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ENDOVASCULAR TREATMENT FOR VASCULAR GRAFT RESTENOSIS

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ABSTRACT. Restenosis of arteries and grafts after revascularization interventions represent difficult management decisions and real technical challenges that the vascular surgeons need to face. We present a case of a 59 year old male patient with multilevel arterial disease for which he underwent a complex open arterial reconstruction two years ago. He presents with 80% restenosis at the proximal anasthomosis on the external iliac artery. Our option was the endovascular treatment by placing a stent from the external-iliac artery into the Dacron prosthesis. Six months after the intervention, the patient is free of symptoms with patent bypasses evidentiated on Echo Doppler examination.
KEYWORDS multilevel arterial disease, sequential by-pass, stenting, endovascular, critical limb ischemia

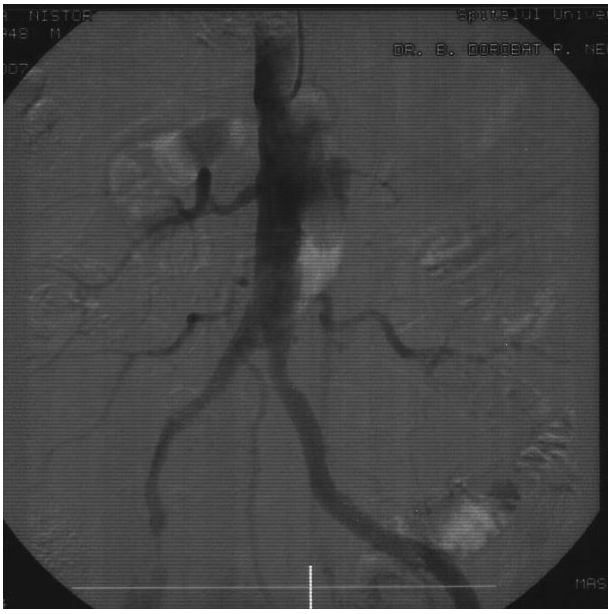
INTRODUCTION

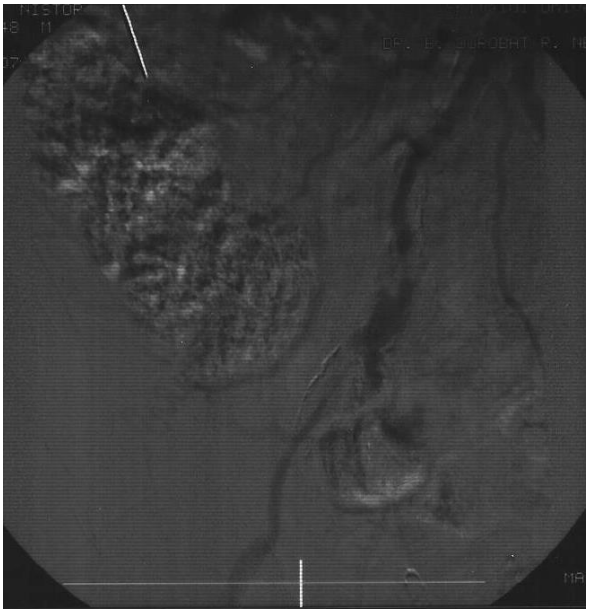
As we approach the second century of modern vascular surgical practice, one hundred years after Alexis Carrel's pioneering work on arterial and graft anastomoses, the narrowing, or restenosis, of arteries and grafts after intervention to improve blood flow continues to provide vascular surgeons with technical challenges and difficult management decisions (Rutherford R. B., 2000). Greater than 20% of all interventions fail because of restenosis. Failure occurs early due to technical problems and later (1-12 months) because of injury-induced scarring (Allaire E.et al., 1997). At much later periods (>12 months), failure results from the underlying atherosclerotic process. Although restenosis occurs within the context of atherosclerosis, the clinical features of atherosclerosis and restenosis are different (Kuhel D.G. et al.,2002). Atherosclerosis is a multifactorial, inflammatory disease that develops slowly, usually taking decades, while restenosis results from the wound healing response to arterial injury and occurs within months.

