

Successful Management in the Case of Mesenteric Ischemia Complicated with Acute Type A Dissection

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We report a case of acute type A dissection with ischemic enterocolitis due to blood flow insufficiency in the superior mesenteric artery. A 67 year-old man, with medicated ischemic heart disease and hypertension, presented to another hospital with chest pain radiating to the back and epigastrium. Contrast-enhanced computed tomography revealed a type A dissecting aneurysm, that extended from the ascending aorta to the left common iliac artery, with a 50-mm diameter in the ascending aorta. Celiac trunk and left renal artery arose from the false lumen, and the superior mesenteric artery (SMA) was compressed by the thrombosed false lumen. Symptoms of acute mesenteric ischemia clearly developed. Then, a large amount of tarry stool (melena) was discharged. First, an emergency saphenous vein bypass was performed from the common iliac artery to the superior mesenteric artery at the orifice of the ileocolic artery where it was free from dissection. Then total arch replacement was performed using cardiopulmonary bypass. The patient's postoperative course was uneventful, and the abdominal symptoms completely disappeared. This case demonstrates that prompt surgical relief of ischemia in major organs is important to save lives in the cases of acute aortic dissection with ischemic complications. (Ann Thorac Cardiovasc Surg 2002; 8: 231-5)

Key words: acute type A dissection, mesenteric ischemia, mesenteric revascularization

Introduction

Malperfusion, that is a devastating complication of type A acute aortic dissection, with a reported incidence of 16 to 33%,¹⁻³⁾ is defined as a complication in an organ system secondary to ischemia and resulting in organ dysfunction and systemic metabolic abnormalities. Although the results of surgical treatment for acute type A dissection have improved because of progress in surgical techniques, the prognosis is still very poor and the optimal therapeutic approach is still not clearly established for cases of acute dissection complicated with malperfusion. Historically, surgical procedures including graft

revascularization of the affected aortic branch vessel or fenestration of the intimal flap have been the only therapeutic alternatives.⁴⁾

Despite the frequency of this problem, prioritization of treatment of these complications in relation to the management of the aortic dissection remains unsettled in the current literature.⁵⁾ Thus, it is not surprising patients with peripheral vascular complications represent a population subgroup at the highest risk of death. We present a case with successfully concomitant mesenteric revascularization with total arch replacement for acute type A dissection with ischemic enterocolitis due to blood flow insufficiency in the superior mesenteric artery (SMA).

Case Report

A 67 year-old man, with medicated ischemic heart disease and hypertension, presented to another hospital with chest pain radiating to the back and epigastrium, and consciousness disturbance due to a stroke. The brain com-

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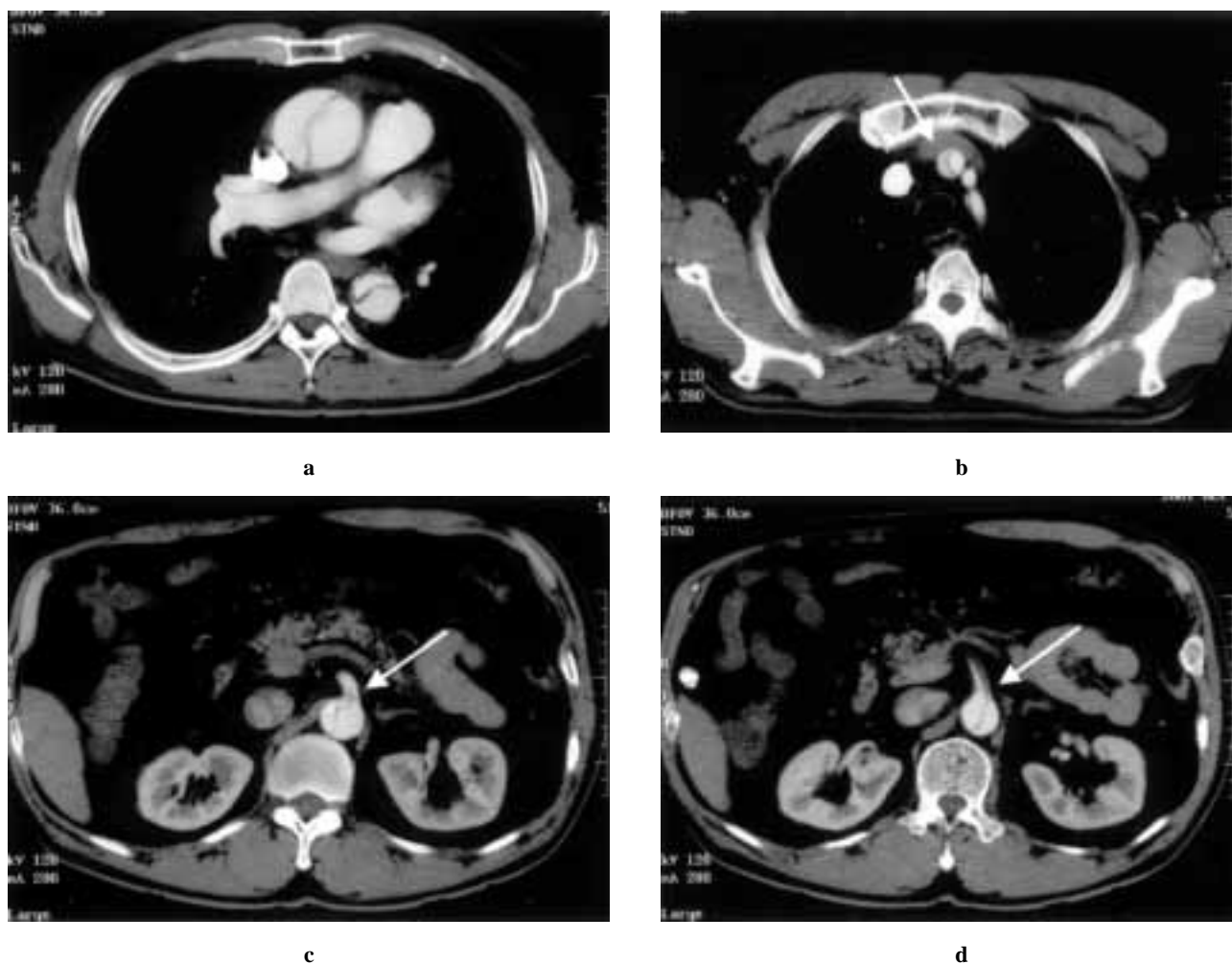


