

CASE REPORT

Revascularizing BTK Occlusions Using the Carnelian Support Microcatheter

BY JOS C. VAN DEN BERG, MD, PhD

A 77-year-old woman was referred to our vascular center for atypical rest pain in both legs (the left side was more severe than the right side). Her medical history revealed atrial fibrillation, arterial hypertension, stage 2 to 3 chronic renal insufficiency, and rheumatoid and psoriatic arthritis. The patient reported a failed attempt of revascularization of the left side in another hospital. MRA performed in the other hospital (not shown) demonstrated an occlusion of the superficial femoral artery (SFA), the popliteal artery, and all proximal segments of all three below-the-knee (BTK) arteries on the left side. On the right side, the SFA and popliteal artery were patent. The posterior and anterior tibial arteries were occluded, with a single-vessel outflow on the fibular artery.

Given the more severe symptoms on the left side, a revascularization procedure of the left SFA, popliteal artery, and BTK arteries in an ambulatory setting was planned and completed successfully with immediate relief of the rest pain. Given the good clinical outcome on the left

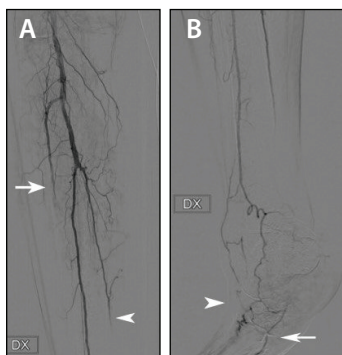


Figure 1. Digital subtraction angiography (DSA) of the proximal right lower leg demonstrating an occlusion of the anterior tibial artery (arrow) and posterior tibial artery (arrowhead; A). DSA of the distal lower leg and foot demonstrating flow in a small-caliber dorsalis pedis artery (arrowhead) and the lateral plantar artery (arrow; B).

side, an ambulatory revascularization procedure of the right lower leg was planned.

PROCEDURE

Antegrade access was achieved in the right common femoral artery under ultrasound guidance, and a 4-F introducer sheath was placed. Diagnostic angiography confirmed patency of the femoropopliteal segment and fibular artery, as well as an occlusion of both the posterior and anterior tibial arteries, and patency of the lateral

plantar artery and a small dorsalis pedis artery (Figure 1). Attempts to cross the occlusion of the posterior and anterior tibial arteries were unsuccessful. Subsequently, selective angiography of the fibular artery was performed, demonstrating a small anterior collateral branch connecting to the dorsalis pedis and a large posterior collateral branch (with a corkscrew appearance proximally) with a connection to the lateral

plantar artery (Figure 2).

Selective cannulation of the fibular artery with a 4-F multipurpose diagnostic catheter was performed. A 0.014-inch Glidewire Advantage guidewire (Terumo Interventional Systems) was advanced into the distal fibular artery, and the diagnostic catheter was exchanged for a Carnelian® Support BTA microcatheter (BIOTRONIK). It was not possible to advance the guidewire through the tortuous corkscrew segment (Figure 3A), so an exchange was made for a 0.014-inch Glidewire GT guidewire (Terumo Interventional Systems). The latter navigated without issue through the tortuous segment (Figure 3B) into the lateral plantar artery, and the Carnelian Support catheter was advanced over the guidewire into the lateral plantar artery toward the distal posterior tibial artery. It was not possible to advance the Glidewire GT guidewire toward the distal posterior tibial artery, and therefore an exchange was made for a 0.014-inch Hi-Torque Command guidewire (Abbott), leaving the Carnelian Support catheter in place.

After formation of a loop in the tip of the Hi-Torque Command guidewire, it was possible to cross the occlusion

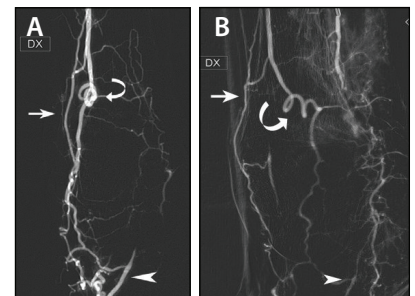


Figure 2. Roadmap image in antero-posterior (A) and oblique view (B) of the right foot obtained with selective injection of the fibular artery showing the anterior branch toward the dorsalis pedis artery (arrow), and posterior collateral (with corkscrew appearance; curved arrow) toward the lateral plantar artery (arrowhead).

