



## Celiac Artery Stenting without Guide Catheter: Bare Wire Stenting

Ayhan Olcay<sup>1\*</sup>, Vedat Ertunc<sup>1</sup> and Elif Gumus<sup>1</sup>

<sup>1</sup>Department of Cardiology, Dogan Hastanesi, Istanbul, Turkey.

### Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

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Case Study

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### ABSTRACT

Chronic mesenteric ischemia is the most common vascular disorder of the intestines though it is rarely observed in daily clinical practice. Presence of multiple collateral arteries between the superior mesenteric artery and the inferior mesenteric artery is the most likely explanation for the infrequent occurrence of chronic mesenteric ischemia in clinical practice. Atherosclerosis is the most common cause of chronic mesenteric ischemia. The increased utilization of computed tomography and magnetic resonance imaging of abdominal vasculature has increased the diagnosis of the atherosclerotic mesenteric stenosis. Chronic mesenteric ischemia is a clinical diagnosis; it is based upon symptoms and should be supported by anatomic findings. Endovascular therapy has been increasingly utilized for chronic mesenteric ischemia, furthermore early outcomes compare favorably with open mesenteric bypass. Our case study depicts a female patient aged 69 years presenting with post-prandial abdominal discomfort that results in significant weight loss. We here present a case of celiac artery stent restenosis treated by percutaneous transluminal angioplasty and later stenting over bare. 035 inch hydrophylic wire without a guide catheter or sheath because guide catheter was damaged at distal end and stent was not advancable through guide catheter.

\*Corresponding author: E-mail: [drayhanolcay@gmail.com](mailto:drayhanolcay@gmail.com);

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## 1. INTRODUCTION

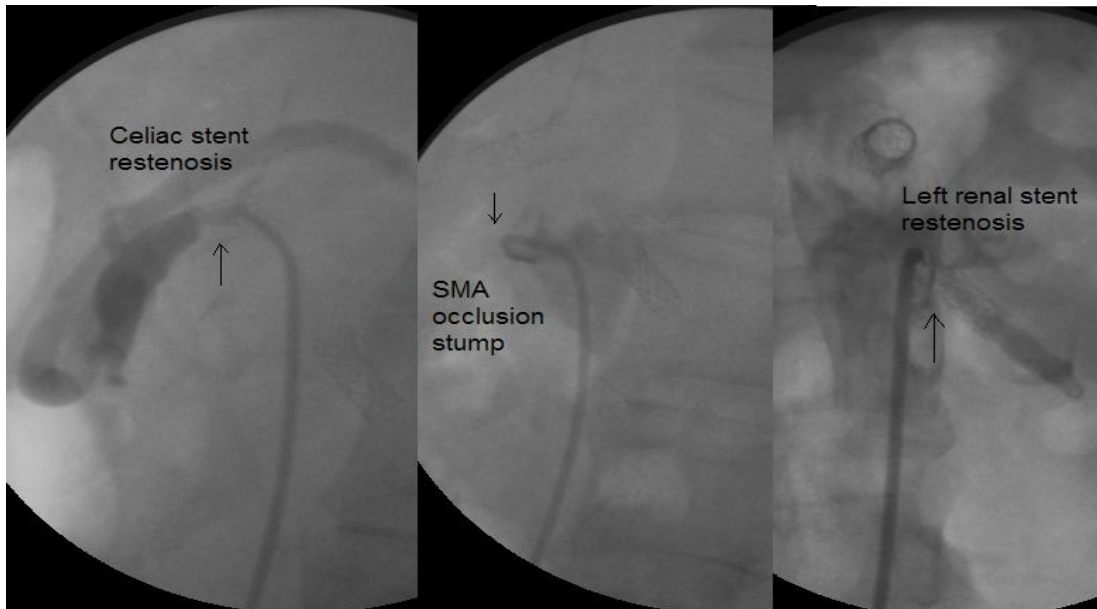
Chronic mesenteric ischemia (CMI) is a rare diagnosis in everyday clinical practice although it is a relatively common vascular disorder of the gastrointestinal tract. CMI diagnosis is grounded on symptoms such as epigastric or umbilical postprandial pain, fear of eating (sitophobia), weight loss, history of vascular disease involving other organs (eg, myocardial infarction, cerebral vascular disease, or peripheral vascular disease). Other nonspecific symptoms include nausea, vomiting, diarrhea, constipation and flatulence. Endovascular mesenteric revascularization therapy decreased morbidity and mortality compared to open surgical procedures, such as bypass and thromboendarterectomy. Early publications have reported higher rates of restenosis, symptomatic recurrence and reinterventions but recent case series present comparable patency rates [1]. While asymptomatic mesenteric vascular occlusive disease (MVD) occurs frequently in patients with established vascular risk factors, it can progress to symptomatic mesenteric ischemia especially in patients with two- and three-vessel disease.

