

## DeBakey IIIb Aortic Dissection Originating in a Distal Aortic Arch Aneurysm

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**This report presents a case of DeBakey IIIb aortic dissection originating in a distal aortic arch fusiform aneurysm. The atherosclerotic change of the aneurysm was mild and the letter “C”-shaped intimal flap was turned over to obstruct the true lumen blood flow. A four-branched woven Dacron vascular prosthesis was implanted in a double barrel fashion. Although this case was successfully managed, an emergent operation should have been conducted. (Ann Thorac Cardiovasc Surg 2003; 9: 209–11)**

**Key words:** aortic dissection, aortic aneurysm, intimal tear

### Introduction

The incidence of the coexistence of aortic dissection and atherosclerotic or degenerative aneurysm is 5.5-7.1%<sup>1,2)</sup> and aortic dissection, the intimal tear of which was located in the aortic aneurysm, is rare. This report presents a case of aortic dissection that originated in a distal aortic arch aneurysm.

### Case Report

A 49-year-old Japanese man was admitted to hospital complaining of severe back pain and coldness in his right leg. When he underwent medical examination three months earlier, a distal aortic arch aneurysm was found and close examination was planned two weeks later.

Physical examination on admission showed that he was 160 cm tall and weighed 53 kg. His blood pressure was 110/56 mmHg and pulse rate 112/min, regular. No abnormalities were found in the lungs and no murmurs were detected in any area. The left femoral pulse was clearly palpable, however, the right femoral and more peripheral pulses were not palpable. But the blood flow of the right

posterior tibial artery was detected by Doppler stethoscope and cyanosis of the leg was not recognized.

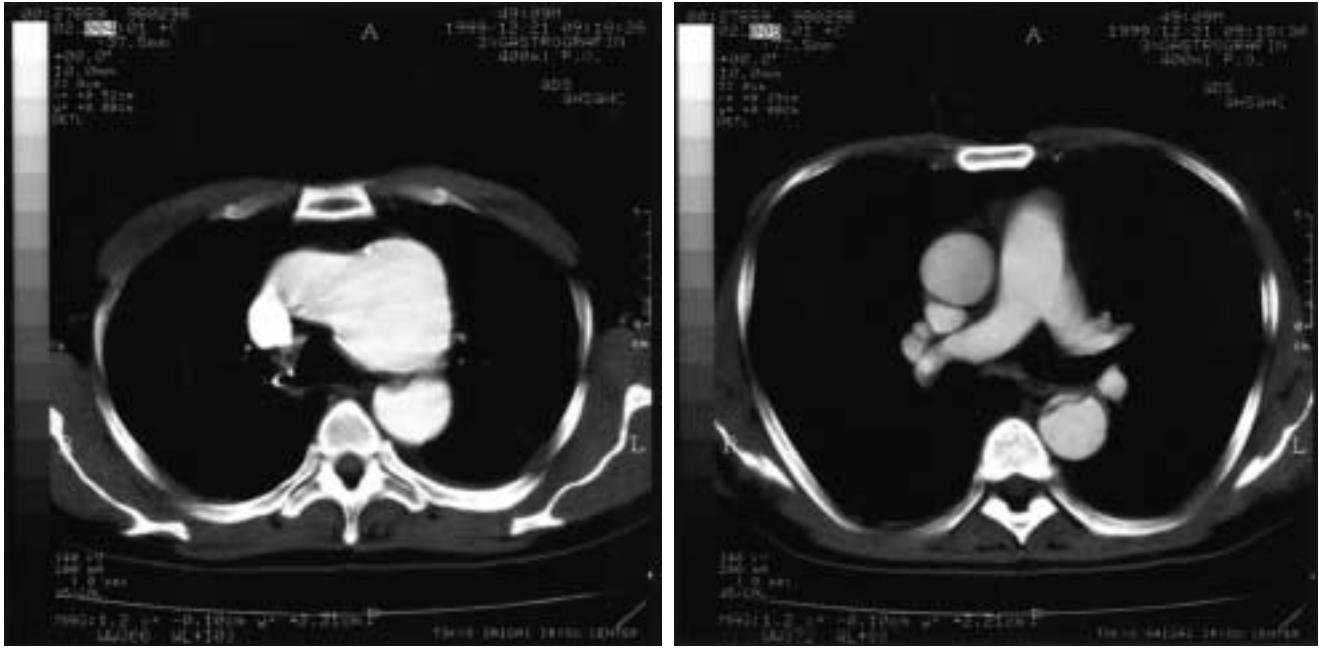
X-ray of his chest indicated an enlarged aortic arch and enhanced CT demonstrated a distal aortic arch unruptured fusiform aneurysm the size of which was 60 mm and descending thoracic aortic dissection (Fig. 1). But the location of the intimal tear was not detected. Routine laboratory examinations on admission were normal and the electrocardiogram showed normal tracing. Since creatine phosphokinase did not increase (138 IU/L) and the blood flow of the right posterior tibial artery was detected, an emergent bypass operation was not conducted. Two days later, the right femoral artery became palpable and the coldness began to improve. One month after admission, angiography was performed, which demonstrated the narrow true lumen and broad false lumen of the descending thoracic and abdominal aorta. The major abdominal branches except the right renal artery originated from the false lumen and the right renal artery from the true lumen.

