Severe Limb Ischemia Related to Previous Abdominal Aortic Aneurysm Repair Induced by Acute Aortic Dissection

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We described the first case of limb ischemia induced by acute aortic dissection in the patient with previous abdominal aortic aneurysm (AAA) repair. A 56-year-old male was referred for severe limb ischemia. He underwent AAA repair one month before the referral. Computed tomography (CT) scan revealed Stanford type B aortic dissection extended to the proximal anastomosis site of the AAA repair. The false lumen made the complete interruption of antegrade blood flow at the proximal anastomosis site of the AAA repair.

Key words: limb ischemia, abdominal aortic aneurysm repair, acute aortic dissection

INTRODUCTION

Several cases of limb ischemia induced by acute aortic dissection were previously reported, including a case with abdominal aortic aneurysm (AAA). However, severe limb ischemia related to aortic dissection at the site of aortic clamp or iliac artery is known as a complication of AAA repair. However, severe limb ischemia induced by Stanford type B aortic dissection has not been described in a patient with previous AAA repair. In this paper, we described an unusual case of limb ischemia induced by acute aortic dissection in a patient with previous AAA repair.

CASE REPORT

A 56-year-old man was referred to our department for sudden onset of severe limb pain and paralysis of the limbs. He underwent AAA repair with a tube graft and reconstruction of the inferior mesenteric artery (IMA) one month before the referral at our department; however, he had no history or symptoms of limb ischemia, and postoperative ankle brachial pressure (ABI) was normal (>1.0). Postoperative computed tomography (CT) scan also revealed no obvious problems at the anastomosis or aortic clamp site (Fig. 1a). The clinical course after AAA repair was uneventful, and he was discharged on postoperative day 9. Concerning the referral for severe limb pain, we investigated the pulse of the bilateral femoral arteries, which was not detectable. As for the ABI, Doppler sound was not also audible. The physical examination revealed paresthesia and paralysis of the lower extremity. Contrast media-enhanced CT scan revealed Stanford type B aortic dissection extended to the proximal anastomosis site of the AAA repair. Ulcer like projection (ULP) site suggesting that it was the primary tear was seen at the proximal descending aorta. False lumen of the aorta was totally occupied with thrombus except the ULP site. The false lumen made the complete interruption of antegrade blood flow at the proximal anastomosis site of the AAA repair (Fig. 1b, Fig. 2). The celiac trunk, the superior mesenteric artery, and the bilateral renal arteries were originated from true lumen; however, the origin of the left renal artery was narrowed by the false lumen. Distal lesion of the proximal anastomosis site was maintained by collateral circulation through the epigastric artery or the mesenteric artery system.

Emergency right axillo-bifemoral bypass was performed using an 8 × 7 mm bifurcated graft. Limb color,
ABI, and neurological dysfunction were improved immediately after operation. Postoperative significant elevation of serum creatine phosphokinase (CPK, peak CPK 16959 IU/l on 1POD) and transient elevation of creatinine (Cr, peak Cr 1.37 mg/dl on 1POD) were observed but improved steadily. Contrast media-enhanced CT scan on postoperative day 7 revealed the patent vascular prosthesis and the persistent but reduced thrombosed false lumen of the aorta (Fig. 1c). The patient began to walk on postoperative day 7 according to the rehabilitation program for acute aortic dissection. His postoperative course was uneventful and he discharged on postoperative day 36. Contrast media-enhanced CT scan at 6 months after operation revealed occlusion of the axillo-bifemoral bypass graft and disap-

Fig. 1 Three-dimensional CT scan.

a: on the 7th day after AAA repair.
b: on referral for limb pain and paralysis.
c: on the 7th day after axillo-bifemoral bypass.
d: at 6 months after operation.

CT, computed tomography

Fig. 2 Two-dimensional CT scan on referral for limb pain and paralysis.

CT, computed tomography
Limb ischemia is one of well-known complication of acute aortic dissection.\textsuperscript{1–3} We described the severe limb ischemia induced by aortic dissection in the patient with previous AAA repair. In our case, the totally thrombosed false lumen made the complete interruption of antegrade blood flow at the proximal anastomosis site. As far as we searched, there was no report of severe limb ischemia induced by aortic dissection in the patient with previous AAA repair. We should consider this because termination of the aortic dissection at the proximal anastomosis site of AAA repair is thought to be a major cause of limb ischemia. Furthermore, limb ischemia in the patient with previous AAA repair could be more severe than that in the patient without previous AAA repair because of reduced collateral circulation related to intra-operative closure of the lumbar arteries or un-reconstruction of the IMA or the internal iliac artery. In our institution, we reconstruct the IMA independent with the result of pressure measurement except the patients with the occluded IMA. In the present case, several pairs of the lumbar arteries were closed, but the internal iliac arteries were patent because of the tube graft repair and the IMA was reconstructed. Nevertheless, our case presented paralysis of the limbs at the same time with the onset of limb pain. This suggests the severity of ischemia induced by aortic dissection in the patient with previous AAA repair and the necessity of prompt and appropriate treatment.

With regards to severe ischemic cases, surgical procedure such as axillo-bifemoral bypass or femoro-femoral bypass has been carried out. Recently, endovascular repair of aortic dissection presenting as severe limb ischemia was also reported.\textsuperscript{5, 6} As a result of those appropriate treatments for limb ischemia, major limb amputation could be avoided in many cases. In our case, the proximal anastomosis site of AAA repair was close to major branches of the abdominal aorta. There was a risk of thromboembolism from the thrombosed false lumen. Thus, we judged that endovascular repair was inappropriate and decided to perform the extra-anatomical bypass grafting.

Limb color, ABI, and paralysis were improved immediately after operation. Postoperative significant elevation of CPK and transient renal dysfunction were observed but improved steadily. Postoperative clinical course was uneventful. At 6 months after operation, disappearance of aortic dissection and restart of antegrade blood flow were observed. Occlusion of the vascular prosthesis was also observed without any clinical symptom, such as intermittent claudication or thromboembolism.

We routinely reconstruct the IMA, independent of its pressure measurements because ischemia or necrosis of the large intestine may occur in a few patients who have had a reconstruction of their bilateral internal iliac arteries. In addition, we usually recommend the IMA reconstruction because it can help in the collateral circulation for improving lower-limb ischemia, induced by acute aortic dissection after AAA repair.

Here, we described an unusual case of limb ischemia induced by acute aortic dissection in the patient with previous AAA repair.

\textbf{References}