

The unusual case of total occlusion of the three splanchnic arteries and the infrarenal aorta

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Abstract:

Chronic mesenteric ischemia due to diffuse atherosclerosis, including the aorta and peripheral arteries, is rare in younger patients and often underdiagnosed. Early diagnosis and prompt treatment are crucial to improve prognosis. Hereby, we present a relatively young patient with concomitant total occlusion of the three splanchnic arteries (celiac trunk, superior and inferior mesenteric artery), as well as the infrarenal aorta down to the femoral arteries. This 61-year old male complaining about bilateral restrictive intermittent claudication at 25m and post-prandial abdominal pain, underwent synchronous aorto-bifemoral and aorto-superior mesenteric artery bypass, using a combination of Dacron and PTFE grafts. The postoperative surveillance was uneventful, and the patient was discharged the 5th post-operative day. Computed tomography angiography confirmed patency of both bypasses at 6-month follow-up and the patient remained asymptomatic.

INTRODUCTION

Aorto-(bi)femoral bypass should be the preferred treatment option in fit patients suffering from aorto-iliac occlusive disease extending to the level of the renal arteries.^{1, 2} Furthermore, chronic mesenteric ischemia due to stenosis or chronic occlusion of the celiac trunk or mesenteric arteries has been associated to the presence of atherosclerotic in other vascular beds.³ In patients with lower extremities arterial disease, significant mesenteric stenosis of at least one of the three arteries may be detected in one third of them.³ Herein, we report a case of a 61-year-old male suffering from concomitant aorto-iliac and splanchnic vessels' occlusion, treated with an aorto-bifemoral and simultaneous aorto-superior mesenteric artery bypass.

CASE REPORT

A 61-year old male, with a history of tobacco use (45 pack/years) suffered from restrictive intermittent claudication of

both lower extremities at 25m, erectile dysfunction and recurrent post-prandial abdominal pain. His current body mass index (BMI) was 17.5. His medical history was significant for chronic obstructive pulmonary disease (FEV1 77%) and dyslipidemia (LDL 105mg/dl). Cardiologist evaluation with echography revealed a preserved ejection fraction at 50%. Computed tomography angiography (CTA) confirmed the aorto-iliac occlusive disease from the orifice of the left renal artery down to common femoral arteries (Figure 1), as well as a synchronous extensive occlusion of the celiac trunk, superior and inferior mesenteric artery (Figure 2). Taking into account his young age and the acceptable interventional risk factor, an open surgical approach with an aorto-bifemoral and a simultaneous aorto-SMA bypass was decided for the revascularization of lower extremities and bowel.

Under general anesthesia, both femoral bifurcations up to the level of external iliac arteries were dissected and controlled using vessel loops. The circumflex iliac vein was ligated bilaterally, and a sub-inguinal ligament tunnel was created and directed to iliac arteries. Subsequently, using a medial incision, the bowel was retracted at right and after the ligation of the Treitz ligament, the infra-renal aorta down to the aortic bifurcation was dissected (Figure 3). The inferior mesenteric artery and vein were recognized and ligated. The dissection of the aorta was extended up to the orifice of the SMA, after the preservation of the left renal vein and both renal arteries. The medial part of the SMA just below the transverse mesocolon was dissected and controlled using vessel loops (Figure 4).

