Surgical Treatment for Aortic Coarctation with Chronic Type B Dissection: Report of a Case

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The aim of this paper is to report a rare case of aortic coarctation with type B aortic dissection. A 37 year-old man had sudden, intense back pain. Enhanced computed tomography revealed aortic coarctation (CoA) at the proximal descending aorta and acute type B aortic dissection just distal to the CoA. The dissecting, descending aortic aneurysm had expanded to a maximal diameter of 52 mm. The aortic coarctation was resected and then the descending aorta was replaced with prosthetic grafts in an uneventful procedure. Surgical repair resulted in a good outcome.

Keywords: aortic dissection, aortic coarctation, thoracic aorta

INTRODUCTION

Aortic coarctation (CoA) is usually diagnosed and treated in childhood. We describe a rare aortic coarctation with Stanford type B dissection in an adult who was surgically treated by an unusual approach.

CASE REPORT

A 37 year-old man suddenly developed intense back pain and rushed to his local hospital where enhanced computed tomography (CT) revealed acute type B aortic dissection. Stenosis in the proximal descending aorta was diagnosed as CoA. He was treated with strict blood pressure control. However, 2 years later, the dissecting descending aorta was expanded to a maximal diameter of 52 mm. He was referred to our department for further evaluation. He had a history of hypertension and had been treated with an antihypertensive agent. A physical examination revealed the following: body weight, 58.0 kg; height, 167 cm; blood pressure, 139/72 and 132/72 mmHg in the right and left upper extremities, respectively, and 104/71 and 98/69 mmHg in the right and left lower extremities, respectively. The right and left ankle brachial indexes (ABI) were 0.77 and 0.72, respectively, which indicated a pressure gradient between the upper and lower extremities. The results of blood tests were all within normal ranges. Spirography revealed vital capacity, 4.09 g/L; %VC, 105%; FEV1.0, 3.48 L and FEV1.0%, 85%, indicating the absence of a respiratory disorder. Three-dimensional computed tomography (3D-CT) showed CoA of the proximal descending aorta (Fig. 1). Aortic dissection extended from a point just distal to the CoA as far as the terminal abdominal aorta. A dissecting aortic aneurysm had expanded to a maximal diameter of 52 mm. The branching level of the Adamkiewicz artery was right Th10 segmental artery. The innominate vein crossed the anterior side of the distal arch aorta and the dorsal side of the descending aorta. Since the proximal descending aorta was closely located to the first costal bone, we considered that the surgical view obtained by posterolateral thoracotomy would be insufficient. We decided to approach via a median sternotomy and anterolateral thoracotomy with the patient...
in the right half-spine position with an elevated left arm. The patient was intubated under general anesthesia with a double lumen tube. At first, the surgical bed was rotated 45 degrees to the left. In this position, a cardiopulmonary bypass was established via the right axillary artery and superior vena cava and inferior vena cava cannulated via a femoral vein. Then, the surgical bed was rotated to flat, and antero-lateral thoracotomy was begun in the fourth costal space. The surgical view was sufficient, and the aneurysm was easily exposed. While the patient was under deep hypothermic, circulatory arrest, we resected the CoA and anastomosed a 20-mm prosthetic graft to the proximal descending aorta by the open proximal technique. A fenestration was created at the level of Th 9, just distal of anastomosis site of the descending aorta, and a 26-mm prosthetic graft was anastomosed using the open distal technique. The body temperature was recovered, and each prosthetic graft was anastomosed. The durations of surgery, cardiopulmonary bypass, and circulatory arrest were 495, 156, and 29 minutes, respectively. The patient was placed in the intensive care unit. His respiratory status was satisfactory, and he was extubated on postoperative day 1. Postoperative enhanced CT showed no pseudoaneurysms at the anastomosis sites (Fig. 2). The postoperative ABI improved to values of 0.98 and 1.03 for the right and left, respectively. The postoperative course was uneventful, and he was discharged on postoperative day 26.

**DISCUSSION**

Aortic coarctation is rare in adults and remains asymptomatic in 69% of such patients. Aortic coarctation was incidentally discovered in our patient during an enhanced CT to determine the cause of the sudden back pain. Together with type A aortic dissection, CoA is often discovered in Turner syndrome. Major causes of dissection in patients with coarctation are hypertension of the upper body and ascending aortic dilatation. However, type B aortic dissection with CoA is unlikely because blood pressure decreases distal to the CoA, and arterial wall tension is reduced. Type B aortic dissection usually arises after angioplasty, or during post surgical treatment, and it rarely arises spontaneously. To our knowledge, 9 reports were available worldwide. An indication for surgery for Type B dissection associated with coarctation is not unknown. But in our case, the dissecting, aortic aneurysm, expanded to over a 50-mm diameter and had grown rapidly. So we thought the aneurysm was at risk of rupture.

The standard approach to CoA is via posterolateral thoracotomy at the fourth intercostal space. However, to anastomose the proximal descending aorta via posterolateral thoracotomy was difficult in our patient due to the...
Aortic Coarctation with Type B Dissection

We surgically treated a rare aortic coarctation with Stanford type B aortic dissection in an adult using a median full sternotomy with an anterolateral thoracotomy. The postoperative course was uneventful, and the outcome was good.

**CONFLICT OF INTEREST STATEMENT**

None of the authors declares any conflict of interest.

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Fig. 2 Postoperative enhanced computed tomography. The Picture showed no pseudoaneurysms at the anastomosis sites. Descending aorta was replaced from distal of left subclavian artery to the level of Th 9.
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