

Outcomes of the Use of a Superflexible Nitinol Stent in the Popliteal Artery

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ABSTRACT

Background: The long-term primary patency rates for percutaneous transluminal angioplasty using first and second generation stents for the treatment of the popliteal artery have been disappointing. However, results with the new nitinol stents seem promising. Our objective was to evaluate short-term clinical outcomes using the superflexible nitinol stent in the treatment of atherosclerotic lesions in popliteal segments. **Methods:** Retrospective longitudinal study conducted from April to December 2013. Population characteristics, procedure-related data and imaging tests were assessed at 6 months. Stent patency and limb salvage rates were obtained. **Results:** A total of 14 patients with mean age of 73 ± 11 years were included, of which 50% were male and 64.3% diabetic. All patients had trophic lesions in the treated limbs. The arteriographic lesions were classified according to the criteria of the Trans-Atlantic Inter-Society Consensus (TASC) criteria as TASC B and C in equal proportions. In the assessment of below-the-knee runoff, 78.6% of the patients had only one distal pervious artery, of which the fibular artery was the most frequently observed. The stent landing zone was the mid segment of the popliteal artery in 57.1% of the cases and the distal segment, crossing the knee joint, in the remaining patients. During the 6 month follow-up there were no stent fractures. The primary patency rate was 85.7% and the limb salvage rate was 100%. **Conclusions:** In our study, angioplasty using the super flexible nitinol stent demonstrated to be safe and effective for the treatment of atherosclerotic lesions of the popliteal artery.

DESCRIPTORS: Stents. Angioplasty. Popliteal artery.

RESUMO

Resultados do Uso de Stent de Nitinol Superflexível em Artérias Poplíteas

Introdução: As taxas de patência primária no longo prazo para a angioplastia transluminal percutânea, com implante de stents de primeira e segunda geração, no tratamento da artéria poplíteia, têm sido desapontadoras. No entanto, resultados com novos stents de nitinol parecem promissores. Nosso objetivo foi avaliar desfechos clínicos no curto prazo do uso de stents de nitinol superflexíveis no tratamento de lesões ateroscleróticas nos segmentos poplíteos. **Métodos:** Estudo retrospectivo, longitudinal, realizado no período de abril a dezembro de 2013. Foram avaliados as características populacionais, os dados do procedimento e os exames de imagem aos 6 meses, sendo obtidas as taxas de patência do stent e de salvamento de membro. **Resultados:** Incluímos nesta análise, 14 pacientes, com idade de 73 ± 11 anos, 50% do sexo masculino e 64,3% diabéticos. Todos os pacientes apresentavam lesão trófica nos membros tratados. As lesões arteriográficas foram classificadas pelo critério *Trans-Atlantic Inter-Society Consensus* (TASC) em B e C em igual proporção. Na avaliação do leito de escoamento, 78,6% dos pacientes possuíam apenas uma artéria pérvia, sendo a artéria fibular a mais frequentemente observada. As zonas de aterrissagem dos stents foram o segmento médio da artéria poplíteia em 57,1% dos casos e, nos demais, o segmento distal da artéria, cruzando a articulação do joelho. Durante o seguimento de 6 meses, não foram observadas fraturas dos stents. A taxa de patência primária foi de 85,7% e a de salvamento do membro foi de 100%. **Conclusões:** A angioplastia com uso de stent de nitinol superflexível demonstrou ser segura e efetiva no tratamento das lesões ateroscleróticas da artéria poplíteia.

DESCRITORES: Stents. Angioplastia. Artéria poplíteia.

Lower-limb revascularization with the use of stents for the treatment of peripheral obstructive arterial disease (POAD) is usually restricted to segments not submitted to external compression, or to regions without mobility, due to the complex mechanisms of forces acting on the vessels, with generation of considerable biomechanical stress, especially in the popliteal artery.¹ Even today, the results are not ideal, with stents of first and second generation showing patency rates below those of conventional surgical treatment. The rates of stent fracture, when the device is implanted in the popliteal artery, range from zero to 65% in different cohorts.²

A new generation of more flexible and resistant stents^{3,4} has shown comparable results, in the short-and medium-term, versus surgical treatment, which is still considered the standard technique for the treatment of these lesions.¹ With the development of third-generation superflexible stents, endoluminal therapy has increasingly replaced surgical revascularization.^{4,6}

This study aimed to evaluate the clinical outcomes in the short-term use of superflexible nitinol stents in the treatment of atherosclerotic lesions of popliteal segments.

