Local Thrombolysis in Femoropopliteal Occlusion: 
Early and Late Results

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Abstract. The early and late results of local thrombolysis with low-dose streptokinase followed by 
balloon dilatation in 64 patients with an occluded femoropopliteal artery are reviewed. The primary 
success rate was 77% for the native arteries; it was higher (80%) for short (<10 cm) as compared with 
long occlusion (40%) and for patients with claudication as compared with those with advanced ische-
mia (89% versus 48%). Eleven complications were observed in 10 patients, most frequently a local he-
matoma at the puncture site. Ascending thrombosis and absence of lysis or incomplete lysis were 
the main reasons for failure. The cumulative patency rate after 1 and 2 years follow-up was 87% and 82%, 
respectively.

Key words: Arteries, extremities—Arteries, transluminal angioplasty—Thrombosis, femoral— 
Streptokinase

Materials and Methods

The clinical charts of 52 men and 12 women who underwent local thrombolysis combined with transluminal angioplasty for an ar-
terial occlusion in the legs between 1980 and 1984 were re-
viewed. The site of the occlusion was the common femoral (n = 
1), the superficial femoral (n = 44), the popliteal (n = 12), or the 
femoropopliteal artery (n = 6). In one patient the entire femoro-
popliteal segment was occluded. The mean length of the occlud-
ing thrombus was 7.3 cm (range: 1.5–25 cm). The time from the 
onset of symptoms to the procedure averaged 3.5 months: 8 
patients had a recent onset (<1 week), while 11 had stable symp-
toms for at least 6 months. Thirty-five (35) patients had a history 
of claudication only (grade 1); 23 had rest pain (grade II) and nine 
presented with ischemic skin lesions or gangrene (grade III) [5]. 
All occlusions were presumably of thrombotic origin.

As in percutaneous transluminal angioplasty, a catheter 
was introduced into the femoral artery and placed in the prox-
imal part of the occluding thrombus, where streptokinase was 
infused. Two dosage schemes were used. In the first 50 patients 
the clot was infiltrated with 1 ml of isotonic saline containing 
5000 U of streptokinase. After 10 minutes the catheter was ad-
vanced and injection of the same dose of the drug repeated. In 
this way progressive lysis of the clot was obtained under continu-
ous fluoroscopic control until the distal open lumen was reached 
(scheme A) [6]. The total dose of streptokinase varied between 
5,000 and 250,000 U per patient (mean 64,500 U) and the proce-
dure lasted between 0.5 and 8 hours (mean 2.4 hours). In the last 
14 patients a continuous infusion of 5,000 U of streptokinase per 
hour together with 400 U of heparin per hour at a rate of 1 ml per 
hour was delivered into the clot. The catheter was first posi-
tioned in the tip of the clot. After 1 hour of infusion a control 
angiogram was obtained. The catheter was then advanced over 
about 1 cm under fluoroscopic control and infusion of thrombo-
lytic enzyme and heparin continued. Control angiograms were 
repeated every 2–4 hours until angiographic evidence of lysis 
was obtained (scheme B) [7]. The infusion lasted between 4 and 
62 hours in these patients (mean 18 hours). Stenotic lesions and 
mural thrombi that remained after thrombolysis were treated im-
mediately by balloon dilatation during the same procedure. Anti-
 thrombotic agents were prescribed after a successful recanaliza-
tion; 42 patients were given a combination of acetylsalicylic acid 
(250, 500, or 1,000 mg per day) and dipyridamole (75 mg three 
times daily) and other coumarinic drugs.

Late follow-up consisted of a meticulous history and physi-
cal examination, with special attention for the arterial pulses just 
distal to the site of thrombolysis. In addition, ankle systolic pres-
sures were measured by Doppler. At the last control visit (Octo-
ber to November 1985) echography of the femoropopliteal artery
Table 1. Primary Success Rate, Clinical Grade of Ischemia, and Streptokinase Dosage Scheme

<table>
<thead>
<tr>
<th>Grade</th>
<th>Grade I (%)</th>
<th>Grade II-III (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All patients</td>
<td>31/35 (89)</td>
<td>14/29 (49)</td>
</tr>
<tr>
<td>Scheme A</td>
<td>25/29 (86)</td>
<td>11/22 (50)</td>
</tr>
<tr>
<td>Scheme B</td>
<td>6/6 (100)</td>
<td>3/7 (43)</td>
</tr>
</tbody>
</table>

Table 2. Cause of Failures

<table>
<thead>
<tr>
<th>Cause of Failure</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>No lysis</td>
<td>3</td>
</tr>
<tr>
<td>Partial lysis</td>
<td>4</td>
</tr>
<tr>
<td>Remaining stenosis resistant to dilation</td>
<td>2*</td>
</tr>
<tr>
<td>Immediate reocclusion</td>
<td>1</td>
</tr>
<tr>
<td>Ascending thrombosis</td>
<td>4</td>
</tr>
<tr>
<td>Subintimal dissection</td>
<td>1</td>
</tr>
</tbody>
</table>

* One patient with distal embolism.

Angiography via femoral catheterization was ordered only if needed for clinical decision making. This follow-up study was approved by the Ethics Committee of our institution. The Chi-square test was used for statistical analysis.

Results

Early Results

Patency was restored and angiographically demonstrated in 49 of 64 patients (77%) with an occlusion of the native artery; 48 of them experienced an immediate clinical improvement. Recanalization of a 3.5-cm-long occlusion of the femoral artery did not improve the ischemia in the last patient, who had widespread atherosclerotic lesions. Because vascular repair was impractical, she needed a major amputation 5 days later. Early reocclusion (within 1 month) occurred in 3 patients. Two of them had the same mild claudication as before thrombolysis; both had a residual stenosis that resisted balloon dilatation at the end of the streptokinase infusion. The third one redeveloped severe ischemia. Since local thrombolysis in this patient had been a limb salvage procedure, amputation could no longer be avoided.

Table 1 relates the immediate outcome of local thrombolysis to the initial clinical stage and to the streptokinase dosage scheme. The success rate was significantly higher in patients with claudication only than in those with advanced grades of ischemia (p < .01). On the other hand, the two dosage schemes appeared equally effective. Recanalization was obtained in 80% of the occlusions with a length less than 10 cm (n = 54), but only in 40% of those equal to or exceeding 10 cm (n = 10) (p < .01). Five patients had severe ischemia due to a long occlusion of the femoral artery combined with diffuse obstructive lesions in the tibial arteries; thrombolysis was unsuccessful in all of them. By contrast, 92% of the shorter occlusions (<10 cm) in patients with claudication were completely lysed. The age of the occluding thrombus had an inverse influence on the success rate: the age was older in successful procedures (4 months vs. 2 months). Eleven complications occurred in 10 patients but they did not affect the final results. They were hematoma at the puncture site in 7, one thrombus formation around the catheter, one subintimal dissection, one arterial spasm, and one distal embolization.

Local thrombolysis failed in 15 patients. The causes of failure are listed in Table 2. Immediate reocclusion in one patient was a consequence of distal embolization with early interruption of the streptokinase infusion. In another 5 patients failure was also due to a complication of the technique. Five patients with unsuccessful thrombolysis received conservative treatment, 5 underwent bypass surgery, and the other 5 were amputated. Thrombolytic treatment in this last group was—as in two others who needed amputation—a limb salvage procedure after vascular reconstruction appeared impractical.

Late Results

All patients with a patent vessel 1 month after the thrombolytic treatment were invited for late follow-up. Thirty-eight (38) of them were followed at the outpatient clinic and 26 consented to a control angi-