

## Case report

# How to treat femoral and popliteal In-Stent restenosis or occlusion?

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## CLINICAL CASE

81-year-old male, with arterial hypertension, diabetes, previous coronary bypass.

This patient was treated for CLTI, with rest pain (Rutherford 4 Class) in the left limb, 4 years ago, with PTA and mimetic stent (Supera, Abbott Vascular) to treat a long superficial femoral artery (SFA) occlusion.

Unfortunately, after 4 years, he presented with recurrence of rest pain in the left limb starting 20 days prior. Duplex-scan showed a complete re-occlusion of the mimetic stent in the SFA, patent popliteal (POP) artery, 2 patent BTK arteries (posterior tibial and peroneal) and chronic occlusion of the anterior tibial artery.

Angiography confirmed the complete occlusion of the stent in SFA

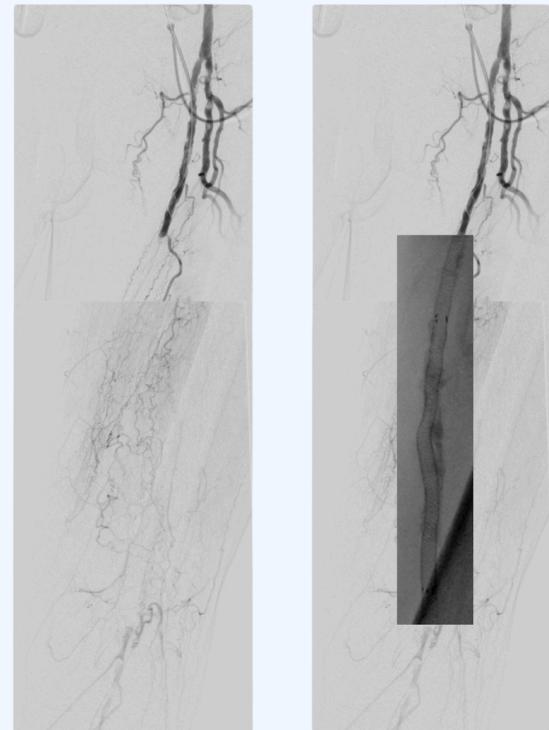


Figure 1: Initial angiography, with occlusion of Supera stent in medial and distal SFA

## RATIONAL

The first question is: how can we treat complex SFA and POP in-stent restenosis or occlusions (ISR)?

We know that ISR is a really challenging situation. The most recent papers show that debulking of the restenotic material (intimal hyperplasia/thrombus) and DCB are the treatment of choice in complex ISR, Tosaka 2 and 3. Debulking seems to be a key point for many different reasons. First, because intimal hyperplasia is different from "de-novo" lesions and, due to migration, proliferation and secretion of extra-cellular matrix from vascular smooth muscle cells, with a dominant extra-cellular matrix that needs to be removed to increase drug delivery in the artery wall. Second, because to obtain an effective lumen gain in arteries with scaffold, PTA alone is not enough and debulking of intimal hyperplasia is the only solution. Third, in patients with complete stent occlusion (Tosaka 3), the "core" of the occlusion could be thrombotic material in different phases of organization, with high risk of embolization.

Based on these concepts, we decided to use a new generation of athero-thrombectomy device (BYCROSS, Plus Medica, Taryag).

Because BYCROSS combines:

- rotational atherectomy with expandable wings (4.7mm channel with open wings), allowing debulking of intimal hyperplasia and improving lumen gain and drug delivery.
- effective aspiration (70 ml/min with a 6F sheath), avoiding distal embolization of thrombotic and/or any type of fragmentable material.

## TREATMENT

In this patient, after crossing the stent occlusion with a 0.018 guidewire (V-18, Boston Scientific) and coming back into the distal patent POP artery, BYCROSS was used for the first pass with closed wings (1.9mm), just to obtain a small channel and to remove fragmentable material. The first pass was stopped 2 cm above the distal part of the occlusion, maintaining a distal cap, to avoid embolization.

The wings were, then, opened (4.7mm) and the second pass was done to remove intimal hyperplasia and to obtain an effective lumen gain, maintaining a distal cap. After removing the catheter and placing a 4F BER II in the stent, contrast medium was injected to evaluate the removal of all fragmentable material. Only at this time, the distal cap of the occlusion is slowly removed by the BYCROSS catheter. This maneuver is helpful to reduce the risk of distal embolization and to avoid the use of a filter (Figure 2).

Due to the complete resolution of the IS-occlusion of the SFA, without residual stenosis, the second question is: should we use antiproliferative therapy to improve long-term patency or not? Of course, as well demonstrated, the use of antirestenotic drugs is mandatory in complex ISR in order to improve long-term outcomes.

In this specific case, two sirolimus balloons (6x150 mm Selution SLR, Cordis) were used (Figure 2).

