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Original article

Predictors of Medium-term Patency in Percutaneous Endovascular Therapy of Femoro-popliteal Lesions☆,☆☆

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ABSTRACT

Background: The objective is to study the medium-term results of angioplasty and stenting in the femoro-popliteal sector in patients with critical limb ischemia (CLI), and identify angiographic predictive factors of primary patency.

Patients and methods: Retrospective review of 98 patients with critical ischemia and angiographic lesions characterized as TASC A=13 (14%), B=38 (40%), C=24 (25%) or D=20 (21%). A total of 106 angioplasties and primary self-expanding stents (mean length of stent coverage of 19 cm) were performed between January 2006 and January 2011.

Results: The immediate results of patency, limb salvage and survival were 95, 96 and 96%, respectively. Primary patency at 1 and 2 years was 54 and 38%, respectively. Twenty-seven cases (25%) required endovascular iterative procedures, providing an assisted patency at 1 and 2 years of 72 and 60%, and a secondary patency of 80 and 67%. A lower primary patency was observed (log rank) when stent length was >20 cm ($P<.001$), popliteal artery was involved ($P=.004$), and in TASC C and D lesions ($P=.04$). In multivariate analysis (Cox), only stent length >20 cm was an independent negative predictor for primary patency (HR=5.7, $P<.001$). The limb salvage at 1 and 2 years was 83 and 81%, respectively.

Conclusions: Angioplasty with stent in the femoro-popliteal sector is a safe technique, but with significantly lower permeability results in injuries that require stent coverage of more than 20 cm. In these cases, vein bypass surgery should be the procedure of choice.

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Factores predictores de permeabilidad a medio plazo en el *stenting* primario del sector femoro-poplíteo en pacientes con isquemia crítica

Palabras clave:
Angioplastia
Arteria femoral
Arteria poplítea
Isquemia crítica de extremidades inferiores

RESUMEN

Introducción: Conocer los resultados a medio plazo de la angioplastia con stent del sector femoropoplíteo en pacientes con isquemia crítica e identificar aquellos factores angiográficos que inciden en la permeabilidad primaria.

Pacientes y métodos: Revisión retrospectiva de 98 pacientes consecutivos con isquemia crítica y caracterizados angiográficamente como TASC A = 13 (14%), B = 38 (40%), C = 24 (25%) y D = 20 (21%), sobre los que se realizaron 106 angioplastias con implantación primaria de stents autoexpandibles entre 2006 y 2011.

Resultados: Los resultados inmediatos de permeabilidad, salvamento de extremidad y supervivencia fueron del 95, 96 y 96%, respectivamente. La permeabilidad primaria a 1 y 2 años fue del 54 y 38%, respectivamente. Veintisiete casos (25%) requirieron procedimientos endovasculares iterativos, determinando una permeabilidad asistida a 1 y 2 años del 72 y 60%, y secundaria del 80 y 67%. Se asociaron (log rank) a una menor permeabilidad primaria una longitud del stent mayor de 20 cm ($p < 0{,}001$), afectación de la arteria poplítea ($p = 0{,}004$) y lesiones TASC C y D ($p = 0{,}04$). En el análisis multivariable (Cox), solo una longitud de stent > 20 cm mostró carácter predictor independiente y negativo sobre la permeabilidad primaria (HR = 5,7; $p < 0{,}001$). El salvamento de extremidad a 1 y 2 años fue de 83 y 81%, respectivamente.

Conclusiones: La angioplastia con stent primario en el sector femoropoplíteo es una técnica segura aunque con unos resultados a medio plazo pobres en pacientes con isquemia crítica cuyas lesiones femoropoplíteas requieren una cobertura mayor de 20 cm. En estos casos, el bypass con vena adecuada debería constituir la técnica de elección.

Introduction

Arterial disease of the lower extremities is a frequent manifestation of systemic arteriosclerosis, and superficial femoral artery (SFA) and popliteal involvement is especially prevalent among these patients.[1] Although the most frequent clinical manifestation is intermittent claudication, in cases of critical ischemia with pain while at rest or ischemic lesions there is a real risk of losing the extremity. Efforts at revascularization are directed at these situations.

Saphenous vein bypass has traditionally been the revascularization treatment of reference, with a reported 70% of extremities saved after 5 years.[2,3] In recent years, the use of endovascular techniques has grown because they are less invasive procedures, and they have evolved immensely thanks to the advent of new materials and smaller devices. In fact, the Trans-Atlantic Inter-Society Consensus[4] (TASC) document from 2007 indicates endovascular treatment as the first choice in TASC A femoro-popliteal lesions and as an alternative treatment in type B and C lesions.

The mid- to long-term results of endovascular treatment, however, continue to show less patency when compared with saphenous vein bypass.[3] Meanwhile, these techniques require a higher number of assisted interventions to maintain competitive results. It is therefore necessary to identify what type of arterial lesions could most benefit from its application, thereby avoiding inadequate interventions. The objectives of this study were to assess the mid-term results of a consecutive series of patients with critical ischemia who were treated with angioplasty and primary implantation of a femoro-popliteal stent and to identify angiographic characteristics of arteriosclerotic lesions that could be predictive for the primary patency of the procedure.

Patients and Methods

We retrospectively reviewed the cases of 98 consecutive patients with critical ischemia due to femoro-popliteal lesions during the period 2006–2011. Mean age was 74.2, and 60% of the patients were male. As is characteristic, 79.2% of the patients were diabetic and 14.3% were on dialysis. All patients presented critical ischemia with pain at rest (21%) or trophic lesions (79%). Table 1 shows other clinical characteristics of the patient sample.

Out of these 98 patients, 106 angioplasties were performed (in 8 cases, both lower limbs were treated) with primary self-expanding nitinol stent implantation in the femoro-poplíteal sector. The angiographic characteristics of the treated lesions are specified in Table 2. In 9 cases, the TASC classification was not reliably established because complete angiographic examination was not available before the intervention. We excluded the cases in which there was associated treatment of the tibial arteries or popliteal lesions distal to the articular interline.

The procedures were performed by vascular surgeons in an operating room with a digital angiography system (Siemens Axiom Artis). Femoral puncture was contralateral in 87 cases