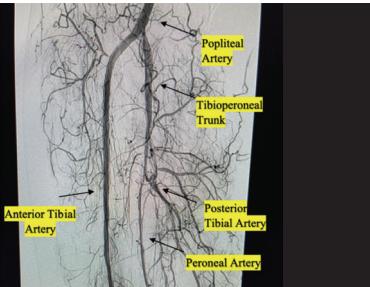


Cath Lab Digest

A product, news & clinical update for the cardiac catheterization laboratory specialist



CASE REPORT

Single Transpedal Access and Novel Use of Equipment During Multivessel Infrapopliteal Revascularization

Mehreen F. Ali, HSII; Amal Khan, MSII; Som A. Bailey, DO; Akif Azmi Mohammed, MD, MRCP, FACC

Below-the-knee retrograde access or transpedal access has become increasingly popular for peripheral interventionalists. Access through the pedal arteries may offer benefits in peripheral intervention that are similar to the transradial approach in coronary intervention when both are compared to the transfemoral approach.^{1,2} One major benefit may be a lower risk of bleeding complications, including retroperitoneal bleed. Many operators can successfully access the pedal artery from the ankle or foot, and revascularize a below-the-knee vessel as well as inflow arteries through a single access site.³

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ORIGINAL RESEARCH

Nurses' Compliance and Confidence With a Hand-Off Process for Patients Post Femoral Arterial Access Before and After a Standardized Approach

Melissa Anderson, MSN, RN, CCRN; Amanda Urosek, RN, BSN, CVRN-BC; Wendy Shaffer, BSN, RN; Virginia Iscrup, BS, BSN, RN, PCCN

This study encompassed the Intensive Care Unit (ICU), Step Down Unit (SDU), and Progressive Care Units (PCU), along with the Heart Center staff, at Excela Health Westmoreland Hospital in Greensburg, Pennsylvania, which includes three community hospitals with 578 licensed beds. There are approximately 50 patients monthly who receive femoral arterial access for procedures in the Heart Center and who are then transferred to an inpatient critical care unit.

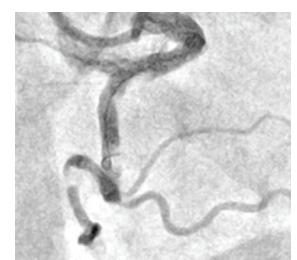


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CASE REPORT

Pushing Boundaries: Transradial Access for Complex PCI

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Utilizing Single Transpedal Access and Novel Use of Coronary Wires, Support Catheter and Balloons for Navigating Acute Angles During Complex Multivessel Revascularization of Infrapopliteal Vessels

Mehreen F. Ali, HSIII; Amal Khan, MSIII; Som A. Bailey, DO; Akif Azmi Mohammed, MD, MRCP, FACC

However, due to the acute angle bifurcation/trifurcation of the tibioperoneal trunk, it can be challenging to intervene on multiple below-the-knee vessels from a single access point when using a transpedal approach. In this setting, it may be easier to intervene from the contralateral transfemoral approach.⁴ Our case describes a successful multivessel revascularization in a patient with lower limb ischemia, high bleeding risk, and previous femoral access site complications. We utilized a novel technique involving a single-access pedal approach incorporating coronary wires, balloons, and support catheters, which offered better flexibility in navigating the acute angle bifurcation of

the infrapopliteal vessels than the use of standard peripheral devices.

