Primary Stenting of the Superior Mesenteric Artery for Treatment of Chronic Mesenteric Ischemia

A Case Report

Andrew R. Forauer, MD*
and Gordon K. McLean, MD†

ST. LOUIS, MISSOURI and PITTSBURGH, PENNSYLVANIA

ABSTRACT

Percutaneous transluminal angioplasty (PTA) has been well described in the treatment of mesenteric artery stenoses but has met with limited success in ostial lesions. The authors describe a case of a 79-year-old woman diagnosed with chronic mesenteric ischemia associated with a 22-pound weight loss and postprandial pain. The celiac axis and inferior mesenteric artery were occluded. A high-grade, calcified stenosis was present in the proximal superior mesenteric artery. This was treated with primary stent placement using a Palmaz stent deployed from an axillary approach. A brief discussion of mesenteric ischemic and visceral artery PTA is included.
Introduction

Traditionally, the treatment of critical mesenteric ischemia requires major vascular surgical reconstruction. Percutaneous transluminal angioplasty (PTA) has been used to dilate stenoses in the mesenteric vessels, but because of elastic recoil, visceral artery angioplasty has enjoyed only a limited success in treating ostial lesions. We describe a case in which primary stenting of the ostial segment of the superior mesenteric artery (SMA) was performed for the treatment of chronic debilitating mesenteric ischemia.

Case Report

The patient was a 79-year-old woman who presented with severe postprandial pain and a 22-pound weight loss. A diagnosis of vasculogenic mesenteric ischemia was made on the basis of the clinical history and an angiogram performed at an outside facility. The aortogram showed a 70% calcified stenosis in the proximal SMA (Figure 1). The celiac axis and inferior mesenteric artery were occluded. The patient was referred to our institution for interventional therapy in light of poor left ventricular function and increased surgical risk.

Because of the acute (15 degree) angle formed by the SMA and the aorta, a left axillary approach was selected. Anteroposterior and lateral abdominal aortograms performed with a 5 French pigtail catheter showed severe atherosclerotic disease with diffuse, grumous-appearing plaques. The pigtail catheter was exchanged for a long, 7 French sheath (Medi-tech/Boston Scientific, Watertown, MA), and 1,500 units of heparin were administered intraarterially. An angled catheter (MPA; Cook, Inc., Bloomington, IN) was used to select and engage the SMA. A superior mesenteric angiogram showed a short segment stenosis, 10 mm in length, beginning 5 mm from the aortic wall. There was a moderate amount of calcification within the plaque. A 0.018 inch, platinum-tipped, tapered guidewire (TAD; Mallinckrodt Medical, St. Louis, MO) was used to cross the narrowed portion of the artery. The lesion was predilated with a 4 mm x 4 cm angioplasty balloon (Boston Scientific, Watertown, MA) and stented with a 4 mm x 10 cm Palmaz-Schatz stent (Johnson & Johnson Interventional Systems, Warren, NJ).

Figure 1.
Lateral aortogram demonstrating a high-grade stenosis in the proximal superior mesenteric artery. The celiac axis and inferior mesenteric artery were occluded.
low-profile angioplasty balloon (Ultrathin; Medi-tech/Boston Scientific, Watertown, MA). A 15 mm, medium Palmaz stent (P 154M; Johnson & Johnson, Warren, NJ) was hand crimped on a 5 mm x 2 cm PTA balloon (PE-MT; Medi-tech/Boston Scientific, Watertown, MA) and deployed across the stenosis. Postdeployment angiograms demonstrated stable stent position without evidence of dissection (Figure 2). The patient was able to eat on the morning following the procedure without pain.

She remained symptom free for 3 months, after which she began to experience recurrent postprandial pain. Six months after initial stent placement, an angiogram showed recurrent stenosis within the stent, narrowing the lumen to a diameter of less than 2 mm. In retrospect, this failure was felt to be secondary to insufficient dilation at the initial stent deployment. Via a left brachial approach, the Palmaz stent was dilated to 6 mm with a 6 mm x 4 cm low-profile balloon (Symmetry; Medi-tech/Boston Scientific, Watertown, MA) (Figure 3). Four months later, she remains asymptomatic.

Discussion

Mesenteric ischemia may be present as an acute or chronic process. The acute form is a surgical emergency with a high associated mortality rate.\textsuperscript{10-12} The chronic form, while not immediately life threatening, is a very debilitating illness for the affected patient. There are three visceral arterial distributions supplying the large and small bowel, and it is believed that occlusive disease must affect two or more of the arterial systems to produce symptoms.\textsuperscript{13} Symptomatic relief can generally be achieved with repair or revascularization of a single visceral trunk. The surgical approach is, however, not without morbidity and mortality.\textsuperscript{14}

The most extensive experience with PTA of visceral vessels has been with renal arteries, where technical and clinical success rates can approach 90%.\textsuperscript{15} Failures have been most often associated with ostial lesions secondary to the inherent elastic recoil of the aortic wall.\textsuperscript{16} Because of this, primary stenting of ostial renal artery lesions is frequently performed in current practice.
PTA for treatment of chronic mesenteric ischemia has been reported in several case reports and series. Technical successes have ranged from 30% to 100% with immediate clinical successes of 75%–100%. A review of the literature found several recent reports of stent placement in the SMA. In two cases, stent placement was used to treat ischemia caused by aortic dissections. Ozdil described post-PTA stent deployment in a patient with Takayasu’s arteritis. Most recently, Waybill and Enea used stent placement as a salvage of failed PTA in a patient with chronic mesenteric ischemia who was a poor operative candidate. Stent placement in the celiac artery has been performed for the treatment of chronic mesenteric ischemia.

Our decision to pursue primary stenting in the case reported here was based on two factors. First, the morphology of the stenosis; the plaque throughout the aorta and within the proximal SMA was very irregular and densely calcified. The proximal margin of the stenosis was 5 mm from the aortic wall, in essence an ostial lesion. This morphology classically does not respond ideally to PTA and theoretically may be at a higher risk of distal embolization. Second, it was felt that a post-PTA dissection would not be well tolerated by the patient, who had surgical morbidity risk factors (left ventricular ejection fraction of approximately 20%). An axillary approach assisted in decreasing the catheter/stent manipulation needed through a severely diseased aorta and its acute angle formed with the SMA.

Andrew R. Forauer, MD
Department of Radiology
St. Louis University Health Sciences Center
3635 Vista at Grand
St. Louis, MO 63110-0250
References