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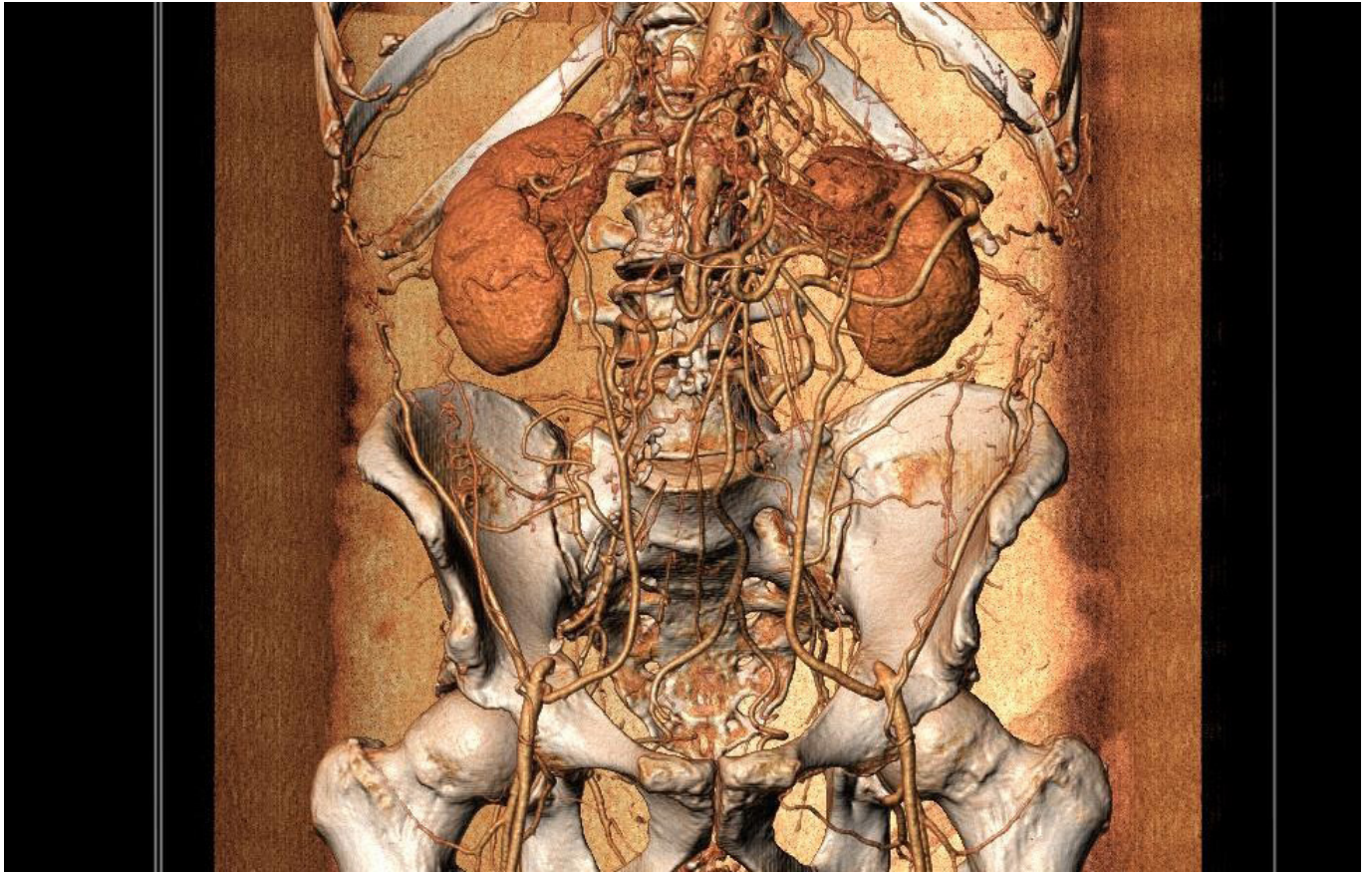


Figure 1. The patient referred intermittent claudication and mild post-prandial discomfort. The pre-operative CTA revealed an aorto-iliac occlusive disease. Collaterals preserved flow of both inferior limbs.



Figure 2. Furthermore, the pre-operative CTA confirmed the presence of celiac trunk and superior mesenteric artery occlusion.

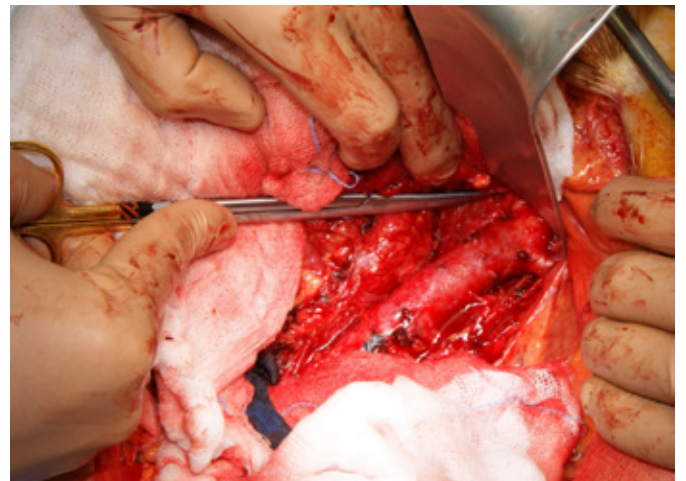


Figure 3. Using a medial incision, the bowel was retracted at right and the infra-renal aorta was dissected down to the aortic bifurcation and iliac arteries. The dissection of the aorta was extended up to the orifice of the SMA.