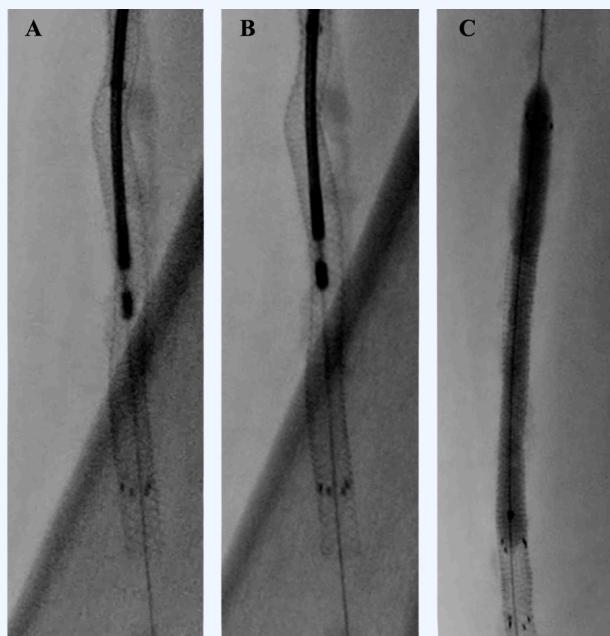


Figure 2. Treatment of IS-Occlusion

A. BYCROSS with closed wing

B. BYCROSS with open wing

C. SIROLIMUS DEB

At the end of the procedure, angiography showed an effective recanalization of the stent in the SFA, without residual stenosis and, also, very good flow in the popliteal artery (Figure 3).

The IVUS evaluation before and after the use of BYCROSS showed complete removal of both the thrombotic “core” and intimal hyperplasia (Figure 3).

The patient was discharged the day after with complete resolution of the pain and with a direct flow in the posterior tibial artery at the ankle level.

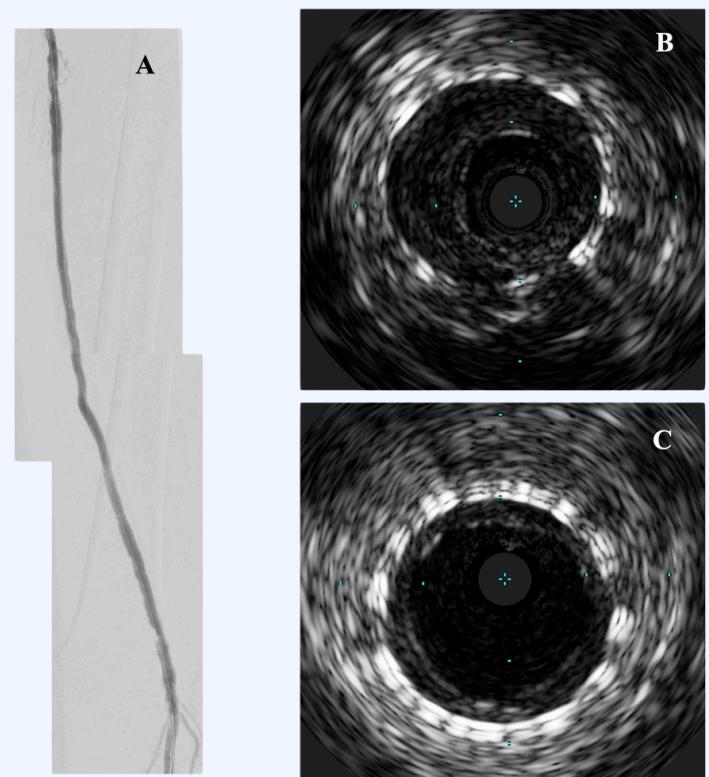


Figure 3. Final angiography (A) and IVUS evaluation before(B)/after(C) treatment

## FOLLOW UP

After 6 months, the patient was completely asymptomatic (Rutherford 0 Class) and the Duplex-scan showed no ISR (Figure 4).

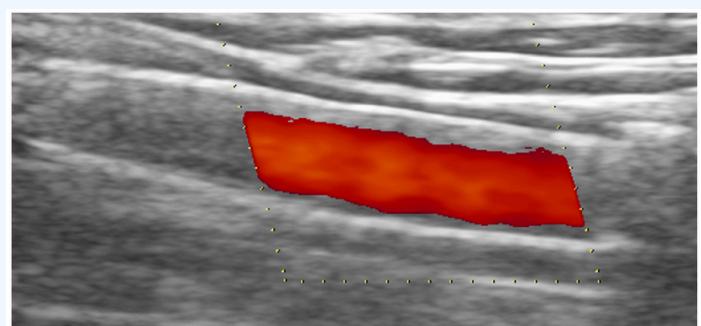


Figure 4. 3-months follow-up with Duplex-Scan