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Successful Concomitant Revascularization in a Patient with Carotid, Coronary, and Intestinal Artery Occlusive Disease

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ABSTRACT

Background: Chronic mesenteric ischemia and carotid stenosis frequently have coexistent coronary artery disease. Myocardial ischemia is the most common cause of morbidity and mortality following revascularization of the peripheral arteries. The optimal treatment of concurrent mesenteric, carotid, and coronary disease is unknown.

Case Report: We report a case of a 75-year-old man who required revascularization of the left anterior descending coronary and superior mesenteric arteries and carotid endarterectomy. After concomitant surgical revascularization, the patient remained asymptomatic during the 3-year follow-up.

Conclusion: A good result in this case encourages us for one-stage combined surgical intervention in patients who require multisystem revascularization.

INTRODUCTION

Severe arteriosclerosis is a multisystemic disease that in some cases affects coronary, carotid, and mesenteric arteries. The prevalence of severe carotid disease (>70% stenosis) in the coronary artery bypass grafting (CABG) population has been reported at 8-12% [Schwartz 1995]. In patients with known coronary atherosclerotic disease, the prevalence of chronic mesenteric ischemia (CMI) may range from 8% to 70%, and cardiac ischemia is the leading cause of mortality after surgical mesenteric revascularization [Ghosh 2002]. The incidence of combination of mesenteric, coronary, and carotid arteriosclerosis is not well established. The best approach for treatment of this trilogy is debatable. In the staged procedure, if carotid endarterectomy (CEA) is performed first, the risk of acute myocardial ischemia during the procedure and postoperative period seems to be quite high. If CABG is performed first, the risk of stroke during the operation and postoperative period is elevated. The incidence of mesenteric ischemia after CABG operation is quite low (0.6–2%) but its mortality rate is extremely high, ranging from 70% to 100% [Schutz 1998].

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We report a case of severe CMI associated with significant coronary artery disease (CAD) and severe carotid stenosis, in which atherosclerotic lesions needed carotid endarterectomy and bypass for the left anterior descending coronary artery (LAD) and the superior mesenteric artery (SMA).

CASE REPORT

A 75-year-old-male was admitted to our institution with weight lost, postprandial abdominal pain, exercise-induced angina pectoris, and history of transient ischemic attack. Coronary artery angiography revealed 95% osteal stenosis of the LAD. Carotid duplex ultrasonography revealed total occlusion of the left internal carotid artery (ICA) and 70-99% stenosis of the right ICA. Abdominal duplex ultrasonography revealed occlusion of the SMA. A computerized tomography

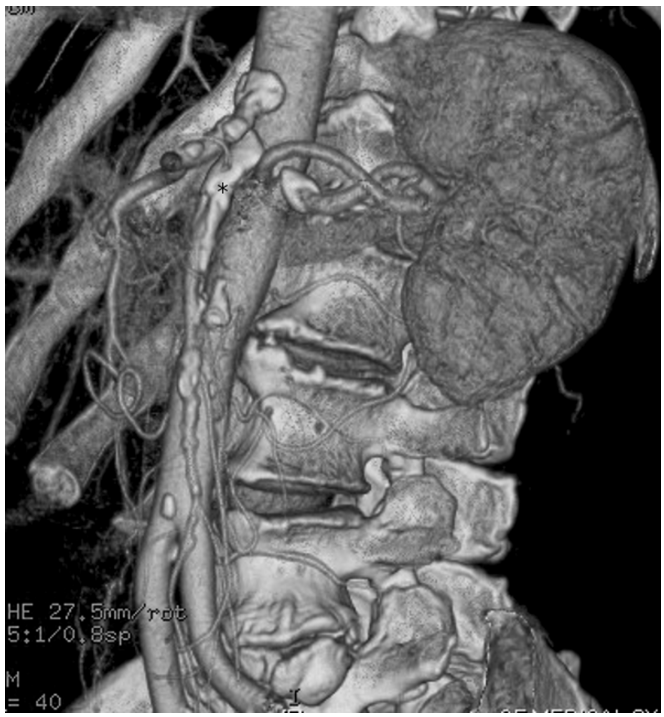

Figure 1. Preoperative computed tomography angiography scan revealed occlusion of the superior mesenteric artery origin with intimal calcified plaque (*) at proximal segment.

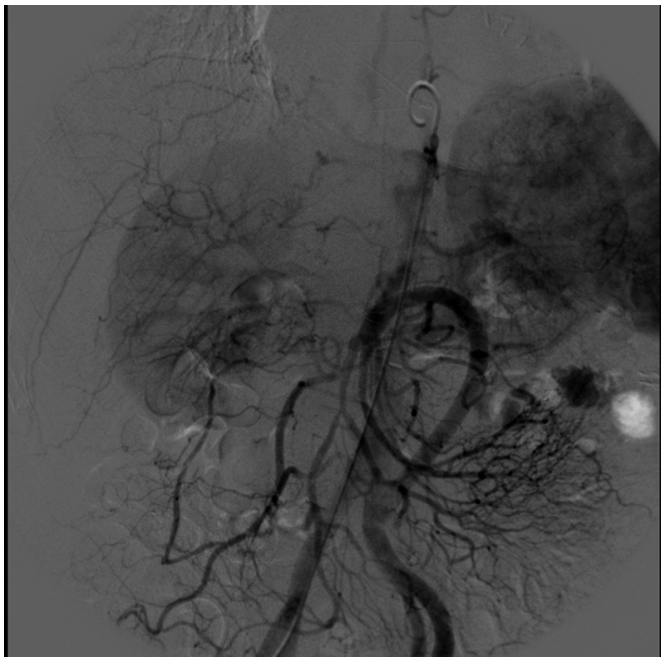

Figure 2. Control digital subtraction angiography shows the patent graft from the left iliac artery to the superior mesenteric artery.