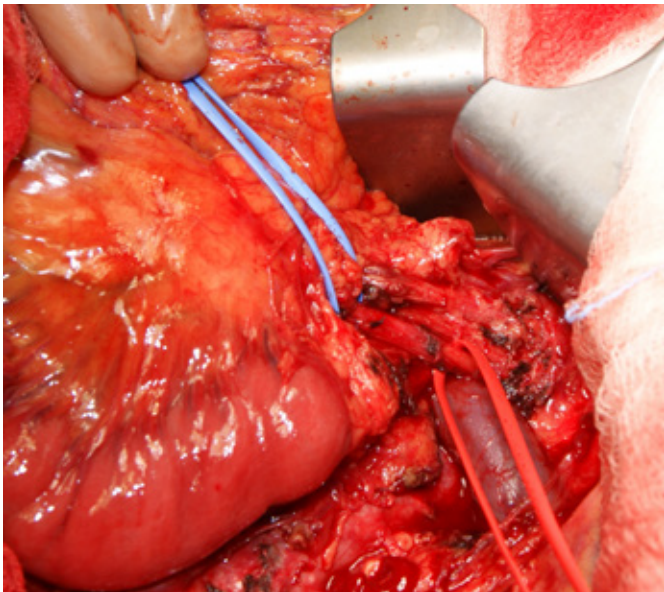


Figure 4. The medial part of the SMA just below the transverse mesocolon was dissected and controlled using vessel loops.

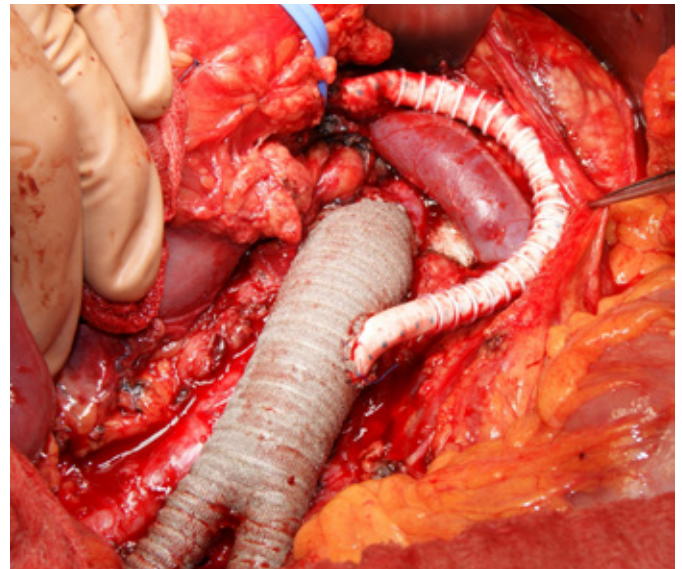


Figure 5. Using a bifurcated Dacron 18-6mm graft, the proximal end-to-side anastomosis was created. Then, the SMA was clamped distally and the distal end-to side anastomosis of an aortic-SMA bypass was created using a PTFE 6mm graft. The operation was completed with the construction of both femoral anastomoses

As thrombus was extending proximally at the orifice of the left renal artery, a left supra-renal clamping was decided to achieve an adequate aortic thrombectomy. After systemic heparinization, the aortic thrombo-endarterectomy was accomplished using an infra-renal longitudinal arterial incision. Afterwards, the proximal clamp was transferred distally having a total duration of supra-renal clamping at 11 minutes. Using a bifurcated Dacron 18-9mm graft, the proximal end-to-side anastomosis was created. Then, the SMA was clamped distally and using a longitudinal incision the distal end-to side anastomosis of an aortic-SMA bypass, using an externally supported PTFE 6mm graft, was created. The proximal anastomosis was accomplished in the same fashion at the main body of the bifurcated graft. (Figure 5).

After the restoration of flow, the bypass to the SMA was patent with peripheral pulses in the SMA. The operation was completed with the construction of both peripheral anastomoses at the femoral bifurcations. Careful hemostasis and Doppler evaluation of the SMA bypass and peripheral arteries were performed before closure.

Intra-operatively the patient was transfused using 1 red blood cell unit. The total duration of the operation was 180 min. The patient was transferred to the ward under close monitoring. No post-operative complications were recorded. Both pedal artery pulses were palpable. Food restriction was decided during the initial 2 post-operative days until normal bowel function was restored. An oral alimentation was gradually resumed, starting the 3rd postoperative day, without any post-prandial pain or discomfort. Finally, he was discharged the 5th post-operative day in a good general condition. At 1st month follow-up, the patient remained in a good general condition, completely asymptomatic with palpable pulses on both limbs. At the last 6th month follow-up, he has gained

almost 10 Kgs without reporting any symptoms. The CTA revealed patency on both grafts (Figure 6A & B).