## 2. PRESENTATION OF CASE

A 69 year old woman with postprandial epigastric and periumbilical pain associated with significant weight loss, food fear and chronic renal failure was evaluated in internal medicine department. Abdominal magnetic resonance (MR) angiography revealed severe stenosis at celiac artery superior mesenteric artery (SMA) while inferior mesenteric artery (IMA) was open. Aorta was diffusely atherosclerotic, right renal artery was totally occluded and left renal artery had severe stenosis. The patient had essential thrombocythemia treated with hydroxyurea as a comorbid factor. Abdominal ultrasonography showed an atrophic right kidney and a normal left kidney. Percutaneous transluminal angioplasty (PTA) and stenting of celiac artery stenosis and left renal artery stenosis were performed. The patient was asymptomatic after the intervention and discharged. She was on clopidogrel 75 mg/day and aspirin 100 mg/day. She presented with the same symptoms 8 months

later. Biochemical tests revealed high creatinine level (2.2 mg/dl). She was on clopidogrel 75 mg/day and aspirin 100 mg/day during 8 months. For evaluation of a possible recurrence of CMI direct angiographic imaging and subsequently intervention was planned after hydration of the patient. Patient's informed consent was obtained and a diagnostic arteriography was performed through right femoral approach. All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal. All authors hereby declare that procedure was examined and approved by the appropriate ethics committee and was therefore performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Diagnostic angiography revealed a severe narrowing of the celiac stent, a total occlusion of the superior mesenteric artery and severe restenosis of left renal artery stent (Fig. 1). 5000 U of heparin was administered after 7F Judkins right coronary guiding catheter (Medtronic) was advanced to celiac ostium. Aspirin 300 mg and prasugrel 60 mg were given before the procedure. A 0.035 inch 260 cm hydrophilic radiofocus M Terumo angled guidewire was advanced across the lesion. Lesion was dilated by Admiral Xtreme 7x20 mm balloon at 12 atm 2 times but there was still residual narrowing at ostium. Implantation of a stent (Assurant Cobalt, Medtronic, 7x20 mm) was attempted but stent could not be advanced at distal portion of guide catheter. In order not to lose wire position we withdrew the guide catheter and advanced same stent on bare 0.035 inch wire to the narrowing (Fig. 2). Stent was successfully implanted and balloon withdrawn and ostium of the stent flared at high atmosphere. After withdrawing stent balloon we reinserted same guide catheter and saw no residual narrowing at celiac artery (Fig. 3). Interventions to partially occluded left renal artery and totally occluded SMA were performed successfully by routine techniques. A total of 180 ml contrast was used during the procedure.



**Fig. 1. Diagnostic angiography showing severe celiac stent restenosis, totally occluded superior mesenteric artery and severe stent restenosis in left renal artery**

Patient was hospitalized for two days and discharged without any complication. Her creatinine levels dropped from 2.2 mg/dl to 2 mg/dl next morning and postprandial symptoms disappeared. Prasugrel 10 mg/day, aspirin 300 mg/day, hydroxyurea 500 mg/day, allopurinol 300 mg/day, rosuvastatin 10 mg/day, valsartan 160 mg/day were prescribed. We planned to continue prasugrel treatment for a year and life long treatment with aspirin avoid any thrombosis issue. On her 3<sup>rd</sup> month follow up she was asymptomatic and her creatinine was 2.5 mg/dl.

