

Case Report: Percutaneous Revascularization of Superficial Femoral Artery Occlusion through Transcollaterals Approach

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Abstract

Peripheral chronic total occlusion occurs in 30% of patient with peripheral vascular disease. Long calcified type of occlusion are still better served with bypass grafts. Yet 60 - 80% of the cases may be managed percutaneously. Different access techniques (antegrade, retrograde and through collaterals) has been describes in literature. This case will discuss retrograde access through antergrade puncture using single wire with balloon support. Many advantages of such strategy including time saving and avoiding another retrograde access puncture site. This approach however, requires more skills and sometimes very trackable small supporting devices.

Keywords: Superficial Artery Occlusion; Peripheral Vascular Disease; Trans-Collateral Access; Percutaneous Vascular Intervention

Abbreviations

SFA: Superficial Femoral Artery; CTO: Chronic Total Occlusion; PFA: Profunda Femoral Artery; BTK: Below the Knee; ATA: Anterior Tibial Artery; PTA: Posterior Tibial Artery; PA: Peroneal Artery

Introduction

Surgical revascularization of SFA disease and occlusions have decreased over the last few years, due to the improvement in techniques and strategies of endovascular therapies applied for such disease [1,2]. While antegrade approach to long occlusive of the SFA still carries some technical challenges, combined retrograde approach is successful in most cases.

Case Report

A 73 year old male admitted at the diabetic foot unit with ulcer at the 3rd toe. He underwent Doppler ultrasound which revealed an occluded SFA. He is known to have systemic hypertension and dyslipidemia. He is a former smoker and has long standing diabetes mellitus type 2 with neurovascular complication on oral medical therapy. Physical examination of the left foot showed 3rd toe ulcer Rutherford class IIID and absence of palpable pedal, posterior tibial and popliteal artery.

Patient underwent peripheral angiography through Right femoral access (crossover) which showed occlusion at the ostium of the SFA with developed collaterals from the profunda artery. Distal SFA appears late figure 1a. Initial percutaneous strategy Using a 4.0 * 40 mm sterling balloon (Boston scientific) supporting 0.018 wire, antegrade trials continues to go subintimal and failed to re-enter distally as seen in figure 1c. Then we decided an alternative strategy navigating through collaterals to re-enter the occlusion at the distal re-entry

point through a challenging tortuous branch of profunda femoral artery. 0.014 Choice PT wire navigates the collaterals with a small 2.0 * 20 mm MAVERICK™ Balloon (Boston scientific) support, the occlusion is crossed and wire is parked at common femoral artery (Figure 1e). Over the 0.014 wire a 3.5 * 220 mm COYOTE balloon (Boston scientific) Predilate the occlusion permitting an antegrade 0.018 wire to cross the lesion and parked distally in the posterior tibial artery. 3 balloons (4.0/5.0/6.0 * 120 mm) IN.PACT™ Admiral™ DCB (Medtronic Vascular, Santa Clara, CA, USA) were used to dilate the lesion starting from the tibial trunk back to ostium of the SFA. Good angiographic results (Figure 1g and 1h). Patient was discharged on DAPT therapy for minimum a month followed aspirin lifelong.

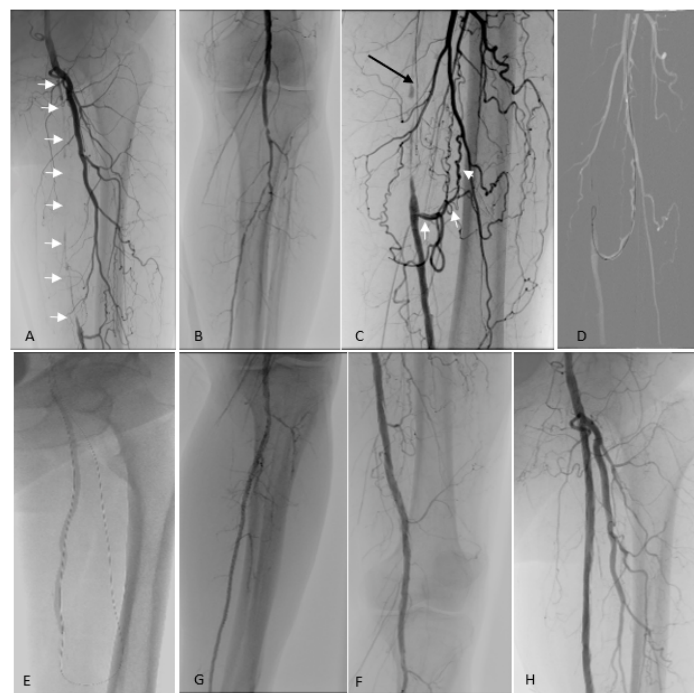


Figure 1: (a) Shows the length of the occlusion of the SFA marked with arrow. (b) Extensive atherosclerotic disease at popliteal and tibial vessels. (c) A magnified Picture of the distal re-entry point. White arrows mark the collaterals used to cross the distal re-entry. Black arrow shows the sub-intimal wire antegrade. (d) Transcollateral balloon supporting wire crossing the distal re-entry. (E) Dilating the ostium SFA retrograde. (G-H) Final results post dilatation of posterior tibia back to proximal SFA.

Discussion

Chronic total occlusions (CTO) are present in approximately 30% - 40% of patients with symptomatic peripheral arterial disease [3]. Difficulties in crossing such lesions varies mainly because of the calcification and tortuosity. Unfortunately, regardless of the multiple technique and devices invented the failure rate has remained approximately 20% [4,5].

Many times antegrade attempts end up subintimal. Crossing CTO subintimal is a widely accepted alternative, but re-entry into the true arterial lumen may be sometimes unsuccessful. Several antegrade techniques and re-entry devices have emerged to cross CTOs, with very good results for intraluminal recanalization [6]. However, these devices are expensive and not available in every center. Alternatively, retrograde methods using accesses distal to the occlusion sites such as the popliteal, distal SFA and BTK (ATA, PTA, PA) have been described. the retrograde puncture of these arteries can be better achieved through a road map technique with contrast or

following the artery wall calcification. A transcollateral approach to recanalize totally occluded SFA via the PFA has been reported in few cases with excellent success and no complications both BTK and above [6-10]. Transcollateral approach is not a common approach to cross the occluded SFA. Despite it has several advantages: no additional access sites need to be prepared and so the risk of puncture site hematoma is eliminated. Limitations of this technique include the absence of sufficiently developed collateral vessels as well as kinking of the collateral vessels. This may be overcome with appropriate tools and experienced operator. The transcollateral access requires delicate catheters and wires to reduce the friction and spasm. In our case we used a balloon supporting wire to navigate and cross the distal re-entry, others reported using a microcatheter [6]. Given the proximity of the SFA occlusion, we had successfully dilate the occlusion without capturing the retrograde wire.

Conclusion

Endovascular/percutaneous methods to unblock CTO SFA are growing, yet surgical bypass is always an alternative option. Antegrade and retrograde techniques have been briefly discussed above. Transcollateral approach is sometimes labelled difficult, this could be an alternative crossing technique, if collaterals connecting to distal re-entry site are well developed.

Conflict of Interest Statement

The authors have no relationships relevant to the contents of this paper to disclose.

Financial Disclosures

None.

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