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A case report

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Extra-anatomic iliac to superior mesenteric artery bypass after bridge endovascular treatment for chronic mesenteric ischemia. A case report

A 60 year old patient presenting chronic mesenteric Ischemia (CMI) was managed with superior mesenteric artery (SMA) stenting as bridge therapy to conventional open surgery. At 5 months follow-up, the SMA stent occluded. During this bridge period the patient gained his general condition and the body mass index (BMI) increased from 18 to 22. The patient was managed subsequently with iliac-SMA bypass in C-loop configuration. At 6 months follow-up the bypass is patent, the patient has no CMI symptoms and his BMI is 25. The endovascular approach did not preclude a subsequent conventional open surgery and it can be safely employed as bridge therapy. An improved patient clinical condition, also during a limited bridge period, can improve the conventional open surgery outcomes.

KEY WORDS: Body Mass Index(BMI), Mesenteric artery, Mesenteric ischemia

Introduction

Chronic mesenteric ischemia (CMI) is a rare disease with an estimated incidence of about 1/100000 patient. CMI presents generally in patients aged over 60 years and it is three times higher in women [1,2]. Abdominal symptoms related to CMI generally manifest when at least two mesenteric arteries are stenotic or occluded[3,4]. Patients with CMI are subject to a poor general state of health due to malnutrition that occurs with weight loss in 84% to 100% [5]. The open treatment (OT) for CMI is a well-established treatment option since 1958. When compared to endovascular treatment (ET), the OT has a higher mortality and morbidity rate but it requires fewer reinterventions and it has higher long-term patency [6]. In patients considered unfit for conventional open treatment; ET can be employed as bridge therapy to OT.[7] Herein we report a case where a bridge ET failed and OT was employed before the end of the bridge period.

Case Report

A 60 year old Caucasian male with history of hypertension (without any medical treatment), myeloma, PAD and polidistrectual atherosclerosis disease was admitted to our Institution for post prandial angina abdominis and severe unintentional weight loss [body mass index (BMI)= 18].
Abdominal pain symptoms onset was reported two months before hospitalization but any correlation with food intake was evident at that time. During this period the patient lost 10 kg and his general health state worse. At admission the CT-Angiography (CTA) showed

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a significant preocclusive (90%) SMA stenosis, a severe celiac trunk stenosis (70%) and an occluded inferior mesenteric artery. In addition, a significant stenosis of the right external iliac artery (EIA) was evident. The patient was managed successfully with SMA stent implantation (6x17mm; EV3 Visi-Pro Plymouth, MN, USA) with no residual stenosis at 1 month CTA follow-up (Fig. 1). After two months the patient underwent to stent implantation (8x30mm; Invatec Scuba, INVATEC S.p.A., Roncadelle, IT) in correspondence of the right EIA. At 3 months follow-up from SMA stent implantation the patient was asymptomatic and started to improve body weight (BMI=21). The duplex sonography (DUS) showed regular patency of stents in SMA and right EIA. After 5 months, the patient was readmitted with diffuse abdominal pain in all quadrants and the CTA showed complete occlusion of the SMA stent (Fig. 2); BMI in that period was 22. The patient was managed with a retrograde iliac-SMA extra anatomic bypass. Briefly, after midline incision the SMA was exposed through the small omentum. The SMA identified at palpation due to the stent presence arising from beneath the inferior border of the pancreas. The small omentum was incised and the omentum retrocavity opened. The II segment of the SMA exposed distally to the occluded stent in order to preserve the middle colic artery. The left external iliac artery was employed as inflow source after standard isolation. A 5000 UI heparin bolus was administered intravenously. A 8 mm reinforced PTFE graft was employed for bypass construction and it was anastomosed proximally in end-to-side fashion after SMA distal clamping (Fig. 3A). The graft was arranged in a "C-loop" configuration allowing an antegrade anastomosis to the SMA. This was tunnellizzed through the omentum cavity behind the basement of the transverse colon (Fig. 3B). Subsequently the bypass was

Fig. 1: Maximal intensity projection CT Angiography showing regular stent patency in superior mesenteric artery at 1 month follow-up.

