

# Hybrid Treatment for Common Femoral Artery Disease and CLI

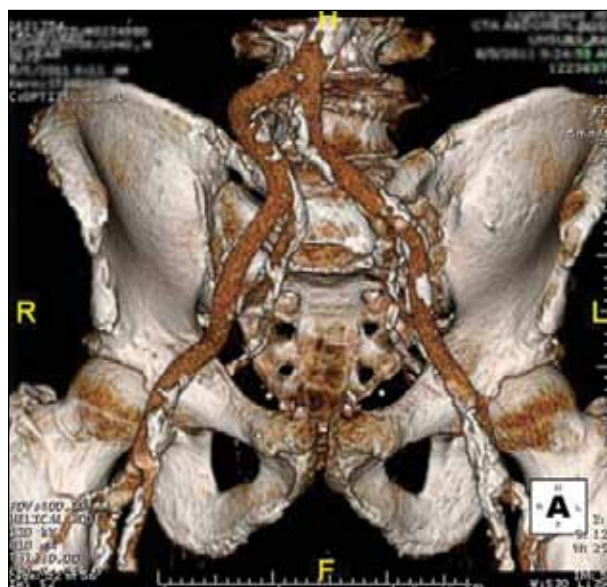
A case report illustrating the successful management of multilevel complex peripheral vascular lesions using a hybrid technique.

**BY TRACY N. HUYNH, MD; AKHILESH K. JAIN, MD; JEFFREY E. INDES, MD, FACS;  
AND CARLOS MENA-HURTADO, MD, FACC, FSCAI**

Patients with multilevel occlusive disease, especially those who are high-risk surgical candidates, may benefit from a combined hybrid surgical and endovascular intervention. This minimally invasive approach consists of a relatively low-risk common femoral endarterectomy followed by endovascular intervention to restore both inflow and outflow at multiple levels, thereby obviating the need for a complex open surgical procedure. A combined hybrid approach maintains favorable patency and limb salvage rates and is an effective option for the treatment of severe iliac and femoral occlusive disease.

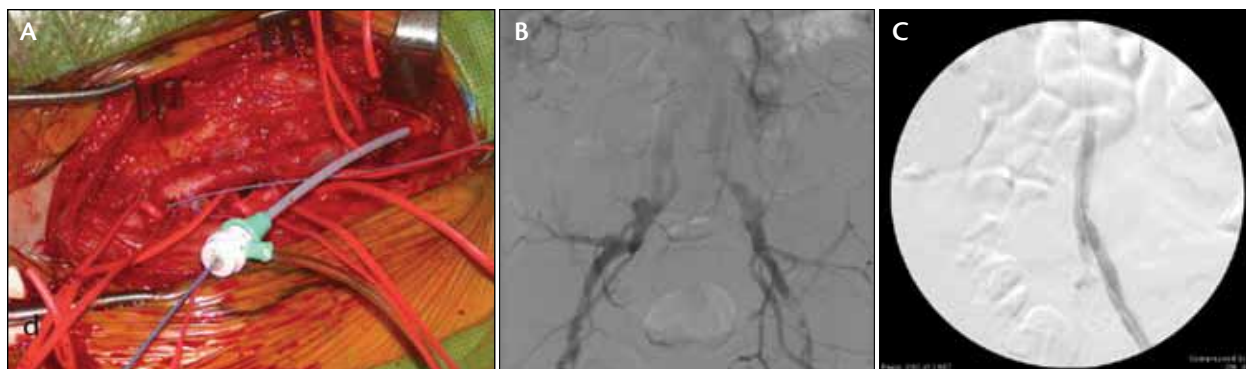
## CASE REPORT

A 64-year-old man presented with Rutherford class 3 claudication. He had progressive, lifestyle-limiting claudication in his left leg and was able to ambulate < 150 feet. His past medical history included coronary artery disease, hypertension, hyperlipidemia, and carotid endarterectomy. He had recently undergone thrombolysis of a right femoral-to-popliteal vein bypass for recurrent claudication secondary to occlusion of the vein bypass. Computed tomographic angiography demonstrated high-grade and heavily calcified stenosis in his proximal left external iliac and common femoral arteries (Figure 1). The ankle-brachial index on the left was 0.58.



