Catheter-Directed Thrombolysis-Assisted Angioplasty for Chronic Lower Limb Ischemia

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Background: Thrombolysis is an appropriate treatment for acute arterial occlusion. There remains controversy as to whether thrombolysis before angioplasty helps to identify the underlying lesion and improve results for chronic ischemia of the lower extremity. We sought to investigate the feasibility of catheter-directed thrombolysis-assisted angioplasty for chronic lower limb ischemia.

Methods: Between July 2008 and December 2009, the data of patients with chronic lower limb ischemia undergoing catheter-directed thrombolysis-assisted angioplasty were retrospectively analyzed.

Results: Twenty consecutive patients (18 men with a mean age of 56.35 ± 8.5 years) underwent thrombolysis-assisted angioplasty for occlusion of a native artery (n =18) or bypass graft (n = 2). The median duration of symptoms was 19 months (range: 3-48 months). Symptoms included disabling claudication in 12 patients, rest pain in 5 patients, and gangrene of the toes in 3 patients. Urokinase or recombinant tissue plasminogen activator as a thrombolytic agent was used before angioplasty. The mean length of occlusive lesions decreased significantly from 150 mm to 30 mm after thrombolysis (P < 0.01). Four patients had no change in their lesions. Improvement of Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II) classification was achieved in 16 patients, with 14 TASC IIA lesions and 2 TASC IIB lesions after thrombolysis. Subsequent stenting was successfully performed in all patients. The ankle-brachial index increased significantly from 0.33 to 0.63 (P < 0.01). No perioperative deaths occurred. Morbidity included access site bleeding in 1 patient and distal embolization in 2 patients without further intervention. The primary patency rate at 1 year was 95%, with a median follow-up time of 19 months.

Conclusions: Catheter-directed thrombolysis-assisted angioplasty is a safe and effective treatment in some patients with chronic lower limb ischemia. It may reduce the magnitude of the lesion and simplify the expected intervention procedures.

Table I. Characteristics of the patients

Patient characteristics	Value
No. of patients	20
Mean age ± SD (yr)	56.35 ± 5.8
Male sex (*n*)	18
Hyperglycemia (*n*)	7
Hypertension (*n*)	8
Diabetes (*n*)	6
Coronary artery disease (*n*)	5
Cerebrovascular disease (*n*)	4
Smoking history (*n*)	3
Fontaine classification	
3—Disable claudication (*n*)	12
4—Rest pain (*n*)	5
5—Ulcer or toe gangrene (*n*)	3
Native occlusion (*n*)	18
Femoropopliteal bypass (*n*)	2 at 1 yr and 2 yrs after operation
Mean occlusion length (mm)	150
Antiplatelet status (*n*)	
Aspirin	9
Ticlopidine	8
None	3
Endovascular access site (*n*)	
Ipsilateral femoral artery	4
Contralateral femoral artery	11
Left brachial artery	2
Bilateral femoral artery	3

SD, standard deviation.

Table II. Clinical data of 20 patients with chronic limb ischemia

Patient no.	Age (yr)/ sex	Duration of symptoms (months)	Site of occlusion
1	49/M	48	Aortobilateral iliac artery
2	57/F	12	Aortobilateral iliac artery
3	61/M	3	Graft of left femoropopliteal bypass
4	69/F	24	Right common iliac artery
5	65/F	36	Right common iliac artery
6	46/M	24	Right common iliac artery
7	52/M	6	Left common iliac artery
8	66/M	36	Left external iliac artery
9	38/M	3	Left superficial femoral artery
10	62/M	24	Right superficial femoral artery
11	71/F	12	Graft of right femoropopliteal bypass
12	40/M	4	Right external iliac artery
13	56/M	8	Left superficial femoral artery
14	56/M	9	Left common iliac artery
15	57/M	9	Right superficial femoral artery
16	52/M	18	Left common iliac artery
17	57/M	20	Left superficial femoral artery
18	55/M	20	Left common iliac artery
19	56/M	28	Right superficial femoral artery
20	58/M	28	Right superficial femoral artery

F, female; M, male.

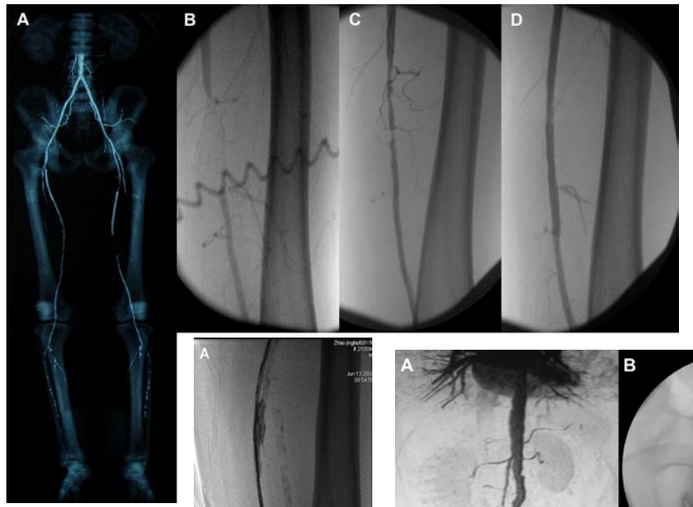

Fig. 1. Case 9 was a 38-year-old man with had severe claudication (150 meters) for 3 months and an ankle brachial index of 0.46. A computed tomography angiography scan and an angiogram revealed occlusion at the left superficial femoral artery (A, B). Catheter thrombolysis (urokinase 750,000 U/day) was performed for 2 days and angioplasty was performed by balloon and stent. Another angiogram revealed excellent results (ankle-brachial index: 1.0) (C, D).

Fig. 2. Case 3 was a 61-year-old man. He had undergone a left femoropopliteal bypass 2 years earlier, had severe claudication (100 meters) for 3 months, and had an ABI of 0.40. An angiogram revealed occlusion at the left femoropopliteal bypass. (A) Catheter thrombosis was performed for 2 days and angioplasty was performed by balloon and stent. Another angiogram revealed excellent results at the left femoropopliteal bypass (ABI: 0.9) (B, C).

Fig. 3. (A) A 69-year-old woman (case 4) with severe claudication (50 meters) and rest pain for 1 year. Her right ABI was 0.35. A magnetic resonance angiography scan revealed severe right iliac artery occlusive lesions. The occlusive length of the right iliac artery was 120 mm. (B and C) The patient received thrombolysis by catheter (urokinase 750,000 U/day). After day 2, another angiogram revealed right iliac artery occlusive lesions from Inter-Society Consensus for the Management of Peripheral Arterial Disease D type changed to B type. (D and E) After endovascular management using the kissing technique, angiography revealed excellent results at the right iliac artery (right ABI: 1.0).