

THE VASCULAR PATIENT - CHRONIC MESENTERIC ISCHEMIA, AAA AND ILIAC OCCLUSION

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Abstract

Introduction: Peripheral arterial disease (PAD), abdominal aortic aneurysm (AAA) and chronic mesenteric ischaemia (CMI) are vascular diseases uncommonly observed in the same patient, especially when treatment is required. This case report illustrates a patient requiring mesenteric revascularization due to CMI. A long flush occlusion of the superior mesenteric artery (SMA) precluded endovascular revascularization. Therefore, we performed a retrograde bypass from the right common iliac artery (CIA) to the SMA. On the 6-month follow-up, the patient developed right limb ischemia despite the absence of intestinal angina. CT angiography revealed CIA occlusion, bypass patency through hypogastric retrograde filling and modest growth of a AAA. Due to the presence of contralateral CIA lesions and to achieve durable revascularization, we opted to perform a AAA repair with an aorto-uni-iliac endograft followed by a femorofemoral crossover bypass. This achieved AAA's repair, lower limb revascularization, and a suitable and durable inflow to the mesenteric bypass.

Keywords: abdominal aortic aneurysm, visceral ischemia, peripheral revascularization

INTRODUCTION

Peripheral arterial disease (PAD), abdominal aortic aneurysm (AAA) and chronic mesenteric ischaemia (CMI) are vascular entities attributed to atherosclerotic phenomena. However, despite atherosclerosis being a common mechanism, AAA growth appears to have different pathologic pathways from those responsible for atherosclerotic occlusive disease¹. Furthermore, PAD is likely negatively associated with AAA growth.² Its simultaneous occurrence in the same patient is less frequent, even more requiring surgical treatment.

This case report exposes the complex approach and treatment of a patient with aortoiliac PAD, AAA and CMI.

CLINICAL CASE

We report a 65-year-old male with good cognitive status and no physical limitations. The patient had a medical history of previous smoking (50 pack-years), arterial hypertension and chronic lymphocytic leukaemia under surveillance. His chronic medication included pantoprazole, aspirin, atorvastatin and alopurinol.

The patient came from another hospital due to one-month-long abdominal pain in the epigastric region, mainly postprandial and subsiding 1 to 2 hours after eating. However, the pain had aggravated significantly for the last two days, despite fasting and painkillers. He also reported weight loss of 15kg in 2 months (21% of body

mass index) and food aversion.

CT angiography (CTA) exposed a severely calcified ostial occlusion of the proximal superior mesenteric artery (SMA) and a 36mm infrarenal fusiform abdominal aortic aneurysm (AAA) [Figure 1]. Celiac trunk and inferior mesenteric artery were patent. Given the diagnosis of acute-on-chronic mesenteric ischaemia, the patient was proposed for urgent surgery. The lesion characteristics - severely calcified and 49mm in length, precluded attempts of antegrade endovascular revascularization or retrograde open mesenteric stenting (ROMS). Open revascularization with extra-anatomic bypass was the preferred initial approach.

Median laparotomy allowed exposure of the proximal SMA at the base of the mesentery and the right common iliac artery (CIA). We preserved the proximal SMA branches. Following systemic heparinization (target ACT - activated coagulation time 200s), the proximal anastomosis was performed side-to-end to the CIA using an 8mm ringed ePTFE graft. Under blunt dissection, we created a retroperitoneal tunnel to position the graft in a "lazy-C" fashion. Care was taken measuring and cutting the graft to length with the SMA in an anatomical position. We then performed an end-to-side distal anastomosis to the SMA, with an excellent palpable pulse distally. Small bowel immediately recovered peristalsis and pink colouration. The postoperative course was unremarkable and the patient discharged after 20 days. Abdominal pain resolved and a gradual weight increase was noted.

At 6-month follow-up appointment, the patient complained of right foot coldness and numbness, and a diminished right femoral pulse was noted. An urgent CTA exposed occlusion of the right common iliac artery, despite the patency of the ileomesenteric bypass, a growth of the AAA up to 42mm, and a significant increase in mural thrombus. Angiography showed that reverse flow of the right hypogastric artery maintained the bypass's patency [Figure 2], despite occlusion of the CIA and distal external iliac artery. Retrograde and antegrade endovascular revascularization attempts of the right CIA were unsuccessful.

Considering the need to restore patency of the right iliac axis, a crossover femorofemoral bypass was planned. After reevaluating the CTA, it was found that prior to the crossover bypass, the aortic bifurcation and left CIA would require pre-emptive revascularization with the need for stenting. This, associated with the AAA's growth (5mm in 6 months) led to the decision to exclude the AAA in the same operative period as the femorofemoral bypass.

