

IMAGES IN INTERVENTION

Retrograde Variant Artery Approach for Infrapopliteal Chronic Total Occlusion Intervention



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Approximately 10% of infrapopliteal arteries have variants, with a type 3A variant, characterized by an aplastic posterior tibial artery and a hypertrophied peroneal artery connected to the plantar artery, being the most common (1). Awareness of infrapopliteal artery variants might expand the role of retrograde intervention.

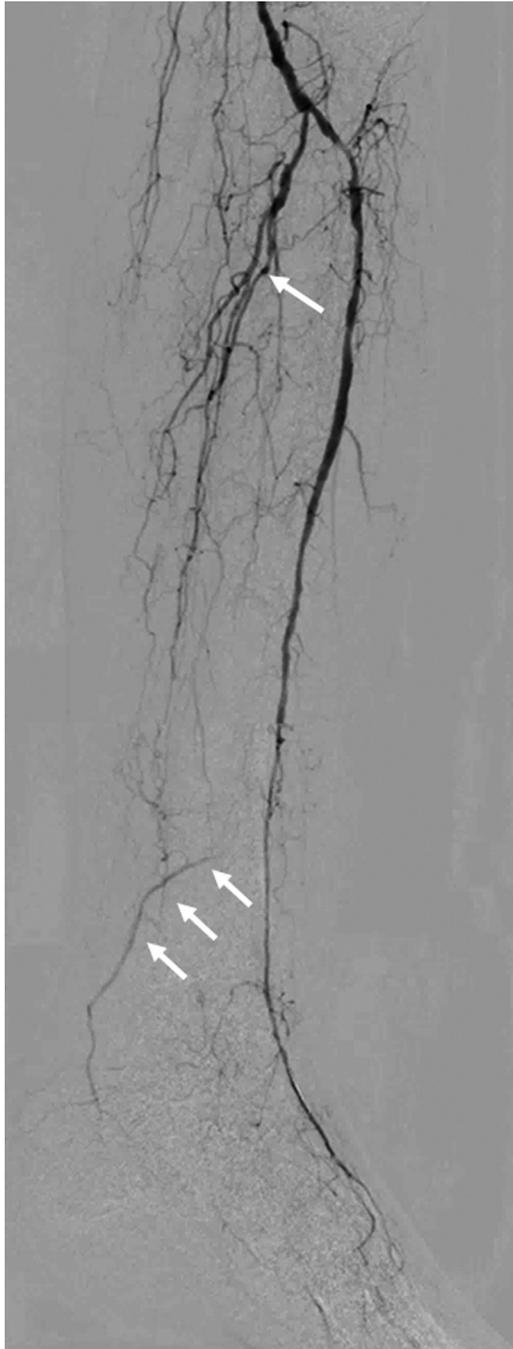
A 68-year-old man on hemodialysis was referred to our institution for endovascular intervention to treat left crural artery disease with toe gangrene after distal bypass occlusion. Angiography after recanalization of the occluded anterior tibial artery revealed a diagonal descending artery distal to an occlusion in the peroneal artery (Figure 1). This angiographic feature suggested an occlusion in an underlying type 3A variant. Confirmatory contrast-enhanced computed tomography demonstrated the presence of a type 3A variant (Figure 2). Two weeks after the first intervention, we attempted a second intervention because of persistent insufficient blood flow to the foot. We used the retrograde approach through the type 3A variant artery to recanalize the peroneal artery because of failed antegrade crossing. Following successful puncture of the variant artery (Figure 3A, Online Video 1), a 3-F

sheath was placed around the ankle. We advanced a 0.014-inch hydrophilic guidewire supported by a microcatheter in a retrograde manner (Figure 3B). The rendezvous technique facilitated subsequent antegrade crossing and balloon dilatation of the long occlusion in the peroneal artery (2). We removed the 3-F sheath and dilated the variant artery for hemostasis of the puncture site (Figure 3C). Final angiography demonstrated establishment of excellent straight-line flow from the peroneal artery to the plantar artery (Figure 3D). Because skin perfusion pressure of the left foot increased from approximately 20 mm Hg to 40 mm Hg, suggesting a high likelihood of wound healing, the patient underwent a scheduled minor amputation.

A retrograde approach via a variant artery could provide a novel option for the treatment of peroneal artery occlusion.