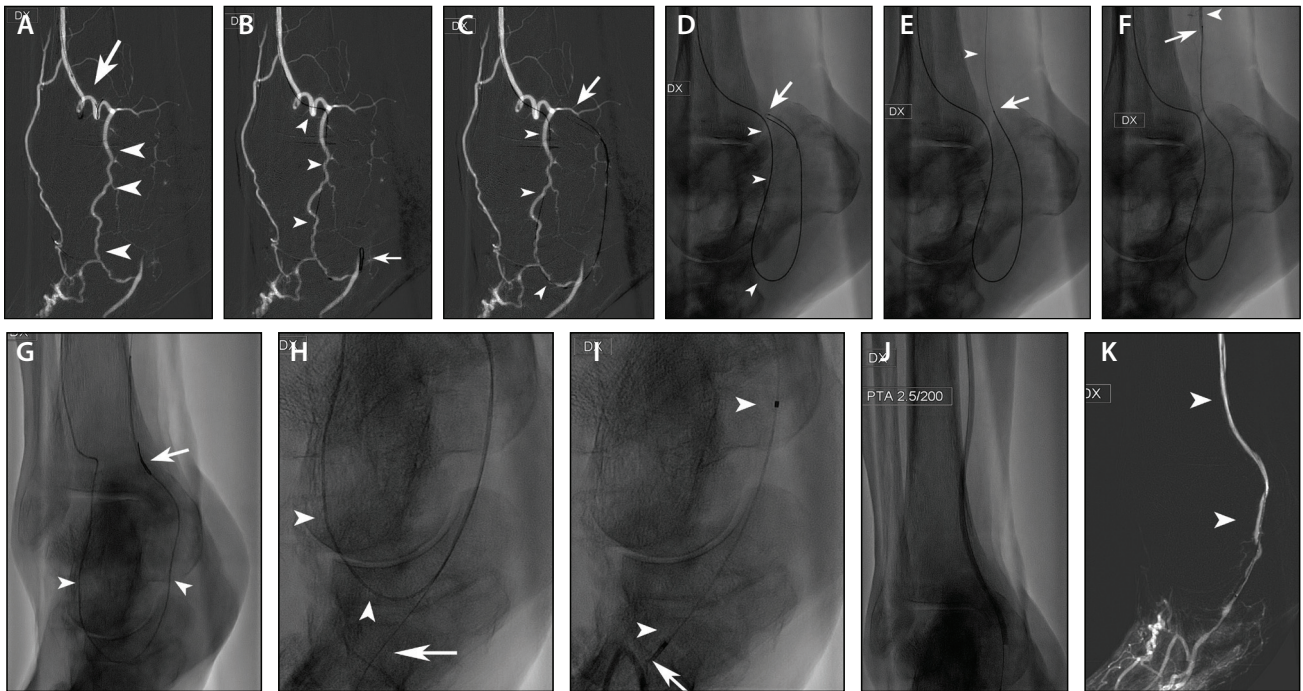


Figure 3. Roadmap image in oblique view demonstrating the distal course of the collateral (arrowheads); the 0.014-inch guidewire advanced through the Carnelian Support microcatheter into the proximal tortuous segment of the collateral (arrow; A). Roadmap image in oblique view after passage of the Carnelian Support microcatheter through the collateral, demonstrating straightening of the collateral (arrowheads) and the looped tip of the 0.014-inch guidewire in the lateral plantar artery (arrow; B). Roadmap image (C) and fluoroscopic image (D) in oblique view demonstrating the Carnelian Support microcatheter after further advancement over the Hi-Torque Command guidewire; the tip of the Carnelian Support can be seen at the level of the distal posterior tibial artery (arrow). Fluoroscopic image showing the tip of the Carnelian Support (arrow) and guidewire crossed into the proximal segment of the posterior tibial artery (arrowhead; E). Fluoroscopic image showing the tip of the Carnelian Support (arrow) and confirmation of intraluminal position after contrast injection (arrowhead; F). Fluoroscopic image showing the Carnelian Support in place (arrowheads) and an antegrade guidewire next to the distal segment of the Carnelian Support (arrow; G). Fluoroscopic image showing the Carnelian Support (arrowheads) and the antegrade guidewire (arrow) after crossing of the guidewire into the lateral plantar artery (H). Fluoroscopic image showing the angioplasty balloon catheter in the lateral plantar artery (arrowheads) and confirmation of intraluminal position with contrast injection (arrow; I). Fluoroscopic image of the inflated 2.5- X 200-mm angioplasty balloon (J). Control angiography showing patency of the posterior tibial artery and the lateral plantar artery (arrowheads; K).

in the distal posterior tibial artery and advance the Carnelian Support catheter into the patent segment of the posterior tibial artery (Figures 3C–3E). Intraluminal positioning of the catheter was confirmed (Figure 3F). The Carnelian Support catheter was left in place, and through the 4-F sheath, a second guidewire (0.014-inch Glidewire Advantage) was inserted in an antegrade fashion next to the Carnelian Support catheter and advanced into the distal segment of the posterior tibial artery (Figure 3G). Using the Carnelian Support catheter as a track, the guidewire was easily advanced in a looped fashion into the lateral plantar artery (Figure 3H). With the antegrade guidewire left in place, the Carnelian Support catheter was withdrawn, an angioplasty balloon was advanced over the antegrade guidewire, and intraluminal positioning in the lateral plantar artery was confirmed (Figure 3I). Percutaneous transluminal angioplasty of the posterior tibial artery was performed using a 2.5- X 200-mm angioplasty balloon (Figure 3J).

RESULTS

Control angiography demonstrated reconstitution of antegrade flow into the lateral plantar artery (Figure 3K) with a triphasic Doppler signal. Hemostasis was obtained with manual compression. The patient was discharged the same day and became fully asymptomatic. ■

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Disclosures: Consultant for BIOTRONIK.