

Aorto-Carotid Bypass for Cerebral Malperfusion after Aortic Dissection Surgery: A Case Report

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ABSTRACT

Malperfusion syndrome may complicate the postoperative course in patients who have undergone surgery for aortic dissection. In these cases, open surgery or endovascular intervention may be required. We present a case of postoperative onset of intermittent severe neurological symptoms after surgery for type A aortic dissection. Progressive dissection of the carotid arteries was diagnosed, and treatment options were discussed. A successful aorto-carotid bypass was performed by cardiac and vascular surgeons in collaboration. All neurological symptoms were completely resolved. We advocate a high degree of vigilance for signs of cerebral malperfusion in the intensive care unit. Early intervention can result in a successful outcome, as illustrated by this case report.

INTRODUCTION

We present a case of postoperative onset of intermittent severe neurological symptoms after surgery for type A aortic dissection. Cerebral malperfusion due to progressive dissection of the carotid arteries was treated successfully by rescue aorto-carotid bypass 17 days after the primary operation.

CASE REPORT

A 54-year-old man with hypertension was admitted to our hospital with chest pain. Acute myocardial infarction was suspected at first, and emergency angiography indicated left main stenosis. To stabilize the patient during intracoronary stent insertion, an intra-aortic balloon pump was inserted. During the stent placement procedure, the correct diagnosis of aortic dissection was established, and the patient was immediately transferred to the operating room. The patient showed no signs preoperatively of neurological damage.

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Surgery was commenced 4 hours after onset of symptoms. Cardiopulmonary bypass was established through the right femoral artery and vein. The ascending aorta was repaired using a supracoronary graft and deep hypothermic circulatory arrest (21 minutes) with retrograde perfusion of the brain. The aortic arch and its branches were carefully examined, and there was no sign of reentry and the aortic tissue was normal. The postoperative course was complicated by pneumonia and the patient was weaned from the ventilator on the seventh postoperative day. A weakness of the left upper limb was noted, and a computed tomography (CT) scan of the brain revealed infarctions in the left occipital and parietal regions. The patient recovered gradually between the eighth and fifteenth postoperative days, and the weakness of the left arm resolved. On the sixteenth postoperative day, the neurological symptoms worsened and intermittent loss of consciousness and left arm weakness developed in conjunction with episodes of hypertension, which were difficult to control by medical treatment. Cerebral malperfusion was suspected, and progressive dissection of the carotid arteries was diagnosed by a contrast-enhanced CT scan (Figure 1). There was a dissection in the right common carotid artery and the false lumen compressed the artery to such an extent that only a few millimeters remained. The dissection in the left common carotid artery reached 10 mm proximal of the bifurcation. However, the true lumen was reduced approximately 50% by the thrombus-filled false channel. Endovascular stent insertion in the carotid artery was not feasible

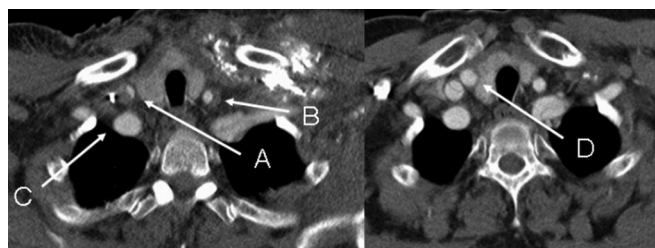


Figure 1. Computed tomography scan before and 4 months after surgery. A indicates right common carotid artery with only a few millimeter-wide true lumen; B, left common carotid artery with 50% reduction of the true lumen; C, right subclavian artery; D, aorto-carotid Dacron graft.



Figure 2. Computed tomography 3-dimensional reconstruction. A indicates aorto-carotid Dacron graft.

since the dissection progressed to the common iliac arteries. The renal and mesenteric circulation was supplied by the narrow true lumen in the abdominal aorta. In this situation with new, progressive, and severe neurological symptoms and an imminent risk of permanent brain damage, we decided to proceed with open bypass surgery to address the cerebral malperfusion. The operation was performed by cardiac and vascular surgeons in collaboration. The sternotomy was reopened and the aortic graft exposed. An 8-mm Dacron vascular graft was anastomosed end-to-side to the aortic graft. The common carotid artery was exposed, and the graft was tunneled and anastomosed end-to-end to the common carotid artery, just below the carotid bifurcation. The proximal end of the common carotid artery was ligated. The patient regained consciousness on the same day after surgery. His consciousness became clear and the weakness of the left arm resolved partially during the hospital stay, and all neurological symptoms had completely resolved after 6 weeks. Four months after surgery, a CT scan was performed, including 3-dimensional reconstruction (Figures 1 and 2). The patient was in excellent clinical condition at follow-up 1 year after surgery.

DISCUSSION

Patients with acute aortic dissection require immediate surgical intervention. Clinically evident malperfusion syndrome is common in patients with acute type A aortic dissections. Surgical treatment of acute type A aortic dissections complicated by preoperative signs of neurological deficit carries a high mortality rate [Tanaka 2005]. Treatment options in cases complicated with peripheral vascular malperfusion include urgent aortic repair alone or in combination with later interventions for remaining malperfusion. Other strategies may include initial percutaneous stent deployment to restore end-organ perfusion and subsequent aortic repair [Cambria 1998; Girardi, 2004]. Residual dissection of the brachiocephalic arteries is common after aortic repair and does not generally require surgical intervention but does pose an increased risk of late ischemic events, as recently investigated by Neri and coworkers [Neri 2004]. An anecdotal report describes a case of aortic dissection where an extra-anatomic carotid bypass was performed in the acute setting and followed by aortic repair 2 days later [Walterbusch 1984].

In the present case, with impending risk of permanent brain damage after surgery for type A dissection due to progressive dissection of the carotid arteries, where an endovascular procedure was not feasible, we successfully performed a rescue aorto-carotid bypass with full restitution of cerebral function.

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