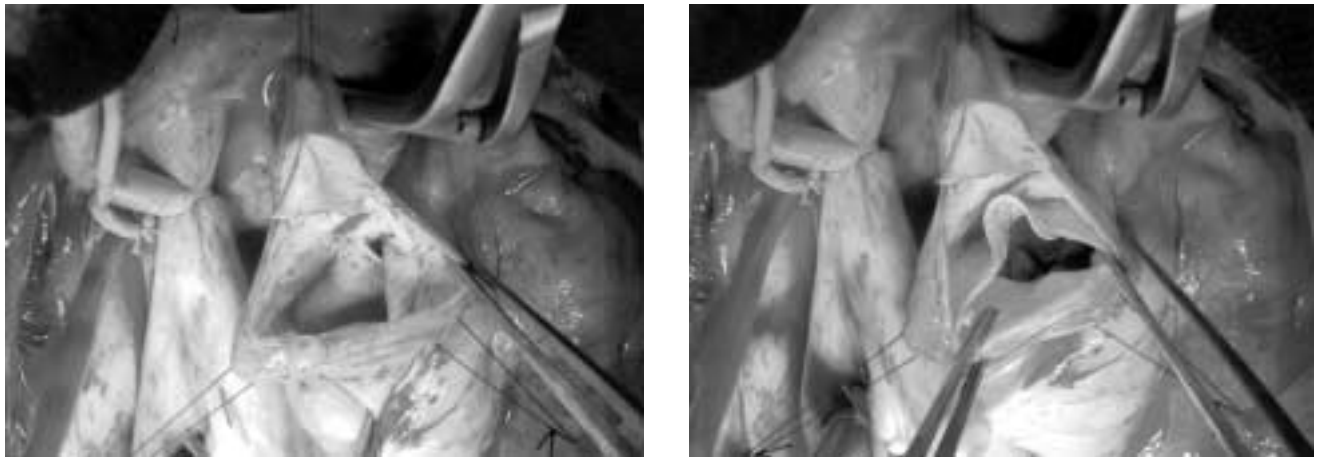


Fig. 2. Intraoperative photographs of the dissected tubular intimal flap prolapsed into the left ventricular outflow tract (A) and that pulled out into the aorta (B).

A | B

mm InterGard, InterVascular Inc., Montvale, NJ) was anastomosed proximal to the origin of the brachiocephalic artery, followed by a proximal anastomosis at the level of the sino-tubular junction with polytetrafluoroethylene

(PTFE) felt reinforcement. Postoperative echocardiography showed trivial aortic regurgitation. The patient had an uncomplicated postoperative course, and he resumed normal activity after discharge.

Discussion

Aortic valvular regurgitation caused by leaflet prolapse is a well-recognized complication in patients with aortic dissection, and up to 60% to 70% of patients with type A dissections develop this complication.¹⁾ Valvular regurgitation may result from three different mechanisms: (1) the dissection may cause progressive aortic root and annular dilatation, which prevents central leaflet coaptation; (2) the dissection may disturb the aortic root geometry in an asymmetric fashion, with consequent prolapse of one leaflet; and (3) the annulus or leaflet (or both) may be torn.²⁾ Diastolic prolapse of the intimal flap into the left ventricle in patients with aortic dissection is a rare cause of aortic regurgitation, which has been reported in only six cases.³⁻⁸⁾ In these reports, all cases have severe aortic regurgitation. Back-and-forth movements of the intimal flap into the aortic root are observed in four cases, and the intimal flap is completely incarcerated to the left ventricular outflow tract in one case. In patients with diastolic prolapse of the intimal flap into the left ventricle, it is considered necessary to circumferentially extend the intimal tear and to invert the adequate length of the proximal flap in order not to affect the aortic valve coaptation. An emergency operation is required for severe aortic regurgitation and congestive heart failure in these patients, even though they do not suffer acute heart failure at the onset of aortic dissection. Kochi and associates suggest that back-and-forth type intimal movements induce severe heart failure gradually if the intimal flap is not completely incarcerated.⁸⁾ This delayed progression of heart failure differs from a usual rapid development of congestive heart failure at the onset of aortic dissection and resultant severe aortic regurgitation secondary to impairment of aortic valve. It was assumed that the primary intimal tear extended progressively and then severe aortic regurgitation was observed at a circumferentially

transected stage.

Finally, intraoperative transesophageal echocardiography and two-dimensional color Doppler imaging were very useful for the identification of aortic intimal flap prolapsing into the left ventricular outflow tract.

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