**Figure 1.** Computed tomographic angiography demonstrating the severe bilateral femoral and iliac disease.

The patient was scheduled for hybrid revascularization of his left leg. We initially performed left common femoral artery endarterectomy with bovine pericardial patch angioplasty. Silastic loops were placed around



**Figure 2.** Initial sheath placement directed toward the pelvis (A). Iliac angiography prior to angioplasty (B). Completion angiography of the pelvis through the sheath in the patch (C).

the left common femoral, superficial femoral, and profunda femoris arteries for vascular control. Antegrade flow to the left leg was established at this time for the subsequent endovascular component.

A standard arterial needle was used to puncture the bovine pericardial patch, and a 0.035-inch starter wire was advanced up the iliac vessel. A short 6-F sheath was inserted at this site (Figure 2A). Under direct fluoroscopic guidance, a Bentson wire (Cook Medical, Bloomington, IN) was used to deliver a 4-F Omniflush catheter (AngioDynamics, Inc., Queensbury, NY) into the descending aorta, and pelvic angiography was performed. This demonstrated heavy calcification and severe stenosis of the left external iliac artery (Figure 2B). The lesion was predilated using a 6- X 40-mm Rival balloon (Bard Peripheral Vascular, Inc., Tempe, AZ) followed by placement of an 8- X 60-mm self-expanding LifeStent (Bard Peripheral Vascular, Inc.). The stent was then postdilated using a 8- X 40-mm Rival balloon. Completion angiography showed complete resolution of the stenosis with good inflow (Figure 2C).

A second short (7-F) sheath was then placed through the pericardial patch; however, this was directed distally

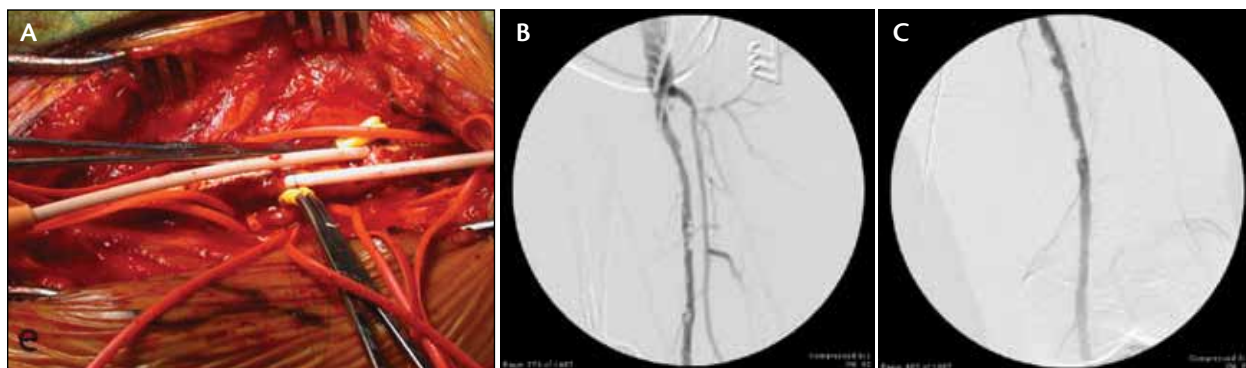
---

This case illustrates the successful management of multilevel complex peripheral vascular lesions using a relatively minimally invasive hybrid approach.

---

into the superficial femoral artery (SFA) (Figure 3A). Left lower extremity angiography showed diffuse high-grade stenosis of the left SFA and above-knee popliteal artery with heavy calcification (Figure 3B and C). There was three-vessel runoff to the ankle. A 0.014-inch Whisper wire (Abbott Vascular, Santa Clara, CA) through the 7-F sheath was used to cross the left SFA lesion. This wire was exchanged for a 0.014-inch Viper wire (Cardiovascular Systems, Inc., St. Paul, MN) using an angled hydrophilic catheter.