Fig. 1. Contrast-enhanced computed tomography revealed type A dissecting aneurysm, with a 50-mm diameter in the ascending aorta (a). Innominate artery was dissected, and the true lumen was markedly compressed (arrow) (b), the celiac trunk arose from the false lumen (arrow) (c), and the SMA was compressed by the thrombosed false lumen (arrow) (d).

puted tomography showed normal findings without infarction and hemorrhage. The chest X-ray revealed mediastinal dilatation. Contrast-enhanced computed tomography revealed type A dissecting aneurysm, that extended from the ascending aorta to the left common iliac artery, with a 50-mm diameter in the ascending aorta (Fig. 1a). The innominate artery was dissected, and the true lumen was markedly compressed (Fig. 1b), the celiac trunk and left renal artery arose from the false lumen (Fig. 1c), and the superior mesenteric artery (SMA) was compressed by the thrombosed false lumen (Fig. 1d). He came to our hospital for operation by ambulance four hours after the onset of initial symptoms. Physical findings indicated a temperature of 36.7°C, blood pressure 110/70 mmHg, and pulse 80 beats per minute and irregular. The 12-lead electrocardiogram revealed atrial fibrillation. Laboratory ex-

amination results were within normal limits except for mild metabolic acidosis in arterial blood gas analysis. Chest pain disappeared at our hospital with medical treatment, however, his upper abdominal pain progressed with associated dyspnea, nausea, and diaphoresis. The abdomen was distended with mild tenderness. Symptoms of acute mesenteric ischemia clearly developed. Then, a large amount of tarry stool (melena) was discharged. Laparotomy was initially performed because ultrasound cardiography showed that there was no aortic insufficiency and tamponade. During the laparotomy, although there was a blood flow disorder in the SMA there was no intestinal necrosis. Therefore, an emergency saphenous vein bypass was performed from the right common iliac artery to the SMA at the orifice of the ileocolic artery where it was free from dissection. Arterial pulsation in the mesen-