We present a case of iliac restenosis after initial synchronous ilio-femoral and femoro-popliteal reconstruction, treated by endovascular stenting.

CASE PRESENTATION

A 59 year old male patient with significant co-morbidities, a medical history of ischemic heart disease, hypertension and dyslipidemia presented to our department complaining of buttock claudication. The median pain-free walking distance was as low as 20 m. This is a patient who presented 2 years ago with critical limb ischemia, complaining of severe right pedal rest pain. The performed angiogram revealed a 90% extensive common femoral artery stenosis and superficial femoral occlusion in the distal segment followed by popliteal artery stenosis **(Fig. 1 a, b, c, d).**





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a) b)

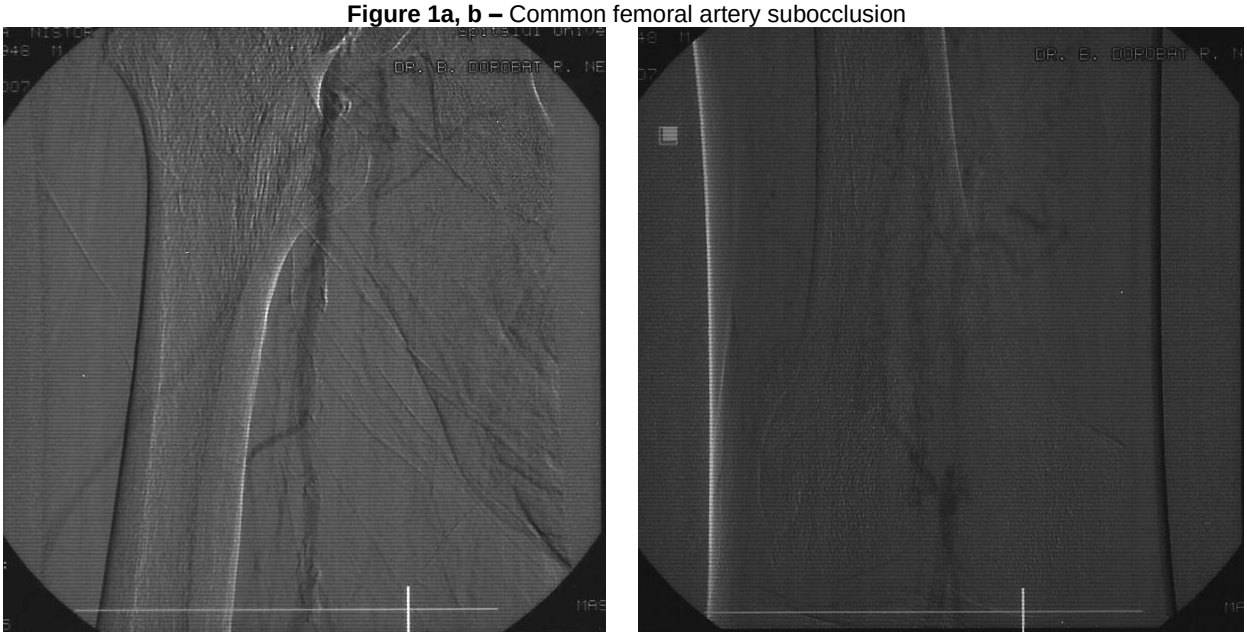

Figure 1a, b – Common femoral artery subocclusion

c) d)

Figure 1c, d – Superficial femoral artery occlusion in the distal segment and popliteal artery stenosis

We performed a sequential external-iliac- superficial femoral by-pass with an 8mm Dacron graft and a prosthetico-distal popliteal by-pass using the ipsilateral great saphenous vein **(Figure 2 a, b, c, d, e)**