Case Report

An 82-year-old male presented to our hospital with acute right lower-extremity pain. His comorbidities included severe aortic stenosis for which he underwent transcarotid transcatheter aortic valve replacement (TAVR) six months prior, coronary artery disease with rotational atherectomy and stenting of his right coronary artery seven months prior, a 50-pack-year history of tobacco abuse, essential hypertension, stage III chronic kidney disease, and type II diabetes mellitus. In

addition, he had a longstanding history of chronic peripheral artery disease with severe iliac tortuosity, calcification, and stenosis, with bilateral superficial femoral artery (SFA) occlusion. One month post TAVR, he had been complaining of right lower extremity limb pain even at rest. He underwent right lower extremity angiography and was found to have a stenosis involving the right external iliac, SFA, and anterior tibial artery that required a complex intervention via the right pedal artery and contralateral femoral approach. The intervention was complicated by a left femoral hematoma that resolved without surgery or intervention. Six months post peripheral intervention, he presented to the hospital with acute limb ischemia. He was found to have occlusion of his right SFA stent and no flow in the tibioperoneal vessels on Doppler. He was urgently brought to the cath lab for a peripheral angiogram.

Angiographic Findings

Transpedal right anterior tibial artery access was obtained using ultrasound guidance with a “dry stick”, and the initial angiogram through the sheath showed a chronic total occlusion (CTO) of the anterior tibial artery, with faint collateral flow to also-occluded peroneal and posterior tibial arteries (Figure 1). A subsequent selective angiogram was performed through a Rubicon support catheter (Boston Scientific), advanced from the transpedal sheath to the right external iliac artery. An angiogram with runoff to the foot showed

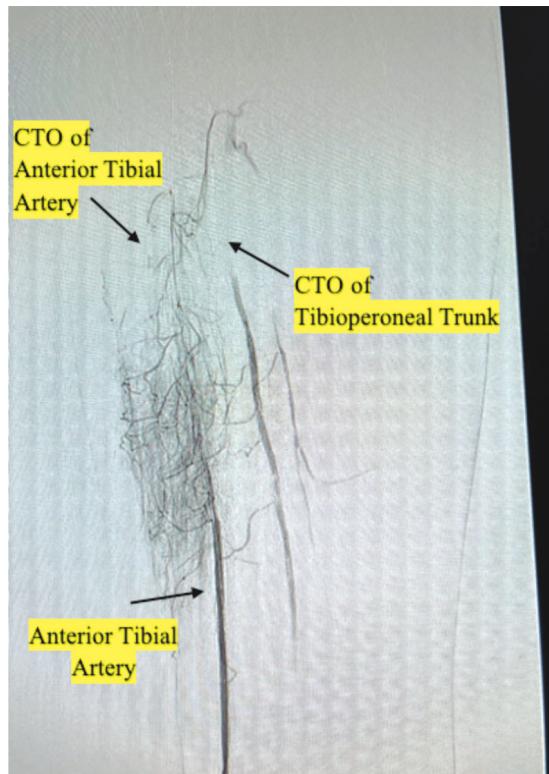


Figure 1. Peripheral angiogram of right lower extremity showing a chronic total occlusion (CTO) of the anterior tibial artery, with some collateral flow to also-occluded peroneal and posterior tibial arteries.

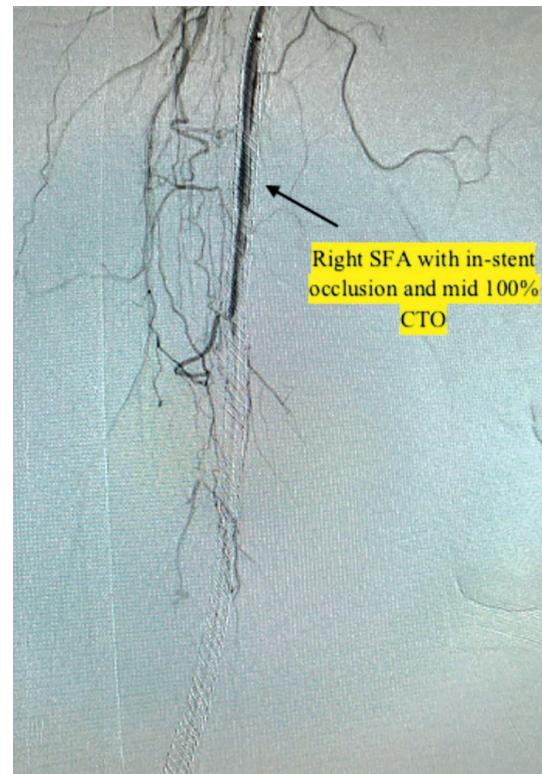


Figure 2. Peripheral angiogram of the right lower extremity showing a right mid-superficial femoral artery (SFA) 100% chronic total occlusion (CTO) with in-stent stenosis.