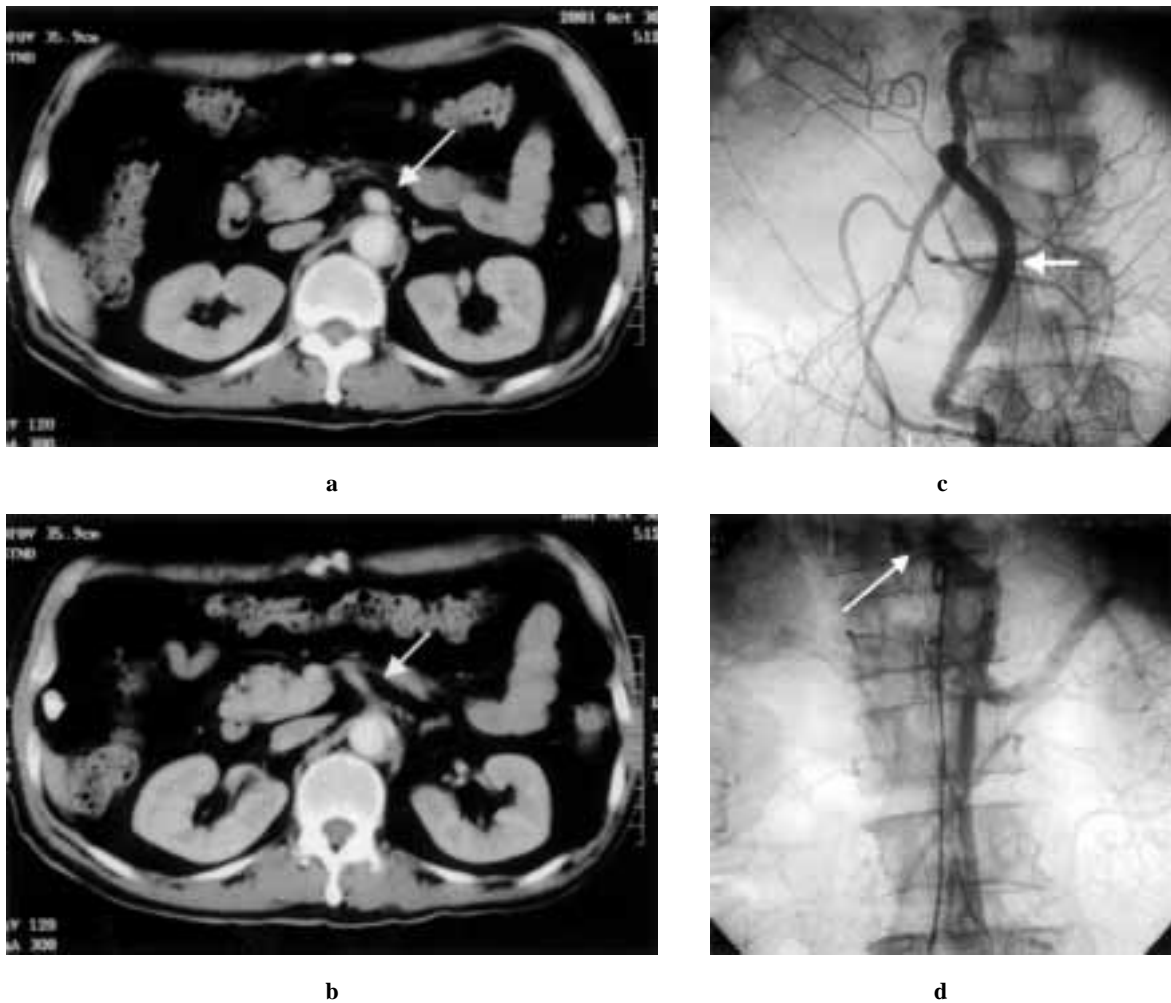


Fig. 2. Contrast-enhanced computed tomography performed postoperatively revealed a celiac trunk which arose from the false lumen (arrow) (a), and the SMA was compressed by the thrombosed false lumen (arrow) (b). Postoperative angiography revealed a good passage of the iliac-SMA bypass graft (arrow) (c). The celiac trunk arose from the false lumen (arrow) (d).

tery was recovered. Then the total arch was replaced with a 24-mm Hemashield arch graft using cardiopulmonary bypass (CPB) and, with concomitant antegrade selective cerebral perfusion, circulation was arrested after the rectal temperature had been lowered to 20°C. When the markedly dilated ascending aorta was incised, it was observed that the dissection extended just peripheral to the right coronary artery ostium and that the intimal tear was about 10 mm from it. The duration of circulatory arrest was 83 min, that of myocardial ischemia 147 min, and that of CPB 196 min.

The patient's postoperative course was uneventful, and the abdominal symptoms completely disappeared. Contrast-enhanced computed tomography performed postoperatively still revealed contrast medium in the false lu-

men only in the abdominal aorta (Fig. 2a, b). Postoperative angiography revealed a good passage of saphenous graft from the right common iliac artery to the SMA (Fig. 2c). The false lumen was enhanced retrogradely from the left common iliac artery to the celiac lesion. The celiac trunk and left renal artery arose from the false lumen (Fig. 2d). The patient remained well at follow up one year later but under careful observation, given the possibility of expansion of the false lumen and stenosis or obstruction of the iliac-SMA bypass graft.

