

# Cannulation of Peripheral Vasculature With Unfavorable Anatomy or Stenosis

The Morph catheter may be used in orifices that were unable to be cannulated with standard sheaths.

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**E**ndovascular procedures have greatly improved over time as a result of the development of advanced interventional devices that facilitate easier access to aortic branches with difficult anatomy or severe ostial stenosis. Many times, the primary reason for failure of a particular procedure is the inability to gain access into the aortic branches with a guide catheter or guide sheath. Additionally, passing the access system is likely an independent risk factor due to possible trauma to the aorta, aortic arch, or the branches proximal to the area to be addressed. Access may also be limited by severe aortoiliac disease, stenosis of the native ostium, or even a previously stented branch.<sup>1-3</sup>

A unique deflectable-tip guide and sheath line, Morph (BioCardia, San Carlos, CA), was developed to provide a pathway through which medical instruments such as balloon dilation catheters, guidewires, or other therapeutic devices may be introduced into the peripheral or coronary vasculature. The Morph catheter family is a fully scalable platform. Physicians can benefit from the ability to navigate the catheter through tortuous anatomy, customize the shape to the patient's anatomy and to their clinical needs during the procedure, and have good backup support once positioned (Figure 1).<sup>4</sup> In this article, we present two cases in which this system was used

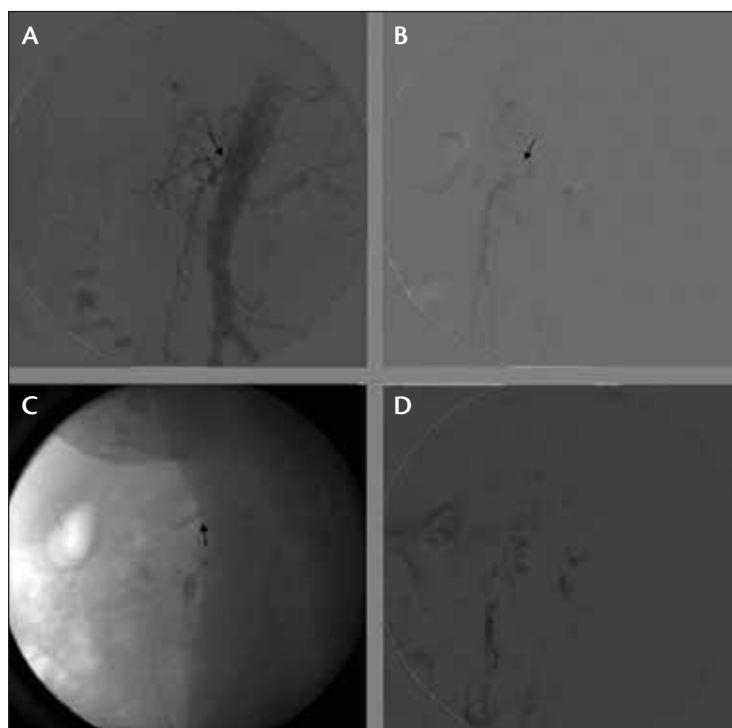


Figure 1. Morph AccessPro 6-F deflectable sheath.

to cannulate orifices that were unable to be accessed with standard sheaths.

## CASE 1

The first case is an 85-year-old woman who underwent previous percutaneous transluminal angioplasty and stenting of a high-grade superior mesenteric artery (SMA) stenosis for mesenteric ischemia 2 years prior. The procedure was difficult due to the high-grade stenosis and acute angle of the SMA. However, the procedure was successfully completed from a femoral approach using a 6-F Ansel sheath (Cook Medical, Bloomington, IN) and a 7- X 18-mm balloon-expand-



**Figure 2.** Use of the Morph catheter for cannulation and treatment of stenosed SMA in an 85-year-old woman. Abdominal aortogram showing severe angulation of the SMA and area of stenosis in the proximal segment of the stent (A). Access of the SMA with a reversed curved catheter and advancement of wires through the catheter were successful, but placement of standard sheaths to the orifice were unsuccessful due to poor back-end support (B). Balloon angioplasty of the proximal stent (C). Posttreatment SMA angiogram showing good expansion of the stent with minimal residual stenosis (also demonstrated by repeat intravascular ultrasound) through the Morph 6-F deflectable catheter (D).