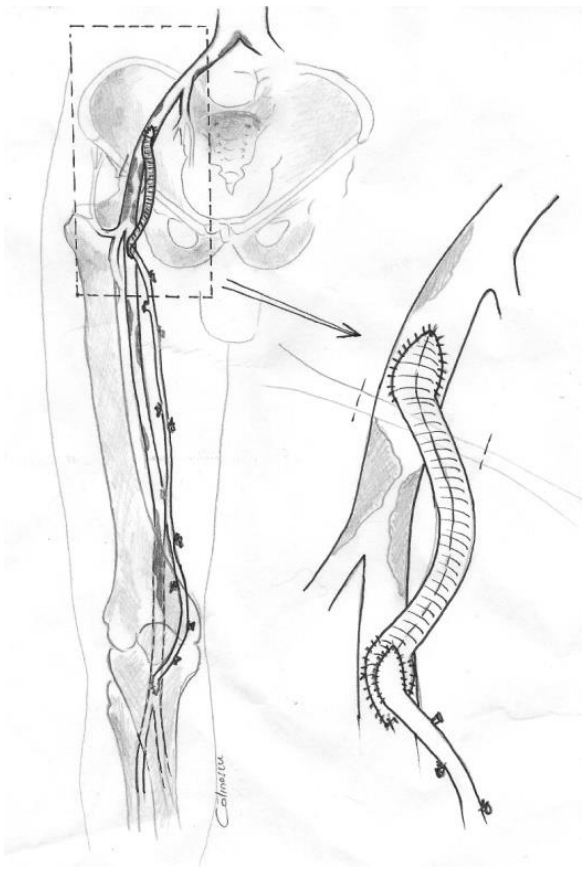

Figure 2a - Schematic representation of the sequential external iliac – superficial femoral and prosthetico-distal popliteal by-pass

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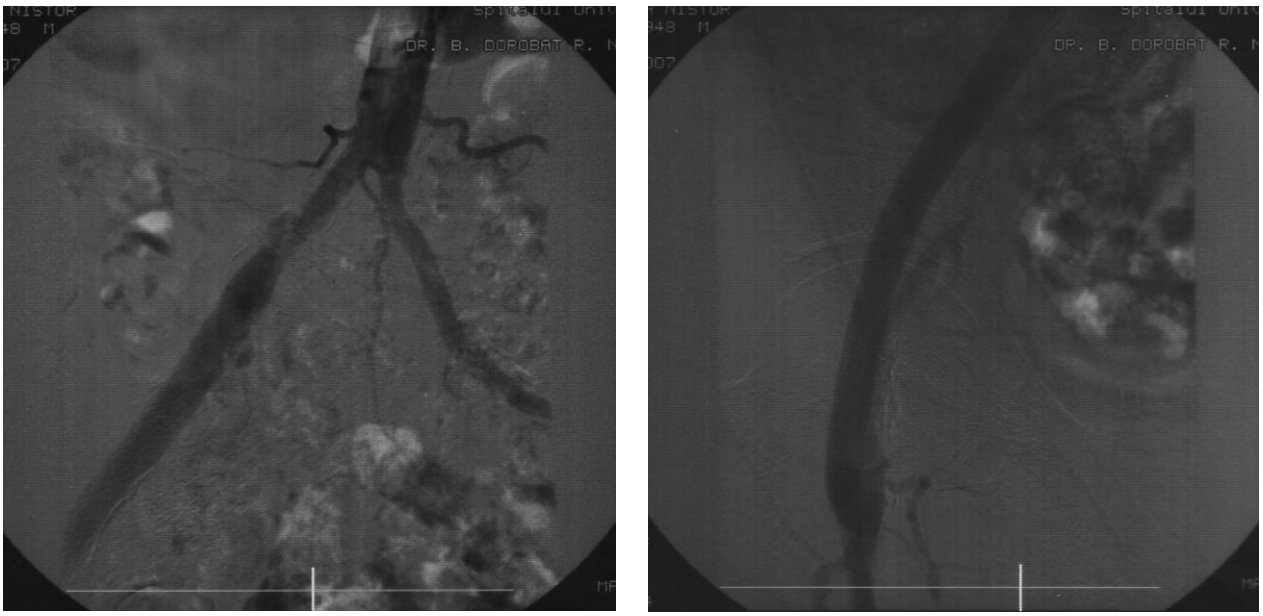
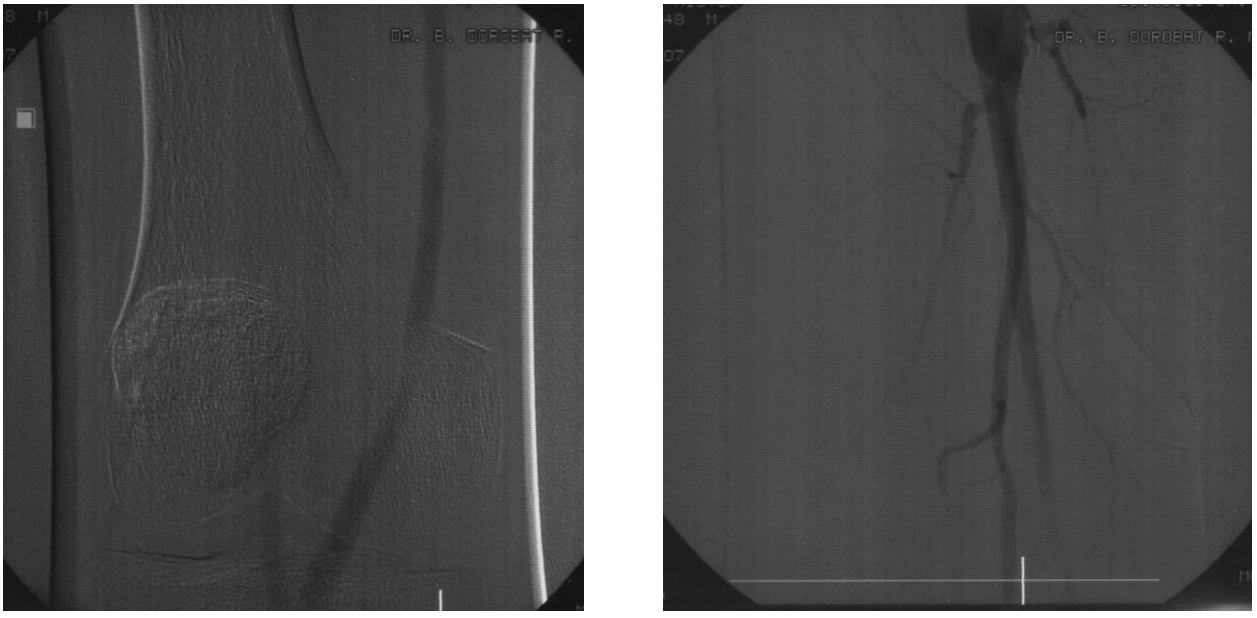