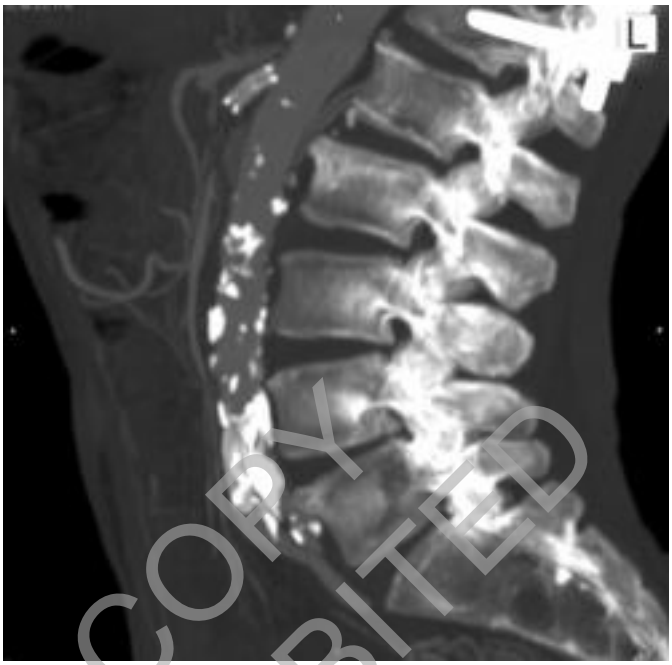
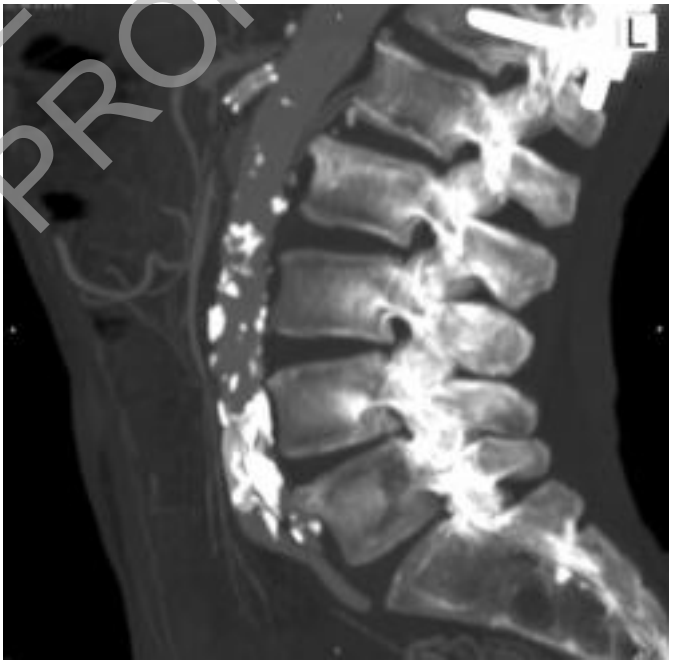


Fig. 2: Maximal intensity projection CT Angiography at 5 months showing superior mesenteric artery stent occlusion with distal recanalization.



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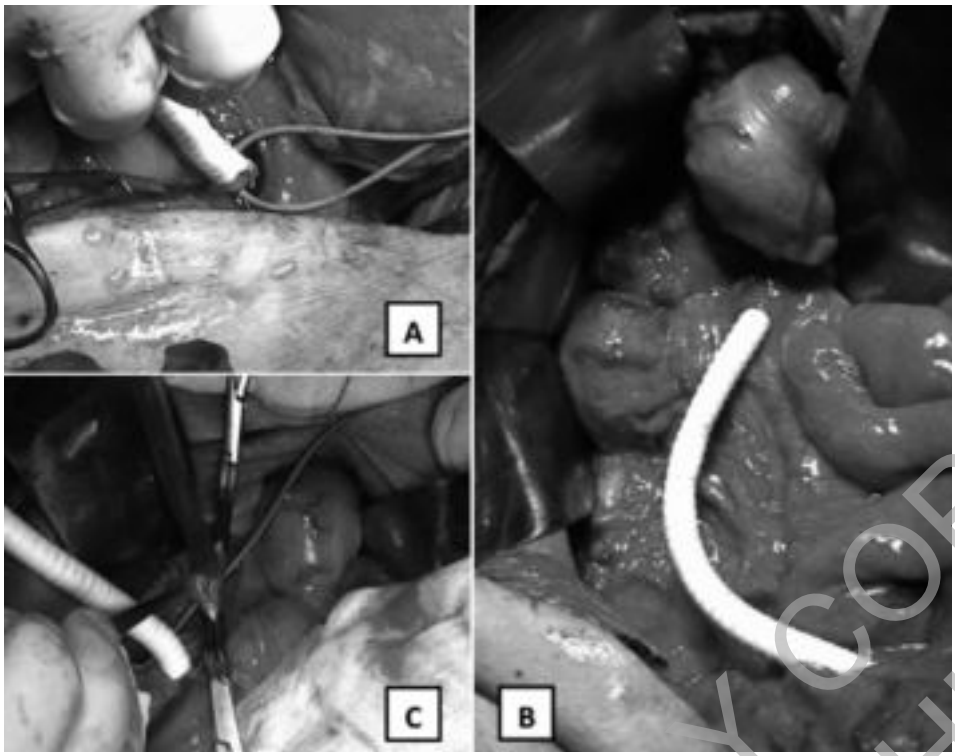