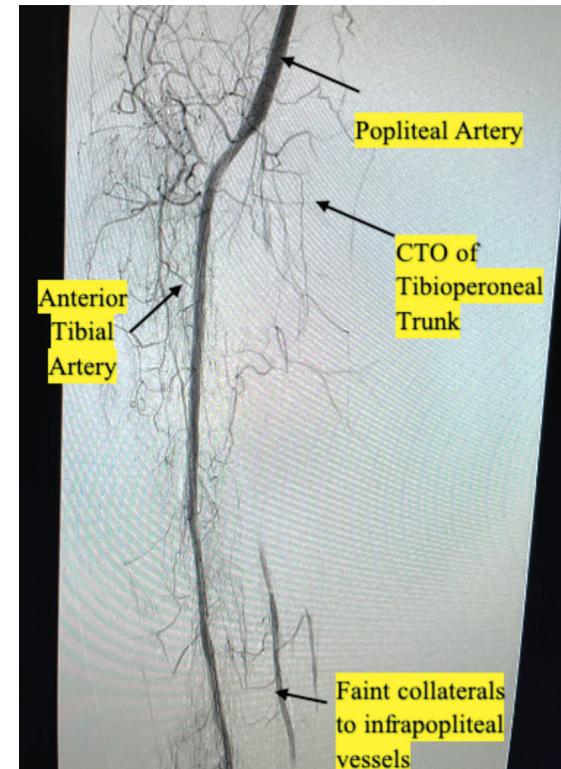


Figure 3. Peripheral angiogram of right lower extremity showing revascularized right superficial femoral artery and anterior tibial arteries. There is residual occlusion of the tibioperoneal trunk at the ostium with occlusion of the posterior tibial and peroneal arteries.

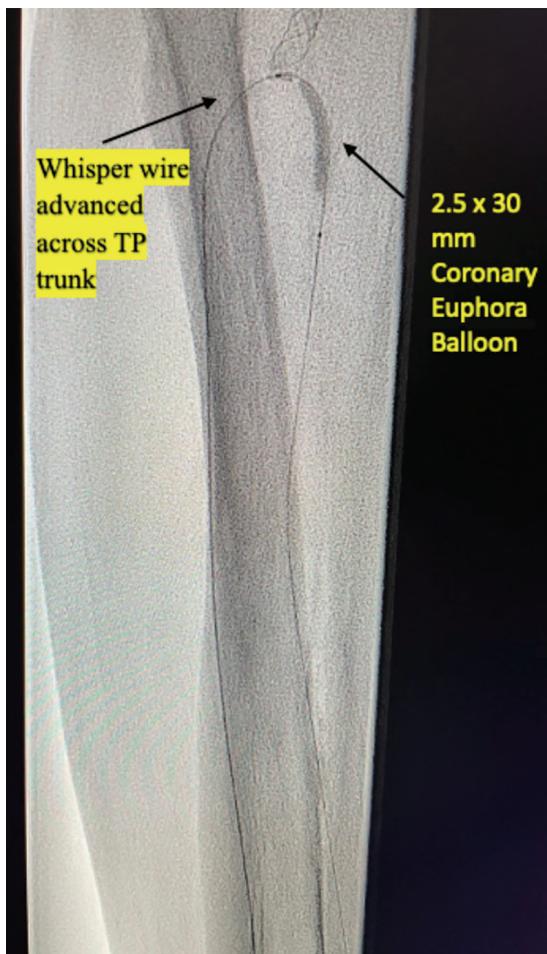


Figure 4. Hi-Torque Whisper wire (Abbott Vascular) across the acute angle of the tibioperoneal (TP) trunk occlusion and advanced all the way down the peroneal artery.

the right SFA had a mid 100% CTO with in-stent restenosis. In addition, the anterior tibial artery was 100% chronically occluded, and the peroneal and posterior tibial arteries were 100% chronically occluded (Figure 2).