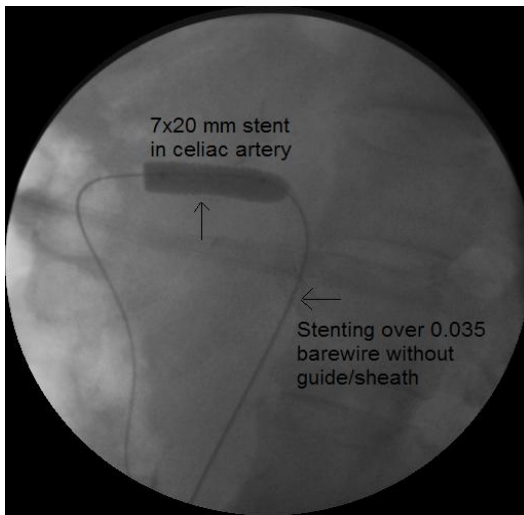
### 3. DISCUSSION

The presence of total occlusions represents a major obstacle to successful endovascular treatment of MVOD. Total occlusions are commonly encountered in symptomatic MVOD patients, especially patients presenting with the acute syndromes. Despite the growing experience and skills in the endovascular management of MVOD, total occlusion of the mesenteric vessels continues to be controversial, and is even considered an indication for open surgery in the setting of symptomatic MVOD. Coaxial support using a flexible sheath is crucial in transfemoral procedures. Once a stable platform was achieved, the lesion is passed with an appropriate catheter/glide wire combination. The most useful combinations are multipurpose angiographic catheter/angled glide wire for a

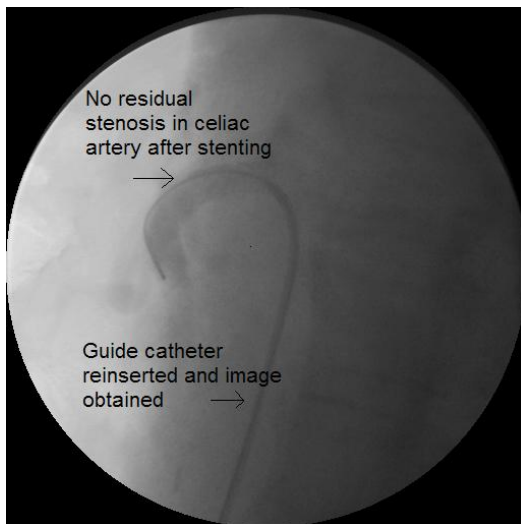
brachial approach, or Simmons-1 or -2 catheter/angled glide wire for a transfemoral approach [2]. We did not have necessary sheath and guiding catheters and therefore tried to implant the stent over bare .035 inch wire.

Intermediate (3-year) follow-up indicates that significant restenosis and symptom recurrence are common following endovascular treatment of symptomatic CMI. Thirty percent of the cohort required a reintervention, one-third of which were conversions to surgical reconstruction. Similar to the surgical paradigm of two-vessel revascularization, endovascular treatment of multiple mesenteric arteries produced better outcomes. A first-line endovascular approach to patients with CMI is a reasonable clinical strategy, but close follow-up is mandatory [3]. Stent implantation is an alternative, safe, and reliable strategy for the treatment of chronic mesenteric ischemia, especially for patients at high surgical risk. However, in-stent restenosis (the Achille's hill of bare metal stent) may occur in up to 20% of cases at 6 months and 53% at 1 year. Our case showed severe narrowing despite large caliber stents (7 mm diameter stent in celiac and 5 mm stent in left renal) implanted in previous intervention. While intervening on celiac restenosis we recanalized totally occluded SMA to prevent a catastrophic situation in case restenosis recurs in celiac artery. A sheath-less stenting technique using self expandable nitinol

stents by Shintani et al. [4], reduced the access site incidence of pseudoaneurysm and did not increase other access site complications. Besides, this technique shortened hemostatic time and bed-rest time. Although in some endovascular aortic aneurysm cases balloon expandable large stents were positioned over stiff .035 inch guidewires to the best of our knowledge a case/study which used balloon expandable stent with sheathless technique in peripheral interventions over a hydrophilic soft guidewires which have less support was not presented before.



**Fig. 2. Stenting of celiac artery without a guide catheter over bare wire**



**Fig. 3. Celiac artery after stenting without any residual stenosis. Images obtained by reintroducing 7 Fr guide catheter**

Our case is different from Shintani's technique by use of balloon expandable stent instead of self expandable stent and use of "bare wire stenting" terminology instead sheath-less technique. We named this technique as "bare wire stenting" and we think it is a useful terminology for interventional literature.

Our technique of stenting over bare wire should be kept in mind when operator meets a problem in advancing the stent through sheath or catheter. Long sheaths, guides and long shafts stents are not available for femoropopliteal interventions from radial artery. Bare wire stent implantation may also find an application in iliofemoral interventions from radial artery when bony landmarks, vessel calcifications allow precise stent placement.

#### 4. CONCLUSION

With "bare wire stenting" technique target arteries should be wired from radial or femoral artery with 6 Fr catheters, ballooning done through guiding catheter and if bony landmarks or vessel calcifications allow and the operator is sure of guidewire support 6 Fr catheter may be removed and lesion stented over barewire. Control images should be obtained by reintroducing the catheter.

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#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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