

LIMB SALVAGE AND SURVIVAL IN DIABETIC PATIENTS WITH LOWER LIMB ISCHEMIA

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SUMMARY – We retrospectively analyzed the results of treatment of lower limb ischemia in 63 diabetic patients (27 female and 36 male, mean age 73.5 years) who were identified in a group of 138 randomly selected patients among those who had undergone lower limb arteriography during hospitalization at the Department of Vascular Medicine, Department of Radiology, Clinical Centre Ljubljana, in the year 1998. The reason for lower limb arteriography was claudication in 18 (29%), chronic critical ischemia in 42 (66%), and acute ischemia in three (5%) patients. After arteriography, the procedure of a revascularization was performed in 32 (