Isolated Tibiopedal Arterial Access for Minimally Invasive Retrograde Revascularization

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ABSTRACT: A 71-year-old male with history of coronary artery disease, peripheral arterial disease, ulcerative colitis, and chronic thrombocytopenia presented with acute onset of severe right lower-extremity claudication characterized by rest pain and a cold leg. The patient was treated using the tibiopedal arterial minimally invasive retrograde revascularization technique due to lack of alternative access with excellent outcomes.

Key words: peripheral vascular disease, atherectomy, claudication, stenting

A 71-year-old male with history of coronary artery disease, peripheral arterial disease (PAD), ulcerative colitis, and chronic thrombocytopenia presented with acute onset of severe right lower-extremity claudication characterized by rest pain and a cold leg. He had recently undergone a complex endovascular intervention of the right superficial femoral artery (SFA) 1 week prior with atherectomy, cutting balloon angioplasty, and stenting with excellent angiographic result. However, the procedure was complicated by access site bleeding in the left common femoral artery (CFA) requiring prolonged compression followed by covered stent placement in the left CFA for hemostasis. Upon current presentation, he stated that he had stopped taking his antiplatelet medications due to the left groin bleeding and bruising and on examination was found to have nonpalpable pulses in the right popliteal artery and pedal pulses only present on Doppler. Computed tomography angiogram of the lower extremities confirmed occlusion of the distal right SFA stent with reconstitution of the right infrapopliteal segment via collaterals. He was started on anticoagulation with heparin infusion and brought to the angiography suite for further evaluation and management.

Due to the lack of contralateral CFA access secondary to prior bleed and covered stent placement, history of chronic thrombocytopenia, and increased risk of recurrent access bleed with antegrade access, the decision was made to obtain retrograde pedal access for revascularization. Using ultrasound guidance and a micropuncture access kit (Cook Medical), a 6 Fr sheath was placed in the right posterior tibial (PT) artery (Figure 1). Selective angiogram through
the transpedal sheath confirmed distal popliteal occlusion extending into the PT with collateral filling of the anterior tibial artery (Figure 2). The popliteal occlusion was crossed using a glidewire and support catheter into the proximal SFA. Selective angiogram from this segment confirmed occlusion of the SFA at the distal edge of the previous stent (Figure 3). Rheolytic thrombectomy (Medrad Interventional) was performed through the occluded segment followed by balloon angioplasty with improvement in flow and small residual distal stent edge dissection (Figure 4). A Supera self-expanding stent (Abbott Vascular) was placed in overlapping fashion at the distal SFA stent edge with excellent angiographic result (Figure 5) and brisk runoff into the PT (Figure 6). Hemostasis was achieved in the posterior tibial artery access site using a RadAR compression de-
The patient was discharged home the following day with dual antiplatelet therapy regimen for an indefinite duration.

**DISCUSSION**

Endovascular therapy has become increasingly effective for treatment of PAD with evolution of technology and techniques. However, there have been limitations includ-
ing lack of adequate vascular access, bleeding complications at access site, and renal impairment from excess contrast use.\(^1\) Recently, the tibiopedal arterial minimally invasive retrograde revascularization (TAMI) technique was described to mitigate these risks and expand the safety of endovascular therapy.\(^2\) The TAMI technique can be considered for patients who are not candidates for vascular bypass surgery or conventional retrograde or antegrade CFA access, and in scenarios where no other alternative access is safe or feasible.

The TAMI technique utilizes a single transtibial artery access using a micropuncture access kit and placement of a transpedal sheath. The entire angiography and revascularization procedure is then performed via retrograde approach from the tibiopedal access. Access preservation is critical with intra-arterial vasodilators to prevent vasospasm and anticoagulation to prevent thrombosis by maintaining activated clotting time of 250-300 seconds. Hemostasis is achieved easily by manual compression or use of radial compression devices.

The average posterior tibial artery is known to be 2.7 mm compared to 2.3 mm radial arteries.\(^3,4\) The transradial approach to coronary angiography and interventions has already demonstrated superior outcomes while reducing the cost burden of vascular complications compared to traditional transfemoral approaches.\(^5\) Just as radial arterial access for coronary interventions has been proven to be safe and effective with minimal risk in patients with preserved palmar arch, TAMI can be performed safely if patients are appropriately selected with preserved pedal arch and adequate distal outflow into the foot. A small study of 23 patients that underwent TAMI revascularization has demonstrated the safety and feasibility of this technique.\(^6\)

Our patient was treated using the TAMI technique due to lack of alternative access with excellent outcomes. Larger studies are needed to further validate safety and efficacy of this technique.

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**REFERENCES**