◆ COMMENTARY ◆

Miniaturized Retrograde Popliteal Approach in a Supine Patient

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With the increasing sophistication of endovascular technology and techniques, the management of peripheral artery disease has undergone tremendous change since Dotter and Judkins[1] first reported the use of endovascular therapy for critical limb ischemia in 1964. As enthusiastic pioneers have demonstrated, an innovative spirit is vital for the advancement of endovascular therapy. An example of this forward-looking attitude can be found in the article on retrograde popliteal access in this issue of *JEVT*; Fanelli and colleagues[2] deserve high praise for their farsightedness, as well as their tenacity and innovation, despite some criticism of this approach.[3]

The treatment of superficial femoral artery (SFA) disease with nitinol stents has expanded the indications for catheter-based revascularization, achieving higher technical success and patency rates than with balloon angioplasty alone. In particular, endovascular therapy for chronic total occlusion (CTO) of the SFA can offer advantages over bypass surgery; it is less invasive, requires shorter hospitalization, entails lower risk of infection and complications of anesthesia, and is repeatable, while preserving vessels for possible future graft surgery. Failed CTO recanalization can be converted to bypass surgery. An endovascular solution for CTO of the SFA is one of the final frontiers of endovascular therapy. Thus, the establishment of a standard recanalization technique for SFA occlusions remains a key goal.

During the last decade, antegrade intraluminal and/or subintimal angioplasty techniques for SFA occlusions have gained popularity thanks to the development of nitinol stent technologies.[4–6] The retrograde popliteal approach has traditionally served as a backup option in case of failed antegrade crossing in the SFA lesion.[7] Against this, the inherent drawbacks of repositioning the patient during the procedure and popliteal puncture site complications require further technical refinement to encourage the widespread application of the retrograde popliteal approach.

Focusing on the unique anatomical characteristics of the SFA, I described in 2010 the novel technique of retrograde 3-F popliteal access accomplished in a supine patient by lifting the patient's heel.[8] In this issue of *JEVT*, Fanelli et al.[2] retrospectively review their experience with retrograde popliteal access in 26 supine patients after failed antegrade crossing. Despite challenging cases, the technical outcomes were quite satisfactory, with all recanalizations successful and no significant popliteal puncture site complications.

However, as shown in the Table, there are some differences between the procedure I reported[8] and the one used by Fanelli et al.,[2] although stent delivery is similarly implemented in an antegrade fashion following retrograde guidewire crossing. I felt that their 4-F popliteal approach posed a small risk of puncture site complications and might be uncomfortable for the patient during hemostasis. Considering that catheter-based treatment of lower limb arterial disease has progressed with the downsizing of endovascular equipment, I recommend the application of a 3-F popliteal approach. Given the currently available devices, a 3-F sheath can

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TABLE
Different Procedural Aspects Between Recently Published Articles on Retrograde Popliteal Access Techniques

	Kawarada et al.[8]	Fanelli et al.[2]
Puncture method	Fluoroscopy guidance	Fluoroscopy or ultrasound guidance
Knee position for the puncture	Elevated by raising the heel	Gently flexed and medially rotated
Popliteal sheath size	3 F	4 F
Hemostasis method	External hemostasis device (Temeta-kun) for 30–60 min	Manual compression for 5–10 min; compressive bandage for 12 h

accommodate a 0.014 to 0.025-inch guidewire system supported by a 3-F catheter. Also, a 3-F sheath can facilitate 0.014-inch guidewire–compatible monorail balloon angioplasty up to 4 mm, which secures the retrograde crossing followed by snaring the retrograde guidewire from the femoral access or accommodating the retrograde guidewire in the femoral access (Fig. 1). Furthermore, I propose sterilizing the popliteal fossa before the procedure to save time in the catheterization laboratory (Fig. 2).

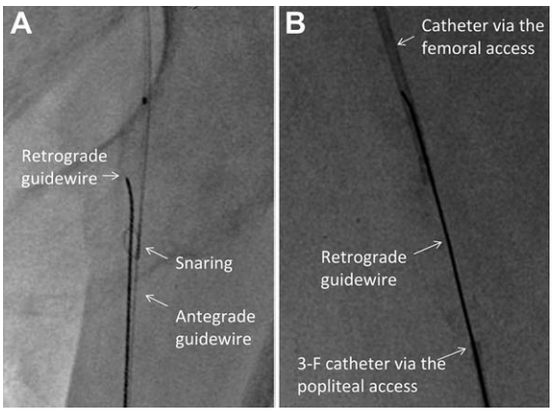

Figure 1 ◆ Representative methods of retrograde guidewire crossing: (**A**) snaring the retrograde guidewire from the femoral access and (**B**) accommodating the retrograde guidewire in the catheter through the femoral access.

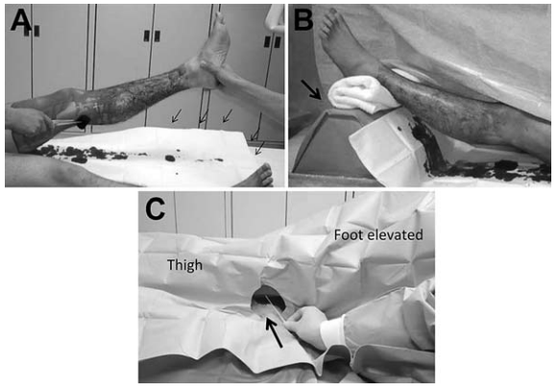

Figure 2 ◆ The retrograde popliteal approach in the supine position. (**A**) Sterilization of the popliteal fossa and crus over the sterilized sheet (arrows) before the procedure. This preparation makes the retrograde popliteal approach in the supine patient simple in case of a failed antegrade procedure. (**B**) Simple conversion to the retrograde popliteal approach; note the pillow used for raising the heel (arrow). (**C**) The popliteal artery is punctured with an upward direction of the needle (arrow).

In Japan, a multicenter prospective study is ongoing regarding the 3-F retrograde popliteal approach in a supine patient with the heel elevated as a last resort in a failed antegrade procedure. In both the East and West, the miniaturized retrograde approach in a supine patient can open new horizons in the treatment of CTO of the SFA.

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