angiography scan confirmed occlusion of the SMA with intimal calcified plaque at the proximal segment and filled retrogradely (Figure 1). Informed consent for the planned operation was obtained from the patient before surgery. At operation, after the conventional anesthesia administration, a midline abdominal incision was made and an 8 mm ringed-PTFE graft was interposed between the left internal iliac artery to the SMA. Next, the right carotid endarterectomy and patchplasty was performed using a carotid shunt. Finally, midline sternotomy was performed and the left internal thoracic artery was anastomosed to the LAD using a standard off-pump beating heart technique with a coronary shunt. Low-dose intravenous nitroglycerin infusion was applied during all procedures to avoid hypotension. The patient was transferred to the intensive care unit free of problems and was extubated at postoperative hour 6. Intestinal motion was begun on the second postoperative day (POD) and oral feeding was started. The patient's postoperative period was uneventful and he was discharged on the ninth POD.

Digital subtraction angiography was performed to control the bypass graft between the left iliac artery to the SMA. This graft was patent (Figure 2). After a 3-year outpatient clinic follow-up, the patient remains asymptomatic.

DISCUSSION

Chronic mesenteric ischemia (CMI) is uncommon, but its incidence is probably underestimated secondary to difficulties in diagnosis. CMI presents with postprandial abdominal pain, inanition, fear of food, nausea, vomiting, diarrhea, symptoms of malabsorption, and unintended progressive weight loss, much like many other abdominal and systemic illnesses. For that reason, diagnosis is often delayed, and the patients encounter starvation, severe malnutrition, bowel infarction, and death from complications of acute gut ischemia on CMI. Even in the absence of symptoms, CMI is associated with a cardiovascular mortality rate of up to 40% within 6 years depending on the severity of the disease [Ghosh 2002; Mateo 1999].

Surgical treatment of stenotic or occluded mesenteric vessels has been performed with a low mortality rate and produces good long-term remission of symptoms [Mateo 1999]. Bypass techniques vary from antegrade to retrograde reconstructions but none are clearly superior [Mateo 1999]. Percutaneous transluminal angioplasty has good clinical results in treating CMI. But its disadvantages are the need for reintervention and inferior durability with a higher incidence of symptom recurrence.

Patients who are treated with surgical revascularization of the mesenteric arteries also have involvement of other system arteries (coronary, renal, carotid, etc.), and myocardial ischemia is the leading cause of morbidity and mortality during treatment and follow-up [Mateo 1999]. However, the ideal treatment of concomitant CMI, CAD, and carotid arterial stenosis remains unclear. Although the incidence of intestinal ischemia following CABG is relatively low (0.6% to 3.7%), the associated mortality is remarkably high (13.9% to 100%) [Schutz 1998]. Eagle et al reported that vascular surgery poses a greater risk of perioperative MI and death for patients with known CAD [Eagle 1997]. Patients with neurologically symptomatic carotid stenosis should be considered for carotid revascularization. In a systematic review by Naylor et al, the peri-CABG stroke risk was 7-11% at unilateral critical carotid stenosis with contralateral occlusion [Naylor 2002]. In patients with critical CAD requiring simultaneous carotid revascularization and CABG, combined CEA-CABG should be considered based on local expertise.

In the present case, we performed a combined carotid endarterectomy with patchplasty, off-pump CABG and mesenteric bypass procedure to maintain stabilization for carotid, myocardial, and mesenteric perfusion. Some reports had already reported that one-stage combined surgery can be safely performed with acceptable morbidity and mortality in the presence of concomitant CAD and either carotid or peripheral vascular disease or abdominal aorta aneurysm [Guler 1999; Kindo 2005]. Two previously reported cases of combined myocardial and mesenteric revascularization had favorable immediate and midterm outcomes [Guler 1999; Kindo 2005].

In our clinical experience, we encountered more hematoma and bleeding complications when abdominal surgery was performed last in combined operations. Therefore, we started with mesenteric bypass between the left iliac artery to SMA with prosthetic graft. We preferred the retrograde route as an inflow because of iliac arteries free from atherosclerosis. After that we performed carotid endarterectomy to reduce the risk of stroke. And finally we performed off-pump CABG procedure. We preferred off-pump technique to avoid hemodynamic fluctuations during and after cardiopulmonary bypass.

Generally, correction of three different systems in the same session is not the preferred approach. But we chose this approach because of the presence of critical stenosis in three different systems. Complete revascularization is very important in patients with hemodynamically critical coronary, carotid, and mesenteric artery disease. Staged revascularization can be performed by turns, but acute myocardial ischemia, stroke, and acute mesenteric ischemia incurred by our choice may cause failure of the whole therapy. A good result in this unique case encourages us for concomitant surgical intervention in patients who exhibit symptoms of myocardial, carotid, and mesenteric ischemia.

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