able Herculink stent (Abbott Vascular, Santa Clara, CA) using rapid exchange on a 0.014-inch wire. The patient was followed with serial duplex imaging. On 24-month follow-up, spectral analysis showed a fasting peak systolic velocity of 354 cm/sec with end diastolic velocity of 65 cm/sec. Clinically, the patient was complaining of early satiety, but there was no evidence of any weight loss.

Based on the surveillance imaging and clinical symptoms, it was elected to proceed with arteriography and possible intervention. Arteriography confirmed the high-grade in-stent stenosis of the vessel. The vessel was cannulated, and multiple attempts to place a standard sheath to the level of the vessel were unsuccessful. Attempts were made with 0.035- and 0.014-inch wires as well as telescoping techniques from a femoral approach. The failure was due to a lack of back-end support around the acute angle with the stent slightly hanging out of the orifice.

A 6-F Morph AccessPro sheath was then inserted over a 0.035-inch Supracore wire (Abbott Vascular, Santa Clara, CA) to the level of the SMA. Using the deflectable catheter, a 0.018-inch Steelcore wire (Abbott Vascular) was advanced past the lesion. Once the Morph was in place, it allowed placement of a 6-mm X 2-cm Angiosculpt balloon (AngioScore, Inc., Fremont, CA) to cross and successfully dilate the lesion. Completion angiography and 6-F intravascular ultrasound confirmed an increased luminal gain, and both were performed through the 6-F Morph AccessPro sheath (Figure 2).

## CASE 2

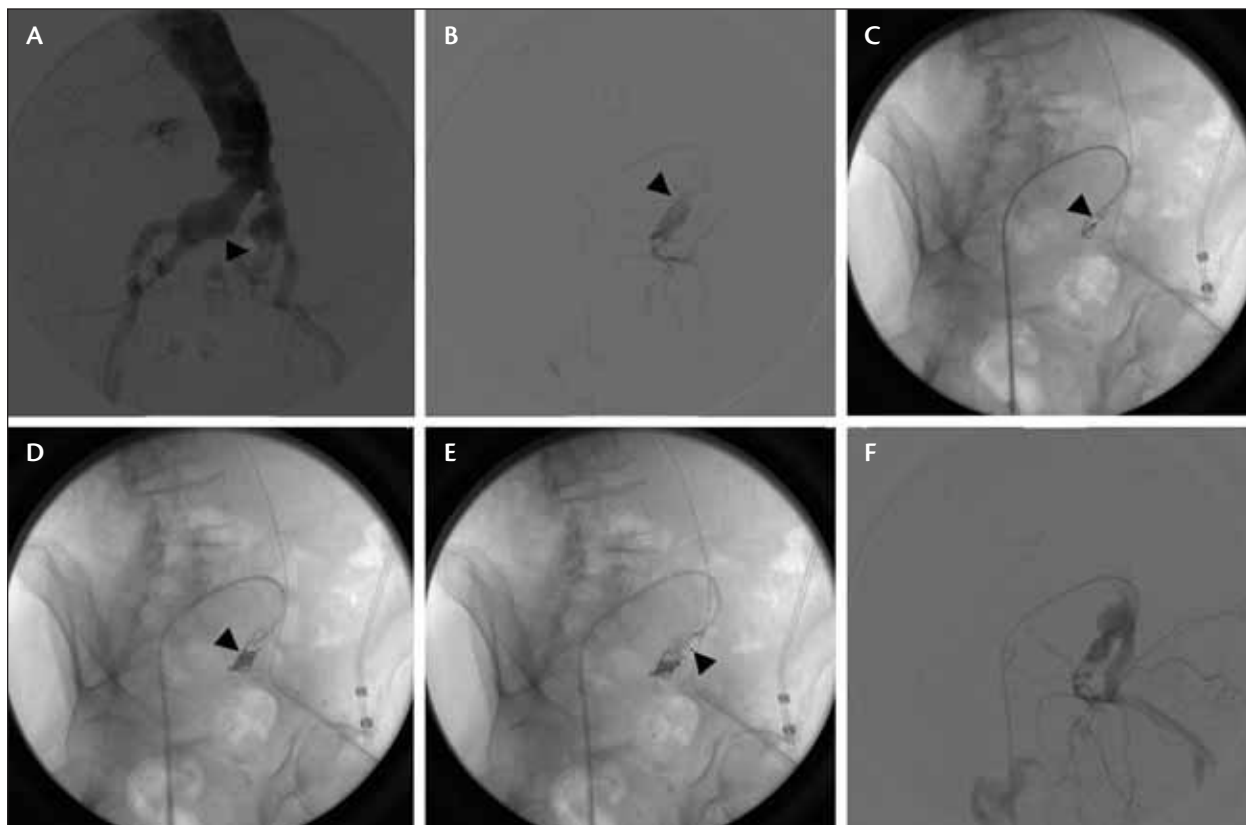
An 83-year-old man with an infrarenal abdominal aortic aneurysm (AAA) and a left common iliac aneurysm required placement of an infrarenal Talent stent graft (Medtronic, Inc., Minneapolis, MN). To achieve a distal landing zone, the stent graft needed to be extended to the level of the left external iliac artery, and the left internal iliac artery needed to be embolized. Due to severe tortuosity, it was elected to access the contralateral side. The 6-F Morph sheath was advanced to the aortic bifurcation and deflected to advance a Glidewire (Terumo Interventional Systems, Somerset, NJ) into the left common iliac artery and left internal iliac artery, and a Glide catheter (Terumo Interventional Systems) was advanced over the wire. A telescoping technique was then used to advance the 6-F