b) c)

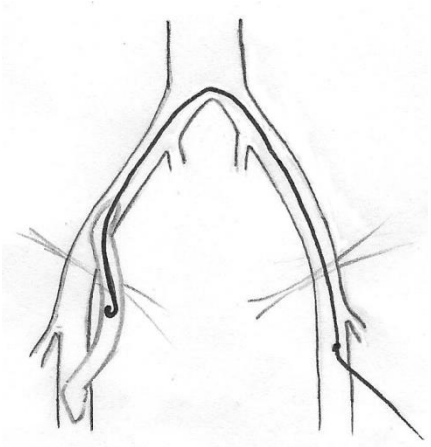
Figure 2b, c – Angiographic aspect of the ilio-femoral by-pass with Dacron 8mm prosthesis with 80% stenosis localized at the proximal anastomosis

On his latest presentation 6 months ago a lower extremity angiographic examination evidentiated an 80% stenosis localized at the proximal anastomosis of the Dacron graft **(Figure 2b),** on the external iliac artery, and patent by-passes despite the decreased inflow **(Figure 2 d, e)**.



d) e)

Figure 2d, e – Angiographic aspect of the prosthetico-distal by-pass with GSV



The scar in the groin, compromised lymph drainage and the presence of synthetic material from the previous operation excluded the possibility of surgical exposure and reconstruction considering the high risk of wound and graft infection. In this case the percutaneous transluminal angioplasty (PTA) and stent deployment through the contralateral femoral artery and crossover manoeuvre **(Figure 3)** offered a reliable option for sufficient revascularization of the iliac artery and consecutive limb salvage.