Fig. 3: Intraoperative findings. A) Proximal end-to-side anastomosis in correspondence of patent distal superior mesenteric artery. B) Bypass 'C-loop' configuration. C) Distal end-to-side anastomosis in correspondence of external left iliac artery.

Fig. 4: CT Angiography 3-dimensional volume rendering at 6 months follow-up showing regular bypass patency and 'C-loop' configuration.

anastomosed distally to the left external iliac artery in end-to-side fashion (Fig. 3C). The patient was extubated after 6 hours and no perioperative complications were registered. On the 7 postoperative day the patients was discharged with no abdominal symptoms. At six months CTA follow-up the bypass is patent with no signs of stenosis (Fig. 4) and the BMI improved to 25.

Discussion

CMI is affecting an increasing number of individuals possibly as the result of the aging population.[8] Initials CMI symptoms as post-prandial abdominal pain with eventual diarrhea, constipation, steatorrhea, nausea or vomiting can be followed by atrophic gastritis, malnutrition (with aggressive BMI decrease) leading to death. CMI symptoms represent clear indications to treatment as they are reported in more than 40% of patients who will present acute mesenteric ischemia [9].

As reported by Foley et al. single bypass grafting aorta to the superior mesenteric artery (SMA) is effective and durable for treating CMI when compared to multiple visceral bypasses. However, the major limitation of this approach is related to the aortic clamping and its complications [10]. The ET for CMI has increased in last years and has been reported as first choice treatment in some centers.[11] This approach has been related to lower periprocedural mortality and morbidity when compared to conventional surgery, and can be considered as the first treatment option in CMI patients with severe malnutrition and considered unfit for conventional surgery [7]. The ET has a technical success rate of 92-100%, a periprocedural mortality rate of 0-10% and complication rate of 0-25%; however ET primary patency represent an issue with a reported 2-year stent primary patency of 30-90% [6,8,9,12].

By contrast open surgical mesenteric revascularization has technical success rates close to 100%, and 5-year patency ranges between 76% and 94%. However, postopera-

tive complication rates reach 33% - 57%, and early mortality rate are high (5.1% - 13%).[10] Primary open surgical treatment is indicated in cases with low/moderate surgical risk and with long life expectancy. Conversely primary ET should be indicated in cases considered at high risk for conventional surgery and/or with short life expectancy. Moreover ET could be employed as bridge therapy in CMI patients with long life expectancy that are considered at high risk for conventional surgery for reversible conditions such as malnutrition status [7].
In this case the patient relative young age was a clear indication for conventional open treatment but the poor clinical conditions were against it, thus a bridge ET to conventional open repair was chosen. The ET was effective to improve patient clinical condition during the bridge period (BMI increases from 18 to 22) and the conventional open treatment was not precluded.

Conclusion

In CMI patients, the bridge ET does not preclude a subsequent conventional open surgery in visceral arteries. In young patients considered at high risk for conventional surgery, the ET treatment should be employed as bridge therapy. Despite the limited ET patency, it was a valid tool to improve patient clinical condition and the outcomes of the conventional open surgery.

Riassunto

Un uomo di 60 anni con ischemia mesenterica cronica (CMI) è stato trattato con una terapia 'bridge' verso una terapia di chirurgia open tradizionale, mediante stenting dell'arteria mesenterica superiore (SMA). Al follow-up a 5 mesi lo stent della SMA è andato incontro ad occlusione. Durante questo periodo 'bridge' il paziente ha migliorato le sue condizioni generali e il suo indice di massa corporea (BMI) è incrementato da 18 a 22. Il paziente è stato sottoposto successivamente ad intervento chirurgico di bypass iliaco-SMA in configurazione 'C-loop'. Al follow-up a 6 mesi il bypass è pervio, il paziente non riferisce sintomatologia di CMI ed il suo BMI è di 25. Il trattamento endovascolare non ha precluso una successiva riparazione chirurgica e può essere impiegato in maniera sicura come terapia 'bridge'. Un miglioramento delle condizioni cliniche, anche durante un limitato periodo 'bridge', può migliorare i risultati della terapia chirurgica tradizionale.

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