

Surgical Reconstruction for Mesenteric Angina in a Patient with Infra-Renal Aortic Occlusive Disease – A Case Report and Review

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ABSTRACT

Mesenteric angina is an uncommon condition which is underdiagnosed, or diagnosed too late when the patient has a mesenteric infarct. The preferred treatment is by surgical reconstruction. A case presented here illustrates the condition and the modifications necessary to reconstruct a completely occluded lower abdominal aorta in treating both mesenteric angina and claudication.

Keywords: mesenteric angina, coeliac arteries, mesenteric arteries, surgical vascular reconstruction, prosthetic graft

INTRODUCTION

Chronic mesenteric ischaemia is an uncommon clinical entity that is often not considered in patients with abdominal pain. This is reflected in the literature where small series of usually less than 50 patients are accrued over long periods of over 10 – 20 years. The unfortunate result of delayed diagnosis is the eventual abdominal catastrophe of acute mesenteric ischaemia with death or short gut syndrome as a consequence. As atherosclerosis is usually the underlying cause of the problem, concomitant peripheral vascular disease especially of the abdominal aorta can sometimes co-exist with additional limb symptoms and important implications in surgical management.

We present a patient with both intermittent claudication and mesenteric angina and her subsequent management.

CASE REPORT

The patient is a 51-year-old Chinese lady with a 22-year history of systemic lupus erythematosus (SLE) on 30 mg of prednisolone and 200 mg of hydroxychloroquine daily. She was also a smoker for the last 20 years. She has been having post-prandial epigastric pain, frequent fatty stools and loss of weight of up to 8 kg over the last 2 years. The constant predictable nature of pain after food resulted in her inability to eat and in the final stages of her condition, she required total parenteral nutrition to sustain her while preparations were made for surgical management. She also had bilateral intermittent calf claudication after walking 50 metres. Raynaud's phenomenon was present but not clinically disabling.

She gave no history of hypertension, diabetes or symptoms suggestive of ischaemic heart disease or cerebro-vascular problems.

On examination, she was thin and emaciated, weighing only 33 kg. Abdominal examination was unremarkable and no bruit was heard. All her lower limb pulses were absent but no evidence of critical limb ischaemia was present. The rest of the cardiovascular and neurological systems were normal.

Gastroscopy and colonoscopy did not reveal any abnormality. Platelet count was $309 \times 10^9/L$. Triglycerides was 2.83 mmol/L, cholesterol 4.21 mmol/L with high density lipoproteins 0.79 mmol/L and low density lipoproteins 2.13 mmol/L. The electrocardiogram was normal as was her technitium-99m hexakis 2-methoxyisbutyl isonitrile (MIBI) scan. Xylose absorption test using 5 mg test dose was abnormal, with 2-hour and 5-hour excretion of 5.5 and 13.7 mmol respectively, indicating malabsorption.

Aortic angiogram revealed an occluded aorta just below the renal arteries with reconstitution of the common iliac arteries via the ureteric, lumbar and subcostal collaterals. The origins of the coeliac, superior mesenteric and inferior mesenteric arteries were completely occluded but distal reconstitution via the internal iliac vessels was present (Figs 1 a,b).

Operative procedure

1. A midline incision was made and at laparotomy, no pulsations were felt in the mesenteric blood vessels. The bowel looked pale and the abdominal aorta was sclerotic all the way to the iliacs.
2. The transverse colon was reflected superiorly and the small bowel retracted to the right. The ligament of Treitz was divided to expose the infra-renal aorta at the junction with the renal arteries.
3. The left renal vein was divided close to the inferior vena cava to expose a segment of supra-renal aorta below the pancreas to allow for proximal control. The renal arteries were slung with vessel loops to minimise backbleed during construction of the proximal anastomosis.
4. A 6 mm PTFE jump graft was anastomosed to the anterior surface of the stem of the Dacron graft using 6.0 prolene continuous running suture in preparation for the bypass procedure so as to minimise aortic clamp time.

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Fig 1a – Aortogram showing juxta-renal occlusion

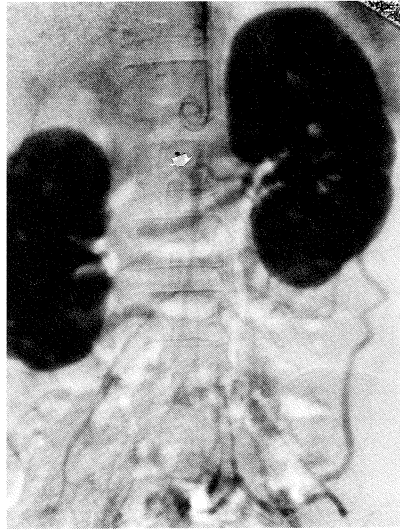


Fig 1b – Aortogram showing reconstituted superior mesenteric artery via collaterals

5. After the clamps have been placed, a vertical aortotomy was made just below the renal arteries and an intra-luminal thrombus above the occluded aorta was removed.

