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## Case Report

# Successful endovascular treatment of severe chronic mesenteric ischemia by concurrent triple-vessel mesenteric artery revascularization

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## ABSTRACT

A 52-year-old man presenting with severely symptomatic chronic mesenteric ischemia had proximal occlusion of the celiac and superior mesenteric arteries and critical stenosis of the inferior mesenteric artery ostium. Concurrent percutaneous revascularization with stenting of all three mesenteric arteries was successfully achieved using techniques tailored to each lesion. Complete clinical recovery was observed at the six-month post-procedure follow-up.

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## 1. Introduction

Endovascular therapy is now considered the first treatment option in most patients with chronic mesenteric ischemia (CMI) secondary to atherosclerotic occlusive disease of the mesenteric arteries.<sup>1–3</sup> In comparison to open surgery, endovascular therapy for CMI has less morbidity, lower or comparable mortality, and shorter in-hospital stay; however it is associated with a more frequent need for re-intervention,<sup>1–5</sup> which could be partly related to incomplete revascularization.<sup>1,4</sup> Obstruction of two or all three mesenteric arteries is usually required to cause CMI, and in keeping with the

surgical principle of revascularizing more than one obstructed mesenteric artery,<sup>6</sup> endovascular treatment of multiple mesenteric vessels improves clinical outcomes.<sup>3,4</sup> However, revascularization of multiple mesenteric arteries frequently entails recanalization of totally occluded arteries, which can be technically challenging. Until now endovascular procedures involving revascularization of mesenteric arteries in CMI have largely been restricted to one or two arteries.<sup>7,8</sup> We report a severely symptomatic case of CMI in which all three mesenteric arteries, two of which were total occlusions, were concurrently and successfully revascularized by endovascular technique.

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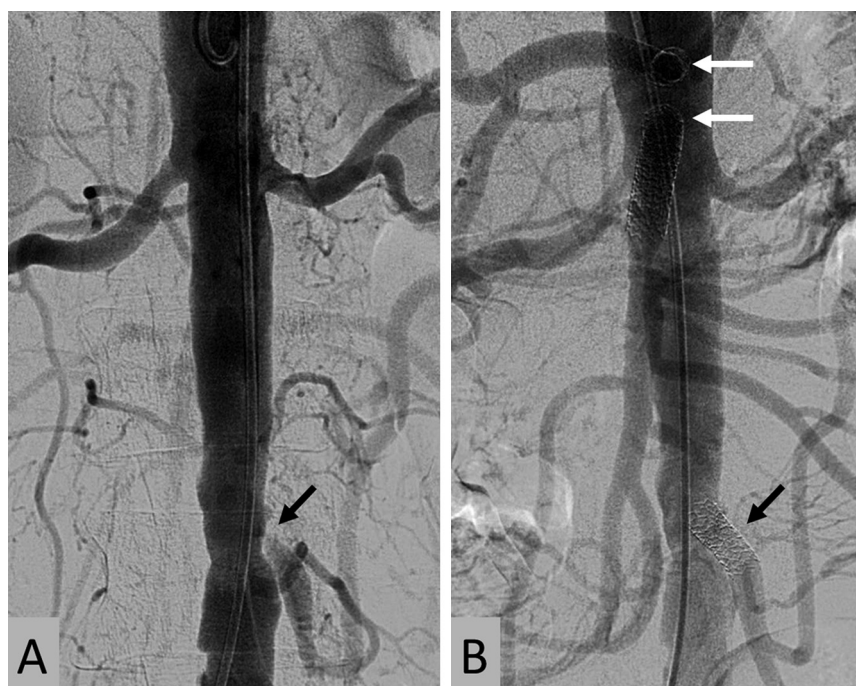
## 2. Case report

A 52-year-old man presented with a history of abdominal pain and occasional vomiting after food intake, associated with progressive loss of weight, for the last two years. He had diabetes mellitus, systemic hypertension, and dyslipidemia, and was a chronic smoker. Physical examination was unremarkable except for significant emaciation (body mass index 16.9 kg/m<sup>2</sup>) and left below-knee amputation from a past accident. Blood tests, abdominal ultrasonography and upper gastro-intestinal endoscopy were non-contributory. CT angiography revealed proximal occlusion of the celiac and superior mesenteric arteries and critical ostial narrowing of the inferior mesenteric artery, with distal patency of all three vessels. Conventional angiography (Figs. 1A and 2A,C) confirmed these findings and also detected non-critical (asymptomatic) coronary artery disease. A percutaneous approach to revascularizing the obstructed mesenteric vessels was preferred in view of the multiple medical co-morbidities.

## 3. Intervention

After obtaining written informed consent, percutaneous 7F right femoral artery access was obtained. 5000 units of heparin was administered. After baseline angiography, the celiac artery ostium was engaged with a 7F Judkins Right guiding catheter and the proximal occlusion was traversed using a 0.014" Conquest wire (Asahi Intecc, Aichi, Japan), after softer wires failed to penetrate the proximal cap. Serial balloon dilatation was followed by implantation of two over-

lapping 6 mm diameter balloon-expandable stents (Dynamic Renal, Biotronik AG, Bulach, Switzerland) of lengths 19 and 12 mm extending distally into the hepatic artery; the second stent was necessary since the first did not cover the celiac artery ostium adequately; the origin of the splenic artery was jailed by the stents, but normal flow into this branch was preserved. Next, using the same guiding catheter, the superior mesenteric artery occlusion was probed and successfully crossed with an angled-tip 0.035" hydrophilic guidewire (Terumo Medical, Somerset, NJ, USA); this wire was changed to a 0.035" Amplatz Superstiff guidewire (Boston Scientific, Marlborough, MA, USA) through a 4F hydrophilic catheter (Terumo); the lesion was dilated and stented using a 8 × 37 mm balloon-expandable stent (Express LD, Boston Scientific) delivered through a 7F long sheath (Ansel, Cook Medical, Bloomington, IN, USA). Lastly, the ostial stenosis of the inferior mesenteric artery was crossed using a soft hydrophilic 0.014" wire (Fielder, Asahi) and stented with a 6 × 18 mm balloon-expandable stent (Express SD). In all the arteries treated, stent diameters were matched with the normal vessel beyond the lesion and stent length was chosen to ensure coverage from the aortic lumen to the normal vessel just distal to the lesion. Final angiography (Figs. 1B and 2B,D) showed a good result in all three mesenteric vessels, with no residual stenosis or dissection and rapid flow into the distal branches. The sheath was removed immediately and hemostasis was obtained by manual compression. The total fluoroscopy time was 46 mins and 250 ml of iodinated contrast was used. The hospital stay was uneventful and the patient was discharged after two days without any complication. The patient's symptoms were completely relieved by the procedure. There was rapid



**Fig. 1 – Abdominal aortograms in antero-posterior projection. A. Baseline angiogram showing atherosclerotic abdominal aorta, severe ostial stenosis of the inferior mesenteric artery (arrow) and non-visualization of the celiac and superior mesenteric arteries. B. Post-stenting angiogram showing recanalized celiac and superior mesenteric arteries (upper and lower white arrows respectively) and stented inferior mesenteric artery (black arrow).**

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