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Research Article

Endovascular Treatment Versus Surgery in Long Occlusions of the Superficial Femoral Artery about 50 Cases

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ABSTRACT

Surgical treatment is considered the gold standard for the management of complex lesions in FSA and is currently in competition with the improvement of new endovascular techniques. The aim of this work is to compare the two revascularization techniques in terms of efficacy, morbidity and mortality, which is based on a retrospective study of 50 cases of long FSA occlusions treated either by surgical treatment or by endovascular, at the vascular surgery department of Avicenna military hospital in Marrakech during the period between January 2014 to December 2016. The mean age of our patients was higher in the endovascular treatment group compared to the surgical treatment group, (68.5 years versus 62.3) respectively, we noted a male predominance in both groups. Critical lower extremity ischaemia was the most common reason for consultation in both groups: 76.7% in the endovascular treatment group and 80% in the surgical treatment group. All the patients had received the necessary explorations to assess the lesion as well as the extension of the atherosclerotic disease. The technique was successful in 100% of cases, without any major postoperative complications or death, the average length of hospital stay was lower in the endovascular treatment group: one day compared to 4 days in the surgical treatment group. The primary and secondary patency at 12 months were similar in the two groups (73.3% versus 75%) and (83.3% versus 85%) respectively. Thanks to the improvement of endovascular techniques, the management of long occlusions of the superficial femoral artery therefore appears to be an attractive alternative to surgical treatment, more particularly for patients with high surgical risk and presenting numerous comorbidities

Introduction

Arteriopathy obliterans of the lower limb is defined by the narrowing of the caliber of the arteries that supply the lower limbs, the main etiology of which is linked to atherosclerosis, the severity is closely related to the involvement of other territories. Femoro-popliteal bypass surgery is considered the gold standard [1]. However, in recent years, the revascularization strategy has been disrupted by the results of endovascular treatment, the emergence of new techniques and dedicated equipment have made it possible to obtain results equivalent to those of bypass grafts [2]. The objective of this work is to compare the two techniques in terms of efficacy, morbidity and mortality.

Material and Method

This is a retrospective study of a series of 50 patients, hospitalized in the vascular surgery department at Avicenna military hospital in Marrakech between January 2014 and January 2016, having benefited from endovascular or surgical treatment of long occlusions of the superficial femoral artery. We included patients who had undergone an endovascular or surgical revascularization procedure on lesions of the femoro-popliteal axis TASC II C and D de novo, and of atheromatous cause, with exclusion of any acute ischemia or patients with a history revascularization of the femoro-popliteal axis.

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Results

The study involved 50 patients, of whom 30 patients had received endovascular treatment and 20 patients had received surgical treatment. In the endovascular treatment group, the mean age ranged between 51 and 78 years with an average age of 68.5 years, while the mean age of those who had received surgical treatment was between 44 and 82 years. with an average age of 62.3 years. The risk factors were dominated in both groups by active smoking and diabetes (70%), then hypertension (13%), dyslipidemia (14%) and abdominal obesity (40%) (Table 1). The endovascular group had a higher prevalence of atherosclerotic comorbidities compared to the surgical treatment group (Table 2). Regarding clinical data, the majority of patients in both groups were critically ischaemic. In patients who received endovascular treatment, 7 patients were found to have intermittent claudication, of which 1 patient had a walking distance> 200m, and 6 patients <200m. 14 patients had lying pain. 9 patients had trophic disorders.

Table 1: Cardiovascular risk factors in the two groups.

RISK FACTOR	ENDOVASCULAR		SURGERY		P
	N	%	N	%	
Tobacco	21	70	14	70	1
Diabetes	22	73,3	14	70	1
HBP	13	43,3	6	30	0,387
DYSLIPIDEMIA	4	13,3	3	15	1
ABDOMINAL OBESITY	12	40	8	40	1

Table 2: Comorbidities in different groups.

	ENDOVASCULAR		SURGERY		P
	N	%	N	%	
atherosclerotic comorbidity	19	63,3	3	15	0,001
Non atherosclerotic comorbidity	13	43,3	6	30	0,387

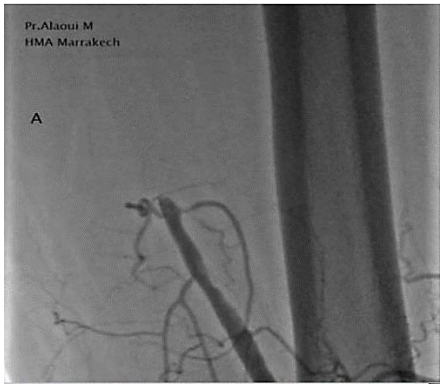

Figure 1: Arteriography image showing arterial access through the popliteal artery.

