INTRODUCTION

Of the arteries of the lower extremities, the superficial femoral artery is the most common site for an atherosclerotic stenotic lesion. The frequent absence of lower limb ischemia in superficial femoral artery occlusive disease (SFAO) is mainly due to a patent profunda femoris artery that provides the major collateralization for bypassing the occluded superficial femoral artery by anastomosing with the pelvic arterial system superiorly and the popliteal artery inferiorly. Likewise, when both the superficial femoral and popliteal arteries are occluded, the profunda femoris artery may make anastomoses with the tibial arteries to maintain an efficient blood supply to the legs.

Taken together, the profunda femoris artery is an essential collateral for supplying the lower limb in femoropopliteal occlusive disease. The worst case scenario is when the profunda femoris artery is also occluded and can not compensate for the diminished blood supply of the stenotic/occluded superficial femoral and popliteal arteries. Hence, keeping this vascular channel patent is the goal of profunda femoris arterial reconstructive procedures, the so-called profundaplasty. A 5-year success rate of 75.3% has been found in a series of 357 profundaplasties.

MATERIALS AND METHODS

Between 2004 and early 2006, 150 patients with the
Biomedicine International (2010) 1: 62-65/ Lower limb arterial diseases

Table 1. Profunda femoris artery status in superficial femoral artery occlusive disease.

<table>
<thead>
<tr>
<th></th>
<th>Diabetics</th>
<th>Non-diabetics</th>
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</thead>
<tbody>
<tr>
<td>No stenosis</td>
<td>16%</td>
<td>57.9%</td>
</tr>
<tr>
<td>Less than 50% stenosis</td>
<td>16%</td>
<td>23.7%</td>
</tr>
<tr>
<td>50-70% stenosis</td>
<td>-</td>
<td>7.9%</td>
</tr>
<tr>
<td>Greater than 70% stenosis</td>
<td>12%</td>
<td>5.3%</td>
</tr>
<tr>
<td>Complete occlusion</td>
<td>4%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Multi-segmental/diffuse stenosis</td>
<td>52%</td>
<td>2.6%</td>
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4% (n = 1) and 28% (n = 7) of the involved limbs in diabetic patients had between 50 and 70%, more than 70% of lumen occlusion and multi-segmental superficial femoral artery involvement, respectively.

Table 2. Levels of distal arterial run-off with complete occlusion of superficial femoral artery.

<table>
<thead>
<tr>
<th></th>
<th>Non-diabetics</th>
<th>Diabetics</th>
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</thead>
<tbody>
<tr>
<td>Femoral</td>
<td>9 (23.7%)</td>
<td>1 (9.1%)</td>
</tr>
<tr>
<td>Popliteal</td>
<td>3 (7.9%)</td>
<td>2 (18.2%)</td>
</tr>
<tr>
<td>Infrapopliteal</td>
<td>11 (28.9%)</td>
<td>6 (54.5%)</td>
</tr>
<tr>
<td>No run-off</td>
<td>15 (39.5%)</td>
<td>2 (18.2%)</td>
</tr>
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RESULTS

Fifty six patients with SFAO ranging from 30% to complete luminal occlusion were studied. The mean age of the patients was 59.1 +/- 13.2 years (58.5 +/- 13.9 for non-diabetics versus 60.1 +/- 12.3 for diabetics) with a female to male ratio of 1 to 7. There were 21 diabetic and 35 non-diabetic patients. Totally, 63 sides had SFAO involvement of which 30 sides were on the left and 33 sides on the right side. Seven patients (four diabetics and three non-diabetics, 12.5%) had bilateral SFAO.