An operation was conducted two months after admission under the diagnosis of a distal aortic arch aneurysm and aortic dissection (DeBakey IIIb). After median sternotomy, cardiopulmonary bypass was initiated by the right atrium and ascending aorta cannulation, establishing a full bypass. Under intermediate hypothermia bypass, the ascending aorta was cross-clamped. Just after the administration of cardioplegic solution to the coronary arteries through the aortic root, complete cardiac arrest was obtained. The bypass was discontinued at 24.8°C of rectal temperature, selective cerebral perfusion was started and

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**Fig. 1.** Preoperative enhanced CT. A distal aortic arch aneurysm, 60 mm in diameter is shown (a). A narrowed true lumen and an enlarged false lumen is demonstrated (b). a | b

an occlusion balloon catheter was inserted into the descending aorta and the cardiopulmonary bypass was recommenced from the cannula inserted into the left femoral artery maintaining a pump flow of 0.7 L/min. The atherosclerotic change of the aneurysm was mild and an intimal tear in the shape of the letter “C” was observed on the posterior wall of the aneurysm and the flap was turned over to obstruct the true lumen blood flow (Fig. 2). The flap was resected to fenestrate the suture line and a four-branched woven Dacron vascular prosthesis was implanted in a double barrel fashion. Then proximal anastomosis and reconstruction of the cervical branches were performed. Total duration of the bypass was 271 min, selective cerebral perfusion time was 173 min and cardiac ischemic time was 122 min.

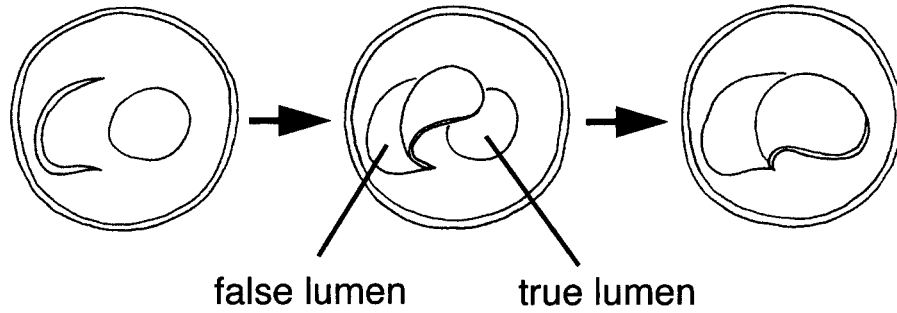
Postoperative angiography showed a satisfactory result (Fig. 3). The postoperative course was uneventful. He was discharged on the 30th postoperative day and has been doing well.

## Discussion

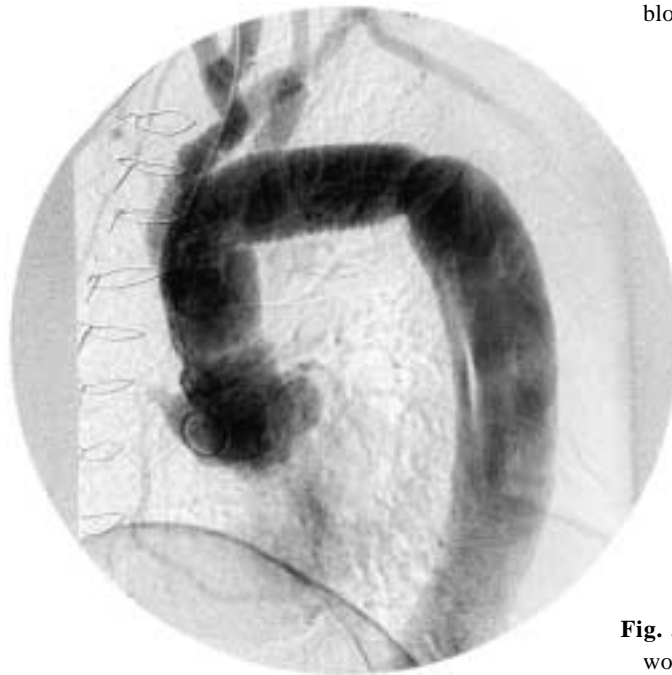
Leg ischemia is one of the symptoms of aortic dissection.<sup>3,4)</sup> This man suffered from right leg ischemia. From the intraoperative view, it was suspected that the “C”-shaped intimal flap suddenly shut off the blood flow al-

most completely. The shape of an intimal tear located in the site of the non-aneurysmal aorta is almost “I”-shaped whether it is longitudinal or transverse. The shape of an intimal tear occurring within an aneurysm, however, may be “C”-shaped because the vascular wall is a globe. The mechanism that caused the flap in the aneurysm to turn over and obstruct the true lumen is dangerous. Fortunately the right leg ischemia improved and multiorgan ischemia did not occur, but if the intimal flap of re-entry were not satisfactory, malperfusion brought on by this dissection would have been fatal.

Although CT scan and angiography were performed, the location of the intimal tear was not identified until operation. Therefore we could not recognize the seriousness of his condition, and this patient was not operated upon immediately. Intimal tears are not generally located in an atherosclerotic place and extensive atherosclerotic plaquing may terminate the longitudinal dissection.<sup>5)</sup> Atherosclerotic change of the aneurysm in this case was mild, and aortic dissection originated in the mild atherosclerotic fusiform aneurysm and the false lumen itself was a component part of the aneurysmal wall. When aortic dissection coexists with atherosclerotic or degenerative aneurysm, the aneurysm is likely ruptured.<sup>1)</sup> Although the aneurysm did not enlarge and this case was successfully treated, an emergent operation should have been conducted.



**Fig. 2.** Operative view. The letter “C” shaped intimal flap in the aneurysm turned over to obstruct the true lumen blood flow.



**Fig. 3.** Postoperative angiogram. A woven Dacron vascular prosthesis is implanted.

## Conclusion

A case of DeBakey IIIb aortic dissection in which the intimal tear was located in the distal aortic arch aneurysm is reported. The mechanism that caused the letter “C”-shaped intimal flap in the aneurysm to turn over and obstruct the true lumen is unusual and dangerous. We should recognize the seriousness of a mechanism like this.

## References

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