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Original Article

Distal retrograde access: Step by step

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ABSTRACT

Complex long lesions are now in the endovascular realm, but with a rate of failure of 10–20% due to impossibility of crossing the lesion. Several CTO devices were developed by commercial companies but are expensive. Distal retrograde access is now the first choice approach in such scenario, improving procedure success, recanalization rate and limb salvage rate, being fast cheap and feasible in the majority of the cases, with low complication rates. The step by step is described.

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1. Introduction

Nowadays, most guidelines recommends endovascular treatment as a valid and safe option for patients with long and complex lesions classified as TASC II C and D, in all territories: iliac, femoropopliteal and infrapopliteal, particularly in the critical limb ischemia scenario.^{1–3}

However, in about 10–20% of such patients, crossing the lesion is not possible in a conventional way, particularly in an absent ostial stump or in severely diseased and calcified distal bed.^{1–3} This was previously accepted as an endovascular treatment failure, being an indication for open surgery.²

On the other hand, the commercial companies developed some devices aiming to allow crossing the lesions.⁴ However it comes with a high financial burden, therefore restricting its wide spread use.⁴

But with the development of dedicated devices for peripheral artery disease such as guide-wires, chronic total occlusion catheters, angioplasty balloon catheters and stents, among others, and the continuous technical development by the interventionists, the distal retrograde access was incorporated into the techniques for treating such complex lesions via endovascular.^{1,4}

Therefore, in the event of an antegrade failure in crossing the lesion, this retrograde distal access is now the first choice as an attempt to cross the lesion once it is cheap, fast and relatively easy

to perform, requiring a small learning curve. It also carries a high successful recanalization rate and a high limb salvage rates.^{1–3,5}

2. The technique

1) Arteries that can be accessed:

According to the lesions to be treated, the below levels can be approached retrogradely^{1–3,5}:

- Distal superficial femoral artery
- Above the knee popliteal artery
- Below the knee popliteal artery
- Tibial vessels (including peroneal artery) in the leg
- Podal arteries

2) Reaching the distal artery:

In the author's experience the below the popliteal access is the most frequent one, followed by tibial vessels and the pedal arteries. Above the knee popliteal access and distal SFA are not common in critical limb ischemia.

Iyer and colleagues were the first to describe the retrograde pedal/tibial approach for cases in which the conventional way of crossing the lesions failed. The access into the pedal vessels was obtained via a cut down and direct percutaneous arterial puncture.⁶ Such technique can be used today but we prefer the use of ultrasound-guided puncture or the fluoroscopy/roadmap guided puncture^{1–3,5} (Fig. 1).