Intervention

After reviewing the angiographic findings, the decision was made to intervene on the anterior tibial artery and SFA. Given the patient's previous groin access complications along with his significant iliac tortuosity, we proceeded using only the single transpedal access obtained during the initial peripheral angiogram. An .009-inch Rotawire (Boston Scientific) was advanced into the right external iliac artery from the pedal sheath. We performed rotational atherectomy of the chronically occluded SFA and popliteal artery, followed by percutaneous transluminal angioplasty of the right anterior tibial artery and SFA CTO. At this point, we observed good flow in the right SFA and anterior tibial arteries, with a reduction of the stenosis from 100% to 0%. However, the tibioperoneal trunk was still occluded at the ostium (Figure 3). We attempted to advance several wires from the anterior tibial artery across the tibioperoneal trunk. We initially attempted to cross using our traditional peripheral wires, which include the Choice PT extra support (Boston Scientific) and Hi-Torque Command (Abbott Vascular) guidewires.

Each attempt was unsuccessful, as the acute angle of the tibioperoneal trunk would cause the wires to prolapse into the popliteal artery. A 120-degree angled tip SuperCross support catheter (Teleflex) (Figures 4-5) was incorporated to help guide us across the acute angle of the occluded tibioperoneal trunk. However, the aforementioned peripheral wires would still prolapse into the popliteal artery and straighten the angled tip of the SuperCross catheter. We switched to a coronary Hi-Torque Whisper guidewire and using the 120-degree angled tip SuperCross support catheter to guide us across the acute angle of the tibioperoneal occlusion, the wire successfully advanced all the way down the peroneal artery (Figures 4-6). We advanced a 2.5 mm x 30 mm coronary Euphora balloon (Medtronic) over the wire and performed successive sequential balloon angioplasty of the proximal tibioperoneal trunk and the peroneal artery all the way to the ankle. An angiogram showed excellent flow post intervention, with 0% residual stenosis (Figure 6).

Discussion

Critical limb ischemia is a complex disease that requires high levels of technical expertise. Unfavorable peripheral anatomy, especially involving bifurcations and acute angles, can preclude guidewire passage.^{5,6} Our case was complicated by an acute angle takeoff of the tibioperoneal trunk

Our case was complicated by an acute angle takeoff of the tibioperoneal trunk with concomitant ostial chronic total occlusion. To circumvent this challenge, we incorporated equipment that is more commonly utilized for coronary interventions.

with concomitant ostial CTO. To circumvent this challenge, we incorporated equipment that is more commonly utilized for coronary interventions. The SuperCross support catheter helped us navigate the acute angle of the tibioperoneal trunk. Its full-length braided steel construction and low profile increases flexibility, allowing the wire to easily make sharp turns in the lower extremities. The distal 40 cm incorporates a hydrophilic coating that enhances deliverability to the target vasculature and reduces friction during deployment. The catheter tapers to 1.8 French at the distal tip, which helps in navigating small, tortuous vessels, and crossing tight lesions and acute angles.⁷ We incorporated a coronary Hi-Torque Whisper Extra Support guidewire after several unsuccessful attempts at crossing the tibioperoneal trunk with more traditional peripheral guidewires. The Hi-Torque Whisper Extra Support guidewire provided the optimal balance of control and durability, allowing for safe navigation across the acute angle of the

