Interventional radiologists at Penn Medicine are performing endovascular revascularization procedures to advance wound care in patients with critical limb ischemia (CLI).

CLI, an end-manifestation of peripheral arterial disease, is defined as occlusion of the peripheral arteries with the manifestation of “rest pain” and tissue loss. Untreated CLI is invariably progressive, leading to diffuse limb ulceration, necrosis and gangrene, and to correspondingly high rates of morbidity, amputation and mortality. Rates of mortality for CLI at five years approach 50%. [1]

For patients with symptomatic CLI, as demonstrated by angiogram, the goals of management include timely resolution of pain, wound healing, limb preservation, maintenance of limb function, ambulatory status and survival.

At Penn Interventional Radiology, the standard of care for patients with CLI includes surgical and interventional revascularization. Recent reports suggest no difference between these modalities in overall mortality, rates of amputation or amputation-free survival at ≥2 years. [2] Patency and vascularization of the pedal arch is associated with improved wound healing and limb salvage in patients with CLI, and for this reason, interventional angioplasty is often a preferred strategy for patients requiring wound management for partial amputation (i.e., transmetatarsal amputation).

CASE STUDY
Mr. M, a 60-year-old male with diagnosed critical limb ischemia, had a transmetatarsal amputation (TMA) for non-healing ulcers of the foot at a community hospital near his home. Unfortunately, even with a negative pressure wound therapy device in place, the stump of the TMA failed to heal, preventing closure of the wound. Two days after the procedure, an angiogram at the hospital demonstrated no flow in the anterior tibialis and peroneal arteries, with minimal flow to the foot through the distally occluded posterior tibialis (Fig. 1). Concerned that the lack of wound healing would lead to necrosis and the possibility of full amputation, Mr. M’s vascular surgeon referred him to Penn Interventional Radiology for a consultation.

After a discussion of his options, Mr. M agreed to have an angioplasty procedure to open the blockage in the posterior tibialis artery. This procedure was successful, and blood flow was restored to the foot. However, the most distal aspect of the posterior tibialis artery remained blocked, and subsequent attempts to close the TMA flap failed due to lack of perfusion. Following further discussion, Mr. M opted for a distal pedal angioplasty revascularization.

During the procedure, a microcatheter was introduced into the foot and advanced under x-ray guidance through the posterior tibialis into the lateral plantar, pedal arch and dorsalis pedis arteries. A long-segment angioplasty revascularization of the posterior tibialis artery was then performed which included the pedal arch (Fig. 2).

Marked improvement in blood flow was seen post-angioplasty (Fig. 3), and Mr. M was discharged the next day to home. In the weeks following the procedure, his TMA stump healed completely.

References
FACULTY TEAM
The specialists with the Interventional Radiology Division at Penn Medicine offer the diagnosis and treatment of a variety of diseases using minimally invasive techniques. In addition to dedicated IR suites, the Division has an active outpatient clinic, as well as admitting and consulting services.

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