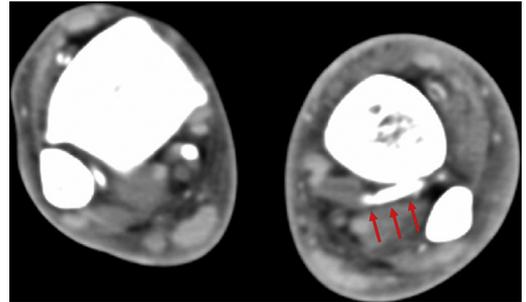
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FIGURE 1 Angiography After Successful Recanalization of the Occluded Anterior Tibial Artery



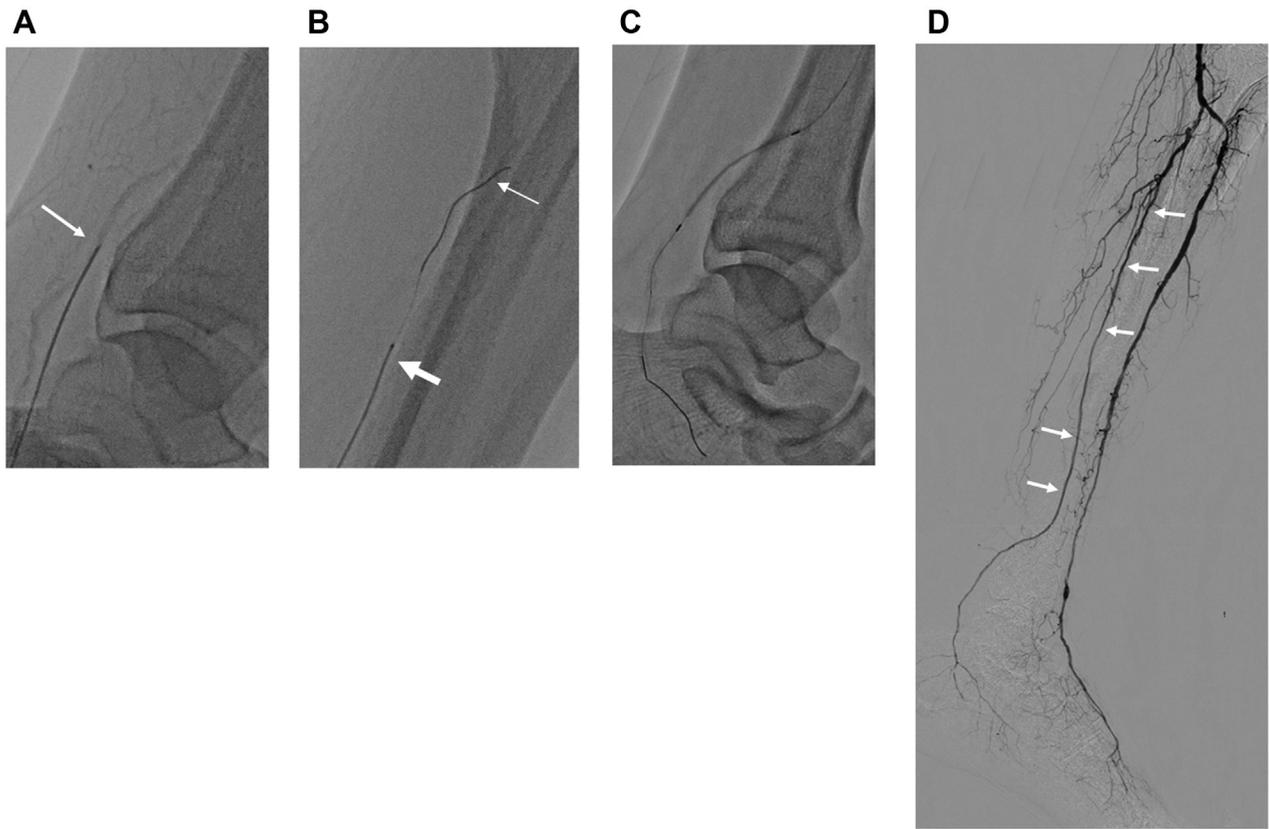
Note a diagonal descending artery distal to the reconstituted peroneal artery (**arrows**) as well as an occlusion in the peroneal artery (**single arrow**).

FIGURE 2 Enhanced CT Angiography (Cross-Sectional Image of the Distal Calf)



Note a reasonable calcified occlusive lesion traversing the left distal calf between the peroneal artery and the plantar artery (**arrows**), suggesting an underlying type 3A variant. CT = computed tomography.

FIGURE 3 Endovascular Intervention



(A) Retrograde puncture of the variant artery under angiographic guidance (**arrow**), followed by placement of a 3-F sheath ([Online Video 1](#)). **(B)** Successful retrograde crossing of a 0.014-inch guidewire (**thin arrow**) supported by a microcatheter (**thick arrow**). **(C)** Balloon dilatation of the long occlusion in the peroneal artery and the puncture site in the variant artery after use of the rendezvous technique and antegrade wiring. **(D)** Final angiography demonstrated establishment of excellent straight-line flow (**arrows**) from the peroneal artery to the plantar artery in the setting of a type 3A variant.

REFERENCES

1. Kawarada O, Yokoi Y, Honda Y, Fitzgerald PJ. Awareness of anatomical variations for infrapopliteal intervention. *Catheter Cardiovasc Interv* 2010;76:888-94.
2. Kawarada O, Sakamoto S, Harada K, Ishihara M, Yasuda S, Ogawa H. Contemporary crossing techniques for infrapopliteal chronic total occlusions. *J Endovasc Ther* 2014;21:266-80.

KEY WORDS chronic total occlusion, infrapopliteal variant, retrograde approach

APPENDIX For a supplemental video and its legend, please see the online version of this article.