Discussion

With proximal aortic dissection, the vast majority of ischemic complications will be remedied by the standard

surgical treatment of central thoracic aorta.^{2,6)} Unfortunately, distal aortic dissection complicated by malperfusion has been associated with a significantly higher operative mortality rate, nearly double the rate for an uncomplicated distal aortic dissection repair.^{2,7)} Fann et al. reported a 64% operative mortality rate in patients with peripheral vascular ischemia who underwent central repair for acute distal dissection.²⁾ This rate is compared with an operative mortality rate of 31% in patients without complications or ischemic symptoms. Although the results of surgical treatment for acute type A dissection have improved because of progress in surgical techniques, the prognosis is still very poor and an optimal therapeutic approach is still not clearly established for cases of acute dissection complicated with malperfusion. Despite corrective procedures and an intact surgical repair, these patients died of metabolic abnormalities and end-organ failure.⁸⁾ Historically, surgical procedures including graft revascularization of the affected aortic branch vessel or fenestration of the intimal flap have been the only therapeutic alternatives.⁴⁾ Despite the frequency of this problem, prioritization of treatment of these complications in relation to the management of the aortic dissection remains unsettled in the current literature.⁵⁾ Thus, it is not surprising patients with peripheral vascular complication represent a population subgroup at the highest risk of death.

The incidence of visceral ischemia and bowel infarction in association with aortic dissection has been reported to be between 3 and 5%.^{2,7,9)} Although the incidence of acute dissection leading to mesenteric ischemia or infarction is uncommon, the survival rate for patients with this complication is disappointingly low, regardless of surgical tactics or medical treatment.^{2,7,10)} Concerning the mortality of patients with aortic dissection complicated by blood flow disorder in the SMA, Pinet et al. reported 23 deaths among 24 cases (96%).¹⁰⁾ Miller et al. examined 175 cases of aortic dissection and concluded that visceral ischemia is one of the significant predictors of operative mortality.¹¹⁾ Of 264 patients with distal aortic dissections reported by Cambria and associates, only 8 (3%) had mesenteric infarction.⁷⁾ All 8 patients died despite bowel resection, revascularization, or both. Fann et al. reported deaths in 3 patients with acute aortic dissection who required small bowel resection for severe ischemia.²⁾

Successful mesenteric revascularization using bypass grafts from the right iliac artery, which is usually spared in the dissection process, has been reported.¹²⁾ One patient with an acute dissection reported by Cavaliere et al. survived a left hemicolectomy performed four days after

graft replacement of the ascending aorta.¹³⁾ Concerning surgical techniques, it is necessary to assess the degree of organ ischemia before initiating CPB, since organ ischemia is likely to worsen due to low perfusion pressure during CPB.¹⁴⁾ Intestinal ischemia after aortic dissection usually results from compression of the SMA origin by the false lumen hematoma or from extension of the dissection into the SMA ostia; either situation can be cause SMA thrombosis.¹⁵⁾ This case is usual in that celiac axis occlusion resulted in steal of flow from the SMA, which was already compromised by the narrowed true lumen, causing secondary colonic infarction. In our case too, celiac trunk arose from false lumen, and SMA was compressed by the thrombosed false lumen. Recently, it is suggested that interventional radiologic techniques might be preferable in attempting to restore visceral blood flow initially.^{2,4)} However, symptoms of acute mesenteric ischemia in this patient clearly developed despite medical treatment. If there had been intestinal necrosis or bad color tone in the intestine, reconstruction of the SMA and/or bowel resection should have been performed prior to aortic replacement. Therefore, laparotomy was initially performed because ultrasound cardiography recognized that there was no aortic insufficiency and tamponade. However, during the laparotomy, although there was a blood flow disorder in the SMA there was no intestinal necrosis. Consequently, we thought that reconstruction of the SMA should have been performed prior to aortic replacement. Observation after withdrawal of CPB revealed good arterial pulsation in the mesentery, and therefore bowel resection was considered unnecessary.

One of the reasons we could save this patient's life was that operation under CPB could be performed relatively safely, because the intestinal ischemia had been alleviated unexpectedly after selective superior mesenteric revascularization and there was no intestinal necrosis at the time of operation. The severity and the duration of visceral ischemia before intervention undoubtedly have an important impact on outcomes and patient survival. This case demonstrates that prompt surgical relief of ischemia in major organs is important to save lives in the cases of acute aortic dissection with ischemic complications.

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