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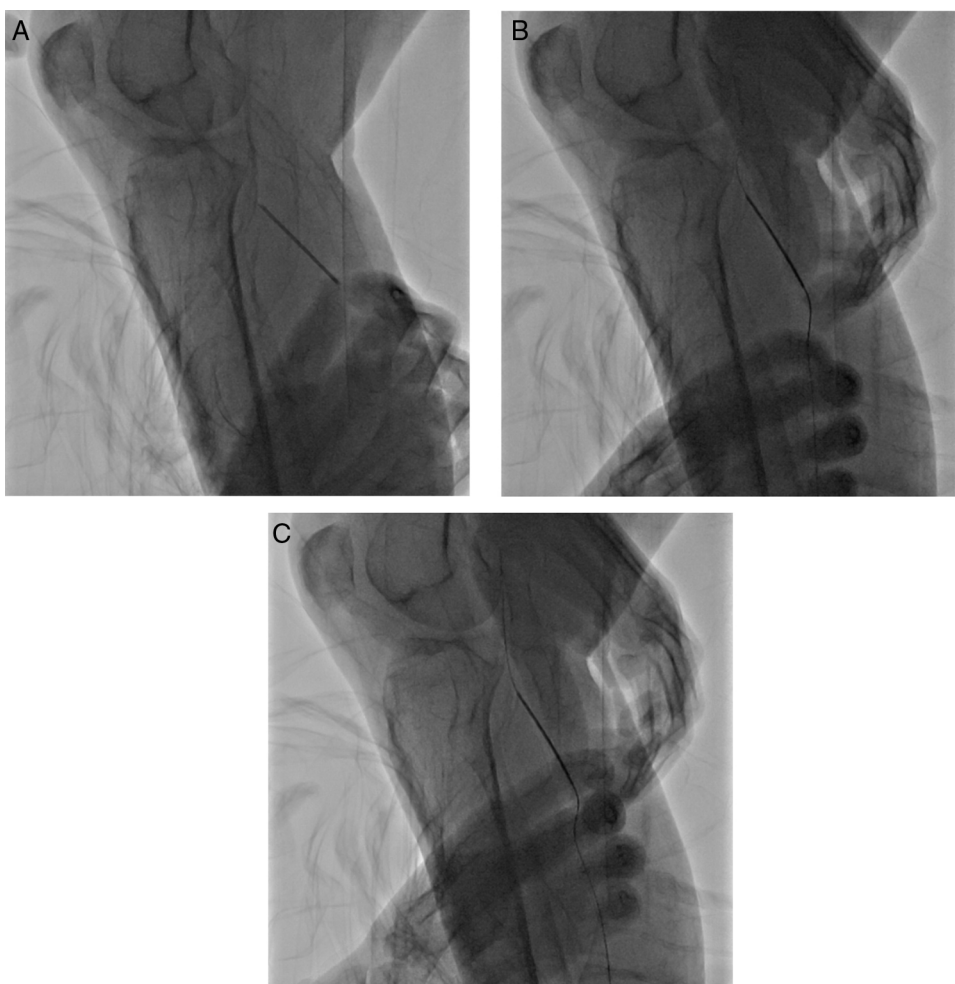


Fig. 1. Photographies of fluoroscopic guided distal popliteal artery pucture. A- Puncture Needle aiming toward the distal popliteal artery. B-After the puncture of the artery, the guidewire reaches the lumen of the vessel. C- The guidewire inside the popliteal artery is going upwards intraluminally.

Therefore, we have the bellow options:

- Cutting down to expose the target vessel for direct puncture
- Ultrasound guided puncture
- Fluoroscopy/roadmap guided puncture

For these punctures, one can use regular devices such as regular puncture needles and exchange 0.014" or 0.018" guidewires. But recently, the Cook Company launched a Micropuncture Kit, with a small dedicated puncture needle and also a 3.5F sheath.

The authors prefer the sheathless access, just with the "bare" guide-wire followed by an angioplasty balloon catheter or a CTO catheter.

3) Crossing the lesion:

The lesion can be crossed sometimes by the distal guide-wire alone, particularly with the 0.018" (but there are those who prefer a 0.035") or by a support or a CTO catheter. The 0.014"s can also be used, but in our experience, it has not been so efficient in crossing the lesions.³

But in some situations one must go from above (antegrade) and bellow (retrograde) simultaneously with angioplasty balloon

catheters (the rendezvous technique) in order to rupture the flap that separates both lumens. With both wires in the separate planes, simultaneous balloon inflation over each wire is performed, above the proximal end of the occlusion where both distal ends of the balloons are touching each other.³

4) Regaining antegrade access:

After the guide wire from bellow crossed the lesion, it must go upwards to reach the sheath directly in to its lumen or through snaring. In the majority of the cases there is no need for snaring, saving costs (Fig. 2). Once the retrograde guide wire is pulled out (Fig. 3), a regular hydrophilic 0.035", 0.018" or 0.014" according to the chosen devices to treat the target vessel (s) replaces it.^{1,3}

After that, intervention is performed in the standard fashion through an antegrade way.

5) Distal puncture site:

There are few complications at the distal retrograde puncture site.

Once a standard intervention is performed and the distal lumen of the target vessel is reached antegradely, the retrograde wire is

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