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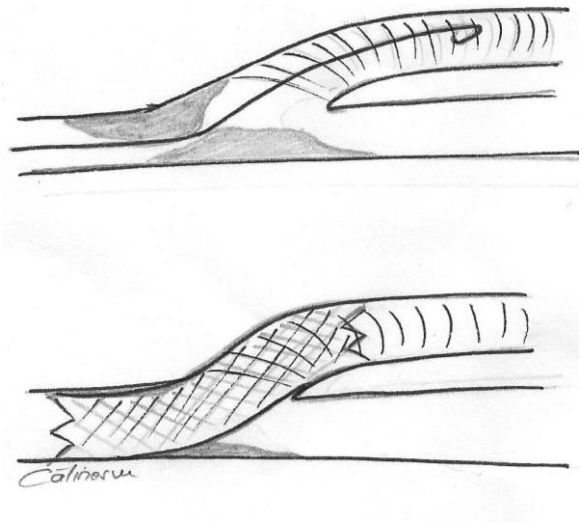
Figure 3 - Contralateral femoral artery approach



The endovascular repair consisted in a PTA followed by a self expandable nitinol stent deployed from the external iliac artery into the proximal portion of the Dacron graft. **(Figure 4)**

Completion angiogram was performed to ensure the successful revascularization of the external iliac and peripheral arteries.

Figure 4 - Stent deployment in the external iliac artery and proximal segment of the Dacron graft.

The postoperative course was uneventful with discharge on day 3.

The patient was set in a clinical surveillance programme with lifestyle and atherosclerotic risk factor modification, as well as in a follow-up programme which included clinical examinations and duplex ultrasound examination at 1 and 3 months, now being in the 6-th month after the endovascular intervention.

The post-interventional treatment included aggressive lipid control as well as double anti-platelet agents (acetylsalicylic acid 100 mg and clopidogrel 75 mg daily)

The duplex ultrasound examination performed at 6 months after the procedure confirmed the patency of both inflow and outflow reconstructions, the patient being free of ischemic symptoms.

DISCUSSION

It is well known that arterial reconstructions involve vessel wall injury with consequent tissue repair processes. Intimal hyperplasia is the result of this healing process resulting a newly formed stenosis of the involved arterial segment. Since intimal hyperplasia affects around 15-30% of all arterial interventions, efforts to try and control this mechanism would have a great clinical impact (Williams DO et al., 2000).

Arterial and venous autografts are the materials of choice to perform arterial by-passes or arterial reconstructions. Taken into account their limited availability as well as a possible future coronary bypass surgery all these autografts should be used with great care. Unfortunately, on the other hand, even with the most recent advances in the development of vascular prostheses, the patency of small diameter prosthetic gratfs (8 mm or less) is limited by the development of anastomotic intimal hyperplasia and consequent graft thrombosis. When small diameter prosthetic grafts such as those fabricated from PTFE or Dacron are placed above the knee, cumulative patency rates range from 37.9 to 71%; and below the knee from 30 to 57% (Green RM et al., 2000; el-Massry S et al., 1994).

It is estimated that approximately one-third of patients will require additional surgery related to their bypass graft within 2 years of the initial procedure. Furthermore, the risk of reoperation is increased substantially by the progression of ischemic heart disease and other associated atherosclerotic risk factors in these patients. Reoperative mortality rates of up to 5% and major limb loss rates of 20% have been reported. As a consequence, patients in whom complications related to their grafts develop may be unable to withstand the secondary operations needed to replace them

The morbidity and expense of further treatment for restenosis is considerable, since adjuvant therapies to prevent luminal renarrowing are only now being realized in the limited context of stent angioplasty with drug coated stents. The ultimate goal of research in this area is to develop pharmacological strategies to modify vascular scarring so that zones of injury are repaired without luminal narrowing.

CONCLUSION

In the case of severe limb ischaemia in patients with a history of multiple vascular reconstructions in the ipsilateral groin, the surgical exposure of the femoral and iliac artery is not only technically demanding but also has an unfavorable prognosis. In these cases endovascular interventions offer a reliable and safe approach at least in the short and medium term.

AUTHOR CONTRIBUTION

All authors have contributed equally to the present work.

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