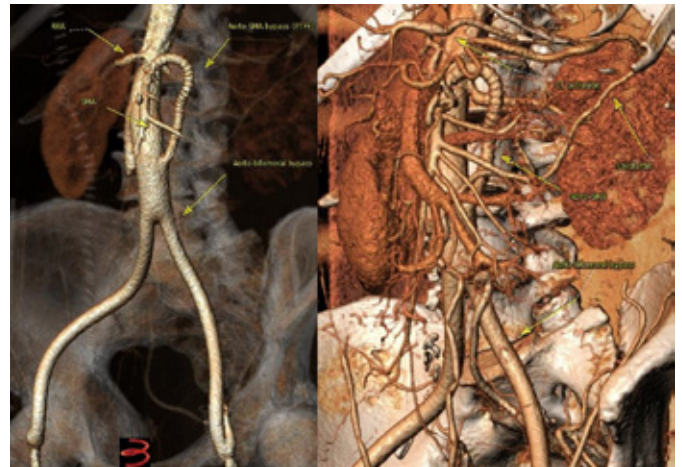


Figure 6A & B. Follow-up CTA revealed patency of both bypasses; aorto-bifemoral and aorto-SMA. An S configuration was used for the SMA bypass to avoid kinking and occlusion. Important collaterals between the SMA and the CT preserve flow in the rest of the splanchnic organs.

DISCUSSION

Mesenteric ischaemia represents a spectrum of disorders with incidence rates that vary according to the etiology (arterial, non-occlusive, venous) and presentation (acute or chronic).⁴ Atherosclerosis is the main etiopathologic factor and clinical presentation may take years to apparent as it is in relation to the atherosclerotic evolution.⁴ In patients diagnosed with atherosclerosis, the prevalence varies widely between 8 and 70%. Especially, in patients with lower extremity arterial disease, a critical stenosis or occlusion of at least one mesenteric artery may be found in 25-29% of them.³ In this case, the

patient referred a restrictive claudication of lower limbs and abdominal post-prandial discomfort. Diffused atheromatosis and concomitant splanchnic vessel stenosis or occlusion may be present in this group of patients and high clinical suspicion index should be high to accomplish the adequate diagnosis.

Chronic mesenteric ischemia (CMI) diagnosis should be considered in the presence of multi-vessel stenosis or occlusion and needs careful investigation.⁴ Symptoms may vary and be atypical.⁵ Typical symptoms include postprandial abdominal pain, food aversion and weight loss.⁵ Abdominal bruit may be present.^{4,5} The “classic triad” of postprandial abdominal pain, weight loss and abdominal bruit is only present in 16-22% of CMI patients.^{6,7} Imaging plays an important role in diagnosis. Duplex ultrasonography may be the first line option with a diagnostic accuracy estimated between 85-90% while CTA presents higher sensitivity in splanchnic vessel atheromatosis.⁸ Furthermore, CTA can confirm the presence of atherosclerosis in other vascular beds.⁴ In this case, intermittent claudication was the dominant symptom while abdominal discomfort was underestimated by the patient. However, CTA confirmed the presence of atheromatosis of both aorta and its branches and played a mandatory role in the pre-operative planning.

Surgical management with revascularization is the best treatment option in patients with symptomatic CMI.⁴ Excessive delays in proceeding with revascularization may be associated with clinical deterioration, bowel infarction and risk of sepsis.⁹ Open surgery present superior long-term results while endovascular intervention may be an effective alternative, especially when taking into account the low peri-procedural mortality and morbidity rates.⁴ In any case, SMA should be the first target vessel for revascularization when multi-vessel disease is present, when its revascularization seems feasible.⁴ Angioplasty and stenting are more adequate for short focal SMA stenoses with minimal to moderate calcification or thrombus while longer lesions cannot be precluded from an endovascular approach.^{10,11} Open surgical bypass may be more effective in hostile mesenteric lesions or previously failed endovascular interventions.⁴ Peri-operative mortality is estimated up to 3% for revascularizations performed in tertiary care centres.⁴ In this case, an endovascular approach was excluded as all target vessels were totally occluded. An open repair was decided due to patient’s medical history and good general status. Furthermore, open repair for aorto-iliac total occlusion is recommended as the best surgical treatment option in fit patients according to current guidelines¹, and therefore a synchronous retrograde bypass from the aortic graft to the SMA seemed a reasonable option. Although the patient suffered a concomitant celiac trunk and SMA occlusion, only one of both vessels was decided to be revascularized, as extensive collaterals could offer the adequate blood supply to the celiac trunk and an additional bypass would prolong further the duration of operation. However, the type of reconstruction should be individualized to patient’s needs and anatomy.¹²

CONCLUSION

Diffused atheromatosis may be present in both aorta and splanchnic vessels. Simultaneous open surgical repair may be the adequate surgical approach at least in fit patients.

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Conflict of interest: None

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