Morph AccessPro sheath into the left internal iliac artery.

With the sheath and the catheter within the internal iliac artery, multiple coils were advanced through the catheter, and the distal aspect of the left internal iliac artery was occluded. A 16-mm Amplatzer plug (AGA Medical Corporation, Plymouth, MN) was advanced through the Morph sheath and placed at the orifice. The deflectable sheath gave excellent support for the plug to be advanced (Figure 3).

## DISCUSSION

Since becoming available in 2002, Morph deflectable catheters have been used successfully in a wide variety of applications. The clinical utility demonstrated may reduce procedure times, thus reducing x-ray exposure for the physician and patient. The system enables physicians to control the catheter in real-time, requiring fewer catheter exchanges.



**Figure 3.** Selective catheterization of the left hypogastric artery in an 83-year-old man with an infrarenal AAA with bilateral common iliac artery aneurysms. Aortogram with iliofemoral runoff (A). Aneurysmal dilatation of the left hypogastric artery (B). Selective catheterization of the left hypogastric artery from the right common femoral artery second-order catheterization using a 6-F Morph sheath (C). Coil embolization of the left hypogastric artery using three 0.035-inch 10-mm X 14-cm coils delivered through the Morph sheath (D). Placement of a 16-mm Amplatzer plug (E). Control angiogram of the left hypogastric artery (F).

The Morph AccessPro steerable introducer system received US Food and Drug Administration clearance in 2009 and was developed for use in procedures associated with peripheral access. This new system is an arterial access steerable conduit with a profile small enough to be used in routine peripheral artery disease (PAD) procedures and an inner lumen large enough to deliver the equipment necessary for treating PAD or cannulating difficult access sites, as demonstrated in the two previously discussed cases. We have successfully placed stents, atherectomy devices, laser systems, and balloons through the steerable introducer system. For PAD cases, the AccessPro system has the potential to enable the first steps in a standard limb access procedure to be performed more quickly with less equipment, reducing procedure costs, which includes rapid contralateral access by simply steering the introducer over the aortic bifurcation and advancing a wire down through the contralateral iliac system. ■

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