6. The proximal anastomosis of the 16 x 8 Dacron aorto-bifemoral graft to the aorta was done with a 3.0 prolene continuous running suture. The aortic clamp was released and transferred to the stem of the trouser graft. Renal perfusion was thus re-established after 15 minutes.

7. The common femoral, profunda femoris and superficial femoral arteries which were mobilised and controlled with slings and arterial clamps. Vertical arteriotomies were made in the common femoral arteries extending into the profunda femoris and the distal anastomoses of the limbs of the aorto-bifemoral graft which have been tunnelled retro-peritoneally to the groins, were completed using 6.0 continuous running sutures.

8. The proximal superior mesenteric artery was isolated and the patent segment distal to the occlusion was controlled with vessel loops.

9. A segment of the long saphenous vein at the groin was harvested, divided along its length and its longitudinal edge was sewn around the edge of the vertical arteriotomy in the superior mesenteric artery as a Miller collar. This serves to ameliorate the compliance mismatch at the junction of the PTFE graft and the superior mesenteric artery. The anastomosis between the collar and the PTFE graft was performed using 6.0 continuous running prolene suture after curving the graft in a retrograde fashion to avoid kinking, and revascularisation of the bowel was achieved (Fig 2).

Her post-operative recovery was uneventful and she was well enough to be transferred back to her referring centre 10 days later.

At 8 weeks post-surgery, she was completely painfree, able to eat and walk any distance without pain and she had put on 3 kg. All her lower limb pulses were present and her ankle brachial index was 1.1 on the right and 1.0 on the left. She was put on

aspirin 75 mg daily together with her medication for SLE. On subsequent reviews in the clinic after one year, she remained well and symptom-free.

DISCUSSION

This patient's presentation is characteristic of chronic intestinal angina. The pain in this condition occurs very soon after a meal, usually within 30 mins to one hour. This has been postulated to be due to "gastric-steal" of blood from the diseased mesenteric vessels⁽¹⁾. The patient becomes fearful of eating (food-fear) and as a result of abstinence, loses a substantial amount of weight⁽²⁾. This combination of abdominal pain and weight loss mimics malignant disease and the patient would not uncommonly be subjected to extensive tests with negative results. In the face of such a situation, the astute clinician should proceed to image the mesenteric vasculature with biplanar aortogram which should include the proximal usually undiseased aorta and the distal extent of the iliacs if also diseased⁽³⁾, before labeling the patient as "psychosomatic" or embarking on a laparotomy⁽⁴⁾. Other gastrointestinal symptoms⁽⁵⁾ like nausea, vomiting and diarrhoea may sometimes accompany the pain, as may the onset of malabsorption⁽⁶⁾ as in the case of our patient.

It is generally agreed that patients with intestinal angina and weight loss for which other causes have been excluded, with occlusion of 2 of the 3 major visceral vessels on angiography, should be considered for interventional treatment⁽⁷⁾. Our patient had concomitant aorto-iliac occlusions which required simultaneous vascular reconstruction.

Percutaneous transluminal angioplasty for mesenteric lesions alone is also possible, though patients who are symptomatic usually have occluded superficial femoral, coeliac as well as inferior mesenteric arteries with bad arterial disease. In selected cases, the procedure can be successfully performed in

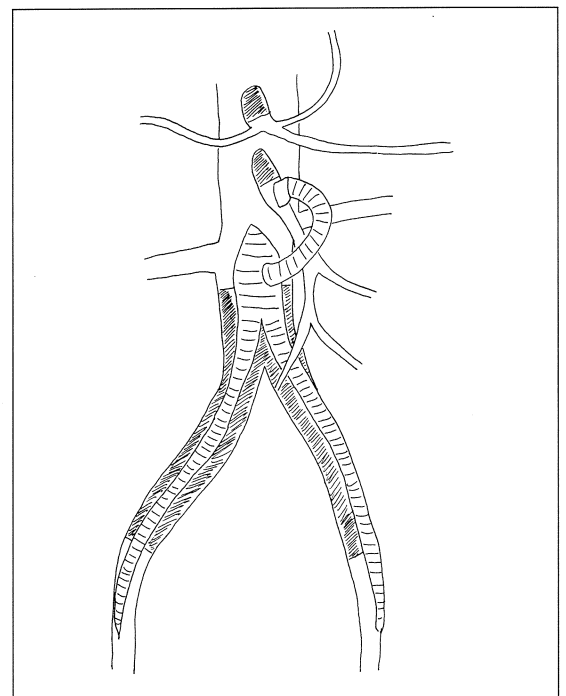


Fig 2 – Aorto-bifemoral bypass with jump graft to superior mesenteric artery on a Miller collar