METHODS

Study type

This was a retrospective, longitudinal, observational study in a referral center for cardiovascular diseases, conducted in the period from April to December 2013. A total of 66 patients underwent angioplasty with stenting of the lower limbs, with 14 cases in the popliteal artery.

Inclusion and exclusion criteria

Patients of both genders, with limiting intermittent claudication, pain at rest in the affected limb or with ipsilateral trophic lesion, and with lesions restricted to the popliteal artery and the presence of at least one leg artery for distal run-off, were treated. Patients with creatinine clearance < 30 mL/kg/min, history of severe allergy to iodinated contrasts, and those with significant atherosclerotic disease in aortoiliac and/or femoral territories were excluded from the procedures.

Preoperative arteriography was used to classify the lesions according to: (1) the Trans-Atlantic Inter-Society Consensus II (TASC-II) 7 criteria: A, B, C, or D (Box); (2) type of lesion: stenosis, occlusion, dissection, or restenosis; and (3) location relative to the articular line: proximal, middle, or distal (Figure 1).

Endovascular procedure

All procedures were performed by the same team at the Hemodynamics Laboratory, Center for Endovascular Interventions, Instituto Dante Pazzanese de Cardiologia.

BOX Classification of lesions according to the Trans-Atlantic Inter-Society Consensus II (TASC II)

- A Lesions that produce the best results and that should be treated by endovascular route.
- B Lesions that produce sufficiently good results with endovascular methods, so that this is still the preferred approach, unless surgical revascularization is required to treat other lesions in the same anatomic area.
- C Lesions exhibiting superior long-term results with surgery, so that endovascular methods should be used only in patients at high surgical risk.
- D Lesions that do not produce good enough results with endovascular methods to justify them as primary treatment.

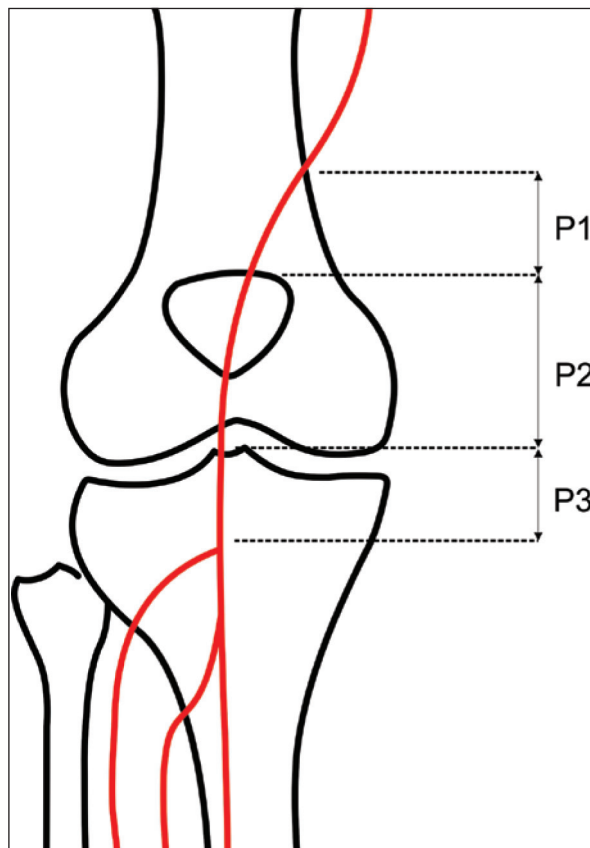


Figure 1 – Schematic representation of the segments of popliteal artery. P1 corresponds to the proximal segment, from the channel of adductor muscles to the upper border of patella; P2 is the middle segment, from the upper border of patella to the joint line; P3 corresponds to the distal segment, from the joint line to the emergence of anterior tibial artery.

Clopidogrel (75 mg/day) and acetylsalicylic acid (100 mg) were started at least three days before the procedure. Clopidogrel was maintained for at least 30 days and acetylsalicylic acid was maintained indefinitely.

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