We performed a left aorto-uni-iliac EVAR (Medtronic® Endurant™, Minneapolis, Minnesota, USA) with a main body 25x14x102mm and iliac extension 16x13x82mm. Plain-balloon angioplasty was required in the left CIA limb to achieve proper stentgraft expansion. This was followed by right common femoral artery endarterectomy and a left to right femorofemoral crossover bypass using an 8mm ringed ePTFE graft [Figure 3]. This

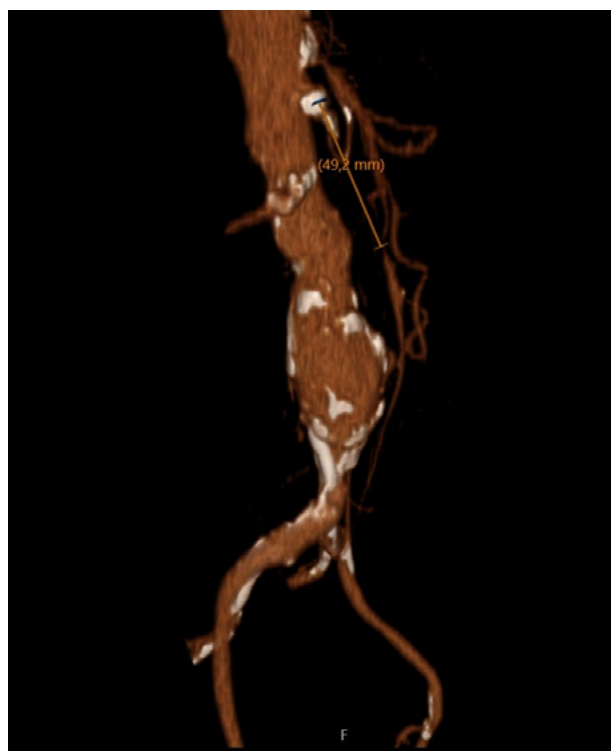


Figure 1

Preoperative CTA exposing a 49mm SMA occlusion with distal permeabilization and a 37mm fusiform infrarenal AAA.



Figure 2

Preoperative angiography right CIA occlusion and retrograde filling of the ileomesenteric bypass by the right hypogastric artery.



Figure 4 *CT angiography 3D reconstruction showing postoperative result: aortouni-iliac EVAR, retrograde filling of the ileomesenteric bypass by the left to right femorofemoral bypass.*



Figure 3 *Intraoperative angiography after aortouni-iliac EVAR, exposing retrograde filling of the ileomesenteric bypass by the right hypogastric artery.*

procedure achieved AAA's repair, ileomesenteric bypass's patency through reverse filling of the right external iliac artery and right lower limb revascularization. There were no procedure-related complications. The remainder of the admission was uneventful.

Follow-up CTA confirmed technical success with patency of the ileomesenteric bypass and AAA exclusion without endoleaks. [Figure 4]. The patient was lost to follow-up two years after the last surgery.

DISCUSSION

In the setting of CMI, revascularization is indicated for symptomatic patients, and there is no role for conservative management³. It has the primary purpose of relieving symptoms, and prevent bowel ischemia or infarction in order to improve weight loss and nutritional depletion. Symptomatic mesenteric ischaemia may occur with single-vessel atherosclerotic occlusion, albeit less often, due to intestinal collateral circulation⁴. Our case report exposes a severely symptomatic patient with single vessel occlusion despite patency of the remainder splanchnic vessels.

For acute-on-chronic mesenteric ischemia, isolated SMA revascularization is recommended and more commonly performed through open or hybrid surgery, allowing examination and bowel resection if needed³. Open bypass is indicated in the patient with unfavourable anatomy or unsuccessful endovascular intervention. Such is illustrated in our case of the SMA's long calcified flush occlusion.

Using the iliac arteries for inflow avoids aortic cross-clamping, carrying less morbidity for patients with suboptimal cardiopulmonary status. Compared to endovascular approach, mesenteric bypass has better patency and freedom of recurrent symptoms, with lower rates of re-intervention⁵.

Our patient developed significant iliac lesions leading to right CIA occlusion in the short follow-up. Clamp-induced lesion or increased blood flow shear stress may have been contributors. Surprisingly, retrograde hypogastric backflow maintained bypass's patency without intestinal angina. Despite favouring an initial endovascular approach, iliac recanalization was not achievable and crossover femorofemoral bypass was the alternative. Upon finding left iliac stenotic lesions and an aneurysm growth of 5mm in 6 months, we decided to exclude the AAA and revascularize the lower limb in the same operative period to achieve long-lasting results.

Vascular disease may affect various arterial segments with occlusive and aneurysmal disease. To achieve favourable long-term patency, interventions for revascularization should be carefully planned. This report exposes the management of CMI, complicated with iliac occlusion requiring AAA repair and crossover femorofemoral bypass for durable revascularization.

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