In the surgical treatment group, 4 patients had intermittent claudication, of which 1 patient had a walking distance> 200m, and 3 patients <200m. 9 patients had lying pain and 7 patients in the surgical treatment group had trophic disorders. IPS measurement was performed in all patients, and patients were classified according to the Leriche and Fontaine classification, and the Rutherford classification. As for the paraclinical evaluation, All the patients had received a Doppler ultrasound of the lower limbs. In the endovascular treatment group, CT angiography was performed in 20 patients, arteriography in 8 patients, and MRI in 2 patients. In the surgical treatment group, 12 patients had undergone CT angiography, arteriography in 7 patients, and MRI in 1 patient.

All patients had undergone an assessment of extension of the atherosclerotic disease, made a cardiac evaluation by a cardiological examination, supplemented by an ECG and an echocardiography which showed that the patients of the endovascular group had more cardiac pathologies compared to in the surgical treatment group with 11 cases of ischaemic heart disease, 2 cases of valve disease: one case of mitral insufficiency, and one case of aortic stenosis 4 cases of cardiomyopathy, while in the surgery group there was 1 case of ischaemic heart disease 3 case of valve disease: one case of mitral and tricuspid insufficiency, and two cases of mitral insufficiency. Doppler ultrasound of the supra-aortic trunks shows that in the endovascular treatment group, 10 patients had presented carotid damage, compared to 4 patients in the surgical treatment group. Abdominal ultrasound found three cases of abdominal aortic aneurysm in the endovascular treatment group with a diameter that ranged between 36mm and 40mm. Against one case of 38 mm abdominal aortic aneurysm in the other group.

To classify the lesions of FSA, we used the TASC II classification. In the endovascular treatment group, occlusions were classified as TASC C in 8 patients, and TASC D in 22 patients (Figure 1), and in the surgical treatment group, occlusions were classified as TASC C in 4 patients and TASC D in 16 patients. Namely who There was no statistically significant difference between the two groups regarding the TASC C and D classification. All our patients were prepared as for conventional surgery, as conversion is always possible. A pre-anaesthetic visit was almost compulsory for all our patients. In the endovascular treatment group, (76.7%) of the procedures were performed under local anaesthesia, associated with a light sedation, a locoregional anaesthesia was associated (23.3%) in the event that a flattening procedure or amputation was performed at the same time of operation, whereas in the surgical treatment group, locoregional anaesthesia was performed in (75%) of the procedures and general anaesthesia was performed in (25%) of the procedures.

Figure 2: Catheterization of the FSA with a hydrophilic guide 0.035.

For endovascular treatment, the arterial approach was performed via the popliteal (retrograde) route in 15 patients by the ipsilateral (anterograde) femoral route in 8 patients, by the contralateral femoral route in 7 patients (crossover).

All endovascular procedures were performed in a catheterization room or in the operating room with mobile scopy by the same team of vascular surgeons, under local or locoregional anaesthesia. The arterial access was performed by antegrade, crossover or popliteal femoral puncture, with the placement of a 6F introducer and a 0.035 guide on a carrier catheter, (Figure 2) the latter was adapted to the morphology of the lesions to be treated. Intravenous heparin therapy was administered as soon as the introducer was placed at a dose of 0.5 mg / kg. The choice of stent diameter and length depended on the lesion being treated. The stents used were self-expanding in nitinol (Figure 3). As associated treatment, 7 patients had undergone minor amputation, and there were no cases of major amputation. All the patients were treated with a double platelet antiaggregating for 3 months: (acetyl salicylic acid) at a dose of 160 mg / day and clopidogrel (plavix) at a dose of 75 mg / day.

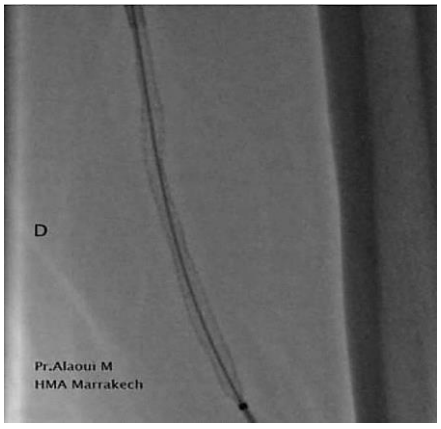

Figure 3: Stent placement in the FSA.