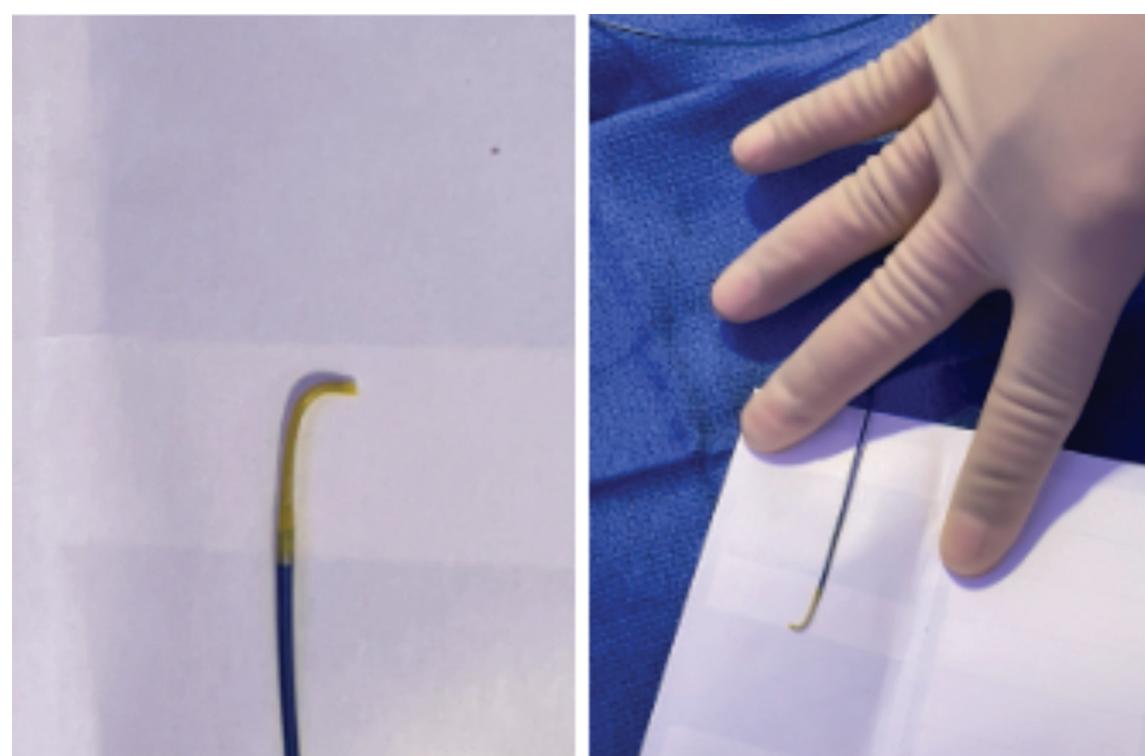


Figure 5. The 120-degree angled tip of the SuperCross Microcatheter (Teleflex), which helped navigate the acute angle of the occluded tibioperoneal trunk.