In non-diabetics, all involved limbs had a complete SFAO, while only 11 out of 25 sides (44%) in diabetics had complete occlusion. The remaining 24% (n = 6),

signs and symptoms of the lower limb ischemia (intermittent claudication or a combination of the classic 5Ps of arterial insufficiency namely paresthesia, pulseslessness, pallor, pain and paralysis) were examined in a single angiography unit in Tabriz Medical University. Angiography was performed by catheterizing the contralateral common femoral artery and injecting dye at the origin of the ipsilateral common femoral artery of the ischemic limb. If both limbs were involved, this was performed by catheterizing via the left brachial artery. Anteroposterior and if necessary, an oblique thigh view was obtained to assess the status of the superficial and deep femoral arteries. Patients with stenosis or occlusion of superficial femoral artery were included in this study. Age, gender and side of involvement as well as the degree and the pattern (either single/short length or multiple/diffuse) of the profunda femoris artery involvement, if any, were recorded. The levels of distal arterial run-off, if present, were determined in the limbs with complete occlusion of superficial femoral artery. Arterial run-offs were classified as femoral (at the level of middle-to-distal two-thirds of superficial femoral artery), popliteal (at the level of popliteal artery) and infrapopliteal (at the levels of tibial and/or peroneal arteries). The patients were then divided into two groups, diabetic and non-diabetic and compared.

Figure 1. Profunda femoris artery status in patients with SFAO. Mild, less than 50% stenosis; Moderate, between 50 and 70% stenosis; Severe, greater than 70% stenosis; Complete, 100% arterial occlusion; MSS, multisegmental stenosis

Figure 2. Multi-segmental stenosis of the superficial and profunda femoral arteries in a diabetic patient
lowed by a stenosis of between 50 and 70% in 7.9% (n = 3), more than 70% in 5.3% (n = 2), diffuse stenosis in 2.6% (n = 1) and complete arterial occlusion in 2.6% (n = 1) of sides. The site of profunda femoris artery involvement was the origin or the proximal one third of this vessel in all the involved sides in non-diabetics (Figure 2), except in a single case with diffuse lesion. However, 84% of SFAO sides (n = 21) in diabetic patients had profunda femoris artery involvement, the most common pattern of which was multi-segmental and long length occlusive lesion (n = 13, 52%; Figure 3). Among limbs with complete SFAO, arterial run-offs were absent in 39.5% in non-diabetic patients while in 18.2% in diabetic patients (Table 2).

DISCUSSION

The results of this study show that the profunda femoris artery is affected differently in diabetic and non-diabetic patients with SFAO. Although diabetics had more frequent and multi-segmental profunda femoris arterial lesions, non-diabetics had fewer and most commonly unisegmental lesions that were usually at the origin or the proximal portion of this vessel. Diabetics tended to develop symptoms of lower limb ischemia with lesser degrees of SFAO, probably because of simultaneous profunda femoris involvement. Simultaneous and complete occlusion of both superficial and deep femoral arteries was a rare condition in this series.

Okike and Bernatz stated that the profunda femoris artery is seldomly affected by atherosclerosis even if the common and superficial femoral arteries are severely affected." King et al. found a correlation between diabetes and the severity atherosclerosis of the profunda femoris artery but not of the superficial femoral artery. Hyvarinen also reported diffuse femoropopliteal arterial disease in diabetic patients. However, the differential pattern of superficial and deep femoral artery involvement was not fully investigated. Surgical repair of the profunda femoris artery has been developed. Fugger et al. postulated that stenosis at the origin of profunda femoris artery is associated with favorable clinical outcome after a profundaplasty. Contrary to this, whole length obstruction of the profunda femoris artery is considered as one of the most common cause of failures after profundaplasty. Percutaneous profundaplasty (balloon angioplasty) is generally a safe and effective revascularization measure that can be applied in patients with anatomically suitable lesions. Our findings may indicate that diabetic patients with SFAO may not be appropriate candidates for profundaplasty as whole length and multi-segmental arterial lesions may make them less favorable for intraluminal stenting and more prone to failure after a bypass profundaplasty. Dardik et al. opined that diffuse profunda femoris disease decreases the success rate of profundaplasty. In the classic study of Pollock, it was shown that diabetics with gangrenous lower limbs had the worst outcome following profundaplasty. In the present study, more non-diabetic patients than diabetics with complete occlusion of the superficial femoral artery had absent distal arterial runoff. Such patients may be poor candidates for arterial bypass surgery or transluminal angioplasty.

Vascular surgeons should have a thorough knowledge of the status of the profunda femoris artery in patients with SFAO. This allows a proper and timely selection of patients who might benefit from profundaplasty. These data may prove useful in the advancing era of vascular surgery.

REFERENCES