Regarding surgical treatment, all bypass grafts in our series were supra-articular femoropopliteal bypass grafts. All the surgical procedures were performed in the operating room by the same team of vascular surgeons, under locoregional anaesthesia or general anaesthesia. Heparin therapy at a dose of 0.5 mg / kg was carried out intravenously before arterial clamping. The bypasses were performed in prosthetic material 8 mm in diameter, in (PTFE) or in Dacron. An arteriographic check was performed intraoperatively to verify the integrity of the distal anastomoses and to check the downstream network. 4 patients had undergone amputation minor, only one case had received major amputation as an associated treatment. All the patients were treated with an antiplatelet agent: (Kardégic) at a dose of 160 mg / day. In both groups, aspirin was subsequently maintained for life at a dose of 160 mg / day, as well as the control of cardiovascular risk factors.

The peri and postoperative data were as follows: the technical success rate was 100% in both groups and The mean hospital stay was lower in patients who received endovascular treatment with an average hospital stay of one day, while the mean duration of hospitalization of patients who received surgical treatment was four days ($p < 0.001$). Thus, and as early complications, in the endovascular treatment group, one patient had presented a pseudoaneurysm, two patients had a hematoma at the point of regressive puncture after annual compression, in the surgical treatment group, one patient had presented a heart infection. amputation stump. Note that no death occurred in the two groups during the 30 postoperative days. The follow-up period covered by our study was set at 12 months, after the revascularization procedure, all the patients were subsequently invited to the consultation for a clinical evaluation. The patients were monitored by palpation of the pulses, as well as arterial Doppler echo of the lower limbs for 15 days, one month, 3 months, 6 months and then one year.

Primary patency (Figure 4) was not significantly different between the two treated groups (Log rank test = 0.886). In the endovascular treatment group, the primary patency at one year was 73.3%, while 26.7% were complicated by thrombosis. In the surgical treatment group, the primary patency at one year was 75%, while 25% were complicated by thrombosis. Secondary patency (Figure 5) was not also significantly different between the two treated groups (log rank test = 0.882). In the endovascular treatment group, the secondary patency at 1 year was 83.3%. In the surgical treatment group, the secondary patency at 1 year was 85%.

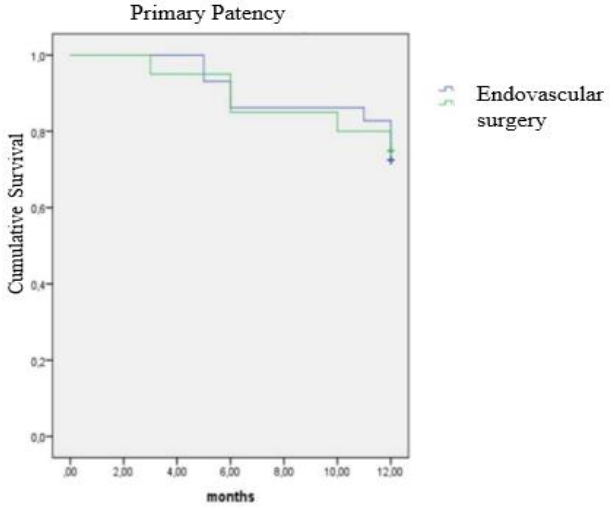

Figure 4: The primary patency rate at 12 months.

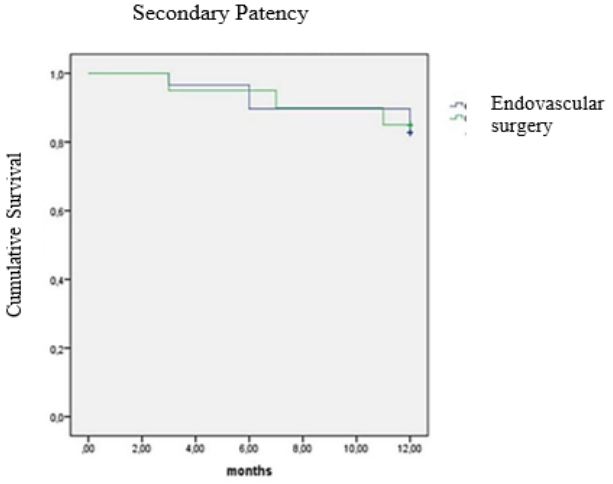

Figure 5: The secondary patency rate at 12 months.

Discussion

The aim of this study was to compare the effectiveness of endovascular treatment versus gold standard (surgical treatment), in TASC C and D lesions of FSA. There are two randomized studies, and a few non-randomized studies comparing surgical treatment with endovascular procedures in TASC C and D occlusions of FSA- 1) The study by Kedora *et al.*: This is a prospective randomized study comparing the two treatments for AFS occlusions, the mean length of the lesions of which was 25.6 cm (TASC C and D: 80%) [3]. Early complications were

observed in (8%) of the endovascular group and (6%) in the group treated by surgery. Limb salvage at one year was not significantly different: 98% for the endovascular group and 89.6% for the surgical group. Up to 12 months no statistically significant difference was found between primary patency and secondary patency in the two groups. In fact, the primary patency at 12 months of follow-up was 73.5% for the endovascular treatment group and 74.2% for the surgical treatment group. Secondary patency at 12 months was 83.9% for the endovascular treatment group and 83.7% for the surgical treatment group. The study concluded that up to 12 months the management of femoropopliteal occlusions with endovascular treatment gave similar results to revascularization by surgical treatment.