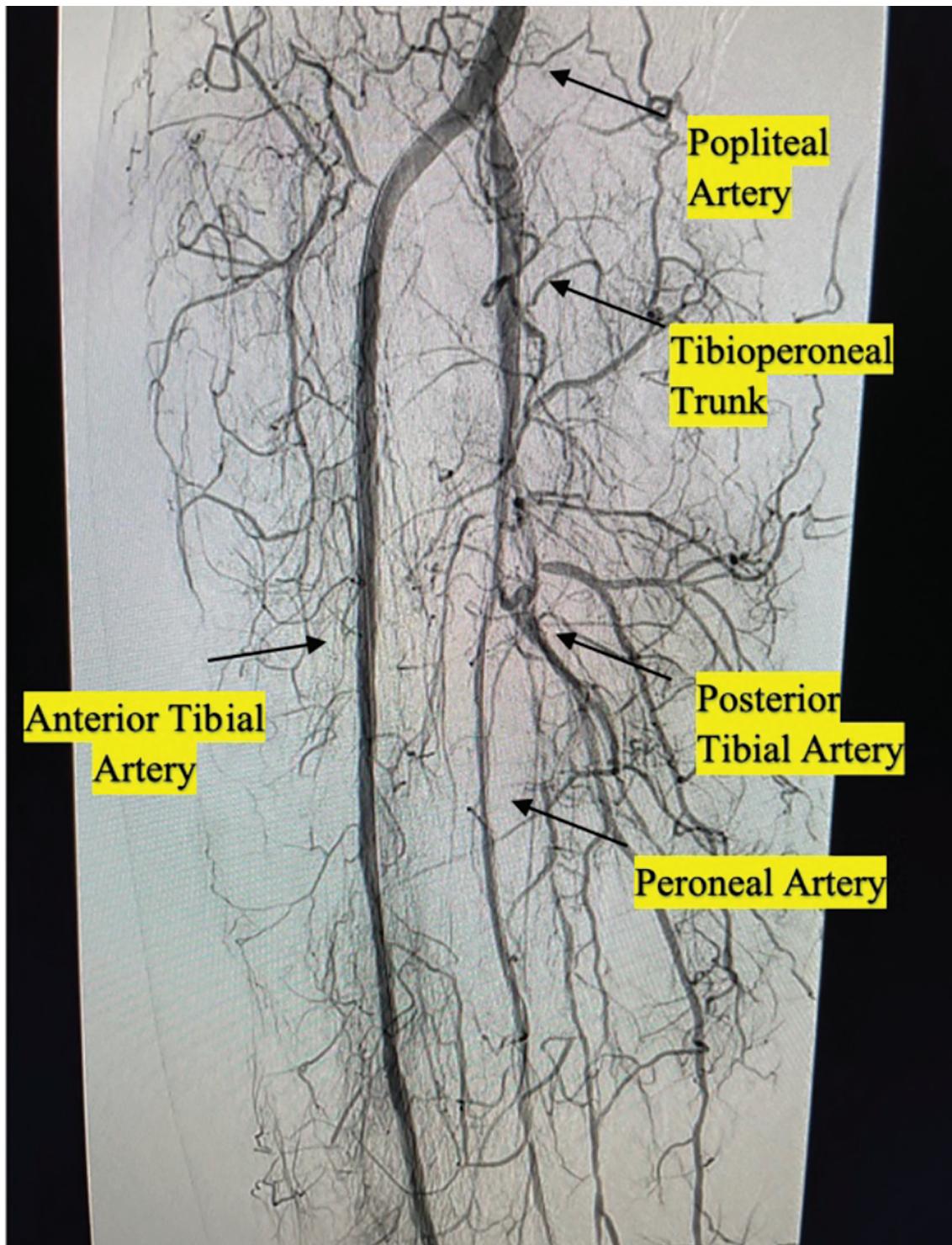


Figure 6. Post intervention angiogram showing revascularized tibioperoneal trunk with excellent flow in posterior tibial and peroneal arteries.

tibioperoneal trunk without losing the 120-degree angle provided by the SuperCross support catheter, which unfortunately occurred when we tried to navigate using traditional peripheral wires.

In addition to complex peripheral anatomy, our patient had a previous groin site complication and an elevated bleeding risk. For these reasons, we chose to proceed using only single pedal access. In addition to avoiding common femoral artery access-site complications, the transpedal approach has additional advantages. With enhanced patient safety and comfort with the use of transpedal access, a shortened time to postprocedural ambulation and overall recovery time should also translate into a lower economic burden for both in-hospital and outpatient peripheral labs. ■

Conclusion

Critical limb ischemia is a complex disease typically occurring alongside numerous comorbidities. Each case is unique and requires a personalized approach for a successful outcome.⁸ Our case was complicated by previous access site issues, tortuous anatomy, and multivessel disease. With the use of a single transpedal access and utilization of more traditional coronary equipment, operators can use this simple, efficient, and safe method of access while avoiding the groin and reducing bleeding risk. The patient was released the same day, a few hours after the procedure, with a band-aid over the insertion site, and remains symptom-free. ■

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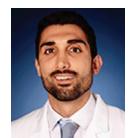
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