Rotational atherectomy was then performed using a Jetstream G3 SF device (Bayer Radiology and Interventional, Indianola, PA) with 2.1- and 3-mm burs. This was followed by balloon angioplasty of the



**Figure 3.** Two sheaths through the patch (A). Initial angiography of the SFA with diffuse calcified plaque (B) and of the SFA-popliteal region with diffuse plaque (C).



Figure 4. Completion angiography of the SFA (A), SFA-popliteal region (B), and the trifurcation (C).

atherectomized segments using a 6- X 100-mm Rival balloon. Three overlapping self-expanding LifeStents (two 6 X 150 mm and one 6 X 50 mm) were placed in the left SFA and postdilated using a 6- X 150-mm Rival balloon. Completion angiography showed widely patent left external, common femoral, and superficial femoral arteries with three-vessel runoff to the ankle (Figure 4).

The patient had an uneventful recovery in the postoperative period and was discharged home on postoperative day 2. Currently, the patient is 3 months post-procedure and is asymptomatic in terms of peripheral vascular disease.

## DISCUSSION

This case illustrates the successful management of multilevel complex peripheral vascular lesions using a relatively minimally invasive hybrid approach. Patients with multilevel occlusive disease, especially those who are high-risk surgical candidates, are most likely to benefit from a hybrid surgical and endoluminal intervention. Femoral endarterectomy alone in our patient would be an inadequate procedure and would have a high risk of acute thrombosis secondary to poor inflow and poor outflow. A purely surgical option for this patient would commit him to a femoral crossover bypass or an aortofemoral bypass. In addition to being more invasive and opening the contralateral groin on the uninvolved side, the procedure may still be compromised secondary to poor outflow.

The combination of a relatively low-risk femoral endarterectomy with a concomitant endovascular atherectomy and stenting of his iliac and superficial femoral arteries provided the patient with both a durable inflow and outflow result, thus addressing his multilevel disease while minimizing operative mortality. This allows multilevel revascularization even in high-risk sur-

gical patients while maintaining favorable patency and limb salvage rates. As would be expected, femoral endarterectomy plays a central role in such procedures.<sup>1</sup> In a retrospective review, Piazza et al reviewed their experience with hybrid procedures and concluded that iliac artery stenting combined with open femoral endarterectomy is as effective as open surgical reconstruction for severe iliac and femoral occlusive disease.<sup>2</sup> ■

*Tracy N. Huynh, MD, is an interventional cardiology fellow at Yale New Haven Hospital, Section of Cardiovascular Medicine, Yale University School of Medicine in New Haven, Connecticut. She has disclosed that she has no financial interests related to this article.*

*Akhilesh K. Jain, MD, is a vascular surgery fellow at Yale New Haven Hospital, Section of Vascular Surgery, Yale University School of Medicine in New Haven, Connecticut. He has disclosed that he has no financial interests related to this article.*

*Jeffrey E. Indes, MD, FACS, is Assistant Professor of Surgery and Radiology and Associate Program Director of the Vascular Surgery Residency/Fellowship, Yale University School of Medicine in New Haven, Connecticut. He has disclosed that he has no financial interests related to this article.*

*Carlos Mena-Hurtado, MD, FACC, FSCAI, is Assistant Professor of Medicine and the Medical Director of Vascular Medicine, Section of Cardiovascular Medicine, Yale University School of Medicine in New Haven, Connecticut. He has disclosed that he has no financial interests related to this article. Dr. Mena-Hurtado may be reached at carlos.mena-hurtado@yale.edu.*

1. Dosluoglu HH, Lall P, Cherr GS, et al. Role of simple and complex hybrid revascularization procedures for symptomatic lower extremity occlusive disease. *J Vasc Surg.* 2010;51:1425-1435.e1.

2. Piazza M, Ricotta JJ 2nd, Bower TC, et al. Iliac artery stenting combined with open femoral endarterectomy is as effective as open surgical reconstruction for severe iliac and common femoral occlusive disease. *J Vasc Surg.* 2011;54:402-411.