2) The Zilverpass study: This is a prospective randomized study comparing surgical treatment (femoro-popliteal supra-articular bypass grafting (PTFE / Dacron), with endovascular treatment (angioplasty / active stent) in claudicating patients or in CHF suffering from TASC C and D lesions of FSA [4]. At 30 days, the endovascular treatment group had presented fewer complications: 4% became complicated in the endovascular treatment group compared with 12.10% in the treatment group The primary patency at one and two years was 78.10% and 68.20% for the endovascular treatment group, respectively, and at 73.10% and 63.70% for the surgical treatment group, the patency was secondary at one year and at two years were respectively 95.20% and 92.80% for the endovascular treatment group and 95.10% and 88.10% in the surgical treatment group. The study concluded that endovascular treatment had gave similar patency results to surgical treatment with fewer complications.

In our series, the patients were a little younger compared to the other studies, the mean age of the patients of the endovascular treatment (68.5 years) was higher compared to those of the surgical treatment (62.3 years), the majority of The patients were male, with 70% of the patients smoking as a higher rate compared to other studies, and the majority of the patients consulted with the critical lower limb ischaemia stage as in the study by Velardi *et al.* namely that the majority of patients in our series were stage D class [5]. In the study by Kedora *et al.*, the arterial access in the endovascular procedure was via the ipsilateral or popliteal femoral approach [3]. All the occlusions were catheterized by subintimal dissection. The stents used were self-expanding nitinol stents. The femoro-popliteal bypass was above articular prosthetic type (PTFE or Dacron).

In the study by Okuna *et al.*, the arterial approach in the endovascular procedure was via the ipsilateral femoral or popliteal approach, the occlusions were catheterized in transluminal dissection, subintimal if the occlusion was total, The stents used were self-expanding nitinol stents [6]. The femoro-popliteal bypass was above articular in 67.6% of cases and subarticular in 32.2%, the saphenous vein was used in 48% of cases and the prosthesis in 52%. In our series, the arterial access was performed via the homolateral femoral approach in 26.7% of cases, via the contralateral femoral approach in 23.3% of cases, and via the popliteal approach in 50% of cases. All of our patients had undergone angioplasty with stenting. The stents used were self-expanding nitinol stents. In our series as well as in the other studies, the length of hospital stay was longer in the surgical treatment group compared to that in the endovascular treatment group.

In the Zilverpass study, the 30-day complication rate was higher in the surgical treatment group: (4% in the endovascular treatment group versus 12.10% in the surgical treatment group) [4]. In the study by Kedora *et al.*, early complications were observed in (8%) in the endovascular treatment group and (6%) in the surgical treatment group. In our study, early complications in the endovascular treatment group were observed in three patients: two cases of hematoma at the puncture site, and one case of false aneurysm; in the surgical treatment group, complications were observed in one patient: infection of the amputation stump.

In the study by Smolock *et al.*, 30-day mortality was 1.5% in the endovascular treatment group and 2% in the surgical treatment group [7]. In our study there were no cases of death in either group. Regarding primary and secondary patency, in our series, the primary patency at one year in the endovascular treatment group was 73.3% versus 75% in the surgical treatment group, the secondary patency at one year was 83.3%. in the endovascular treatment group versus 85% in the surgical treatment group. Our results were close to those of the Zilverpass and Kedora *et al*. studies, in the study by Veraldi *et al*. carried out only on TASC D lesions, the PP at one year of the surgical treatment group was higher than the PP of the treatment group endovascular, however, the secondary patency at one year was similar in the two groups.

Conclusion

The choice of the revascularization technique in long AFS occlusions remains controversial, preventing dictating a firm revascularization protocol in this type of lesions. Studies have shown that endovascular treatment gives encouraging short-term results mainly for TASC C lesions, with morbidity and mortality and shorter hospital stays compared to surgical treatment [4, 8-11]. However, this advantage remains lower in the medium and long term compared to surgical treatment given the high prevalence of restenosis in endovascular treatment. Thus, the choice of one revascularization technique over the other must be made on a case-by-case basis, it depends on the clinical, radiological and anatomical data of each patient as well as on the expertise. In our study, the results of endovascular revascularizations of long ASF occlusions at one year suggest that endovascular treatment appears to be a valid alternative to surgical treatment, especially in patients at high surgical risk. These results need to be supported by a larger cohort, longer follow-up and at best by randomized studies.

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