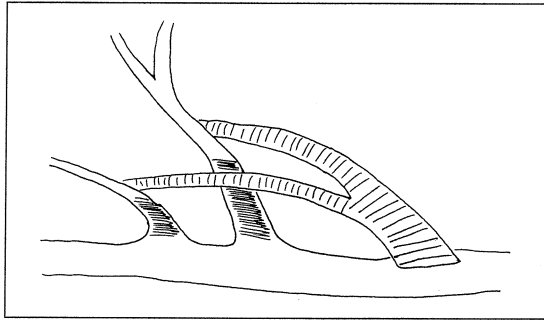


Fig 3 – Antegrade aorto-visceral bypass graft to both coeliac and superior mesenteric arteries

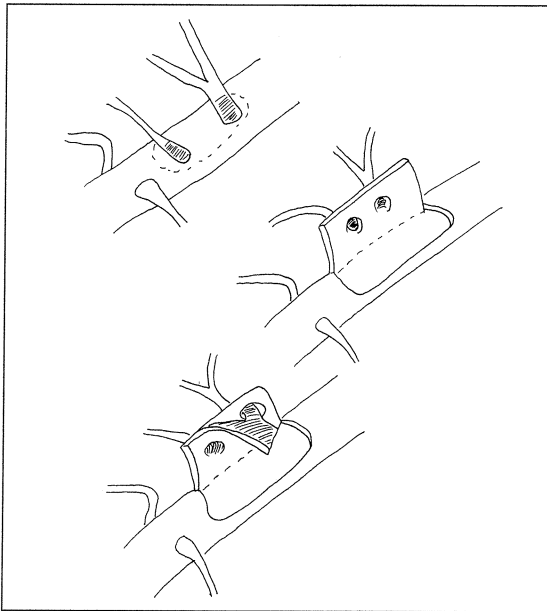


Fig 4 – Aortogram showing reconstituted superior mesenteric artery via collaterals

more than 80% of them with primary patency and relief of symptoms in 75% at a mean follow-up of 2.3 years. However, recurrences are common, sometimes requiring redilatation. They usually occur in 10% – 50% within 4 – 28 months⁽⁷⁻⁹⁾. PTA is probably best reserved for patients with prohibitive risks for open surgery⁽¹⁰⁾.

Operative bypass gives very durable results with primary patency rates of up to 89% at 72 months follow-up with a mortality rate of 7%^(11,12). Though the surgeon is confronted with many options regarding the origin (antegrade or retrograde) of the grafts, graft-type (vein or prosthetic) and number of vessels to revascularise (one or both mesenteric vessels^(13,14)), the trend appears to be towards reconstruction with antegrade position of prosthetic grafts preferably to both visceral vessels^(5,15) (Fig 3). Most series are small with a combination of the various surgical options so it is not possible to make definitive conclusions.

As our patient required an aorto-bifemoral graft for her ischaemic legs, the main modification for her was the creation of a jump graft from the stem of the aorto-bifemoral graft, thus extending the conduit to revascularise not only the limbs but also the bowel.

The other option which gives durable results is transaortic endarterectomy, which is done by the

trans-abdominal route using the medial visceral rotation technique of exposing the aorta (Fig 4). This is especially useful when concomitant renal artery and/or aortic reconstruction is necessary but is associated with a higher peri-operative mortality of up to 14% and more complications, though 86% of the patients remain asymptomatic at 5 years⁽¹¹⁾.

This was not suitable for our patient as the conduct of trans-aortic endarterectomy and aorto-bifemoral bypass would unnecessarily prolong the proximal aortic clamp time as well as the operation as a whole.

CONCLUSION

Though chronic intestinal angina is a rare cause of abdominal pain and weight loss, a high clinical index of suspicion needs to be maintained with prompt imaging of the visceral vessels and early reconstruction⁽¹⁶⁾ which yield satisfying and durable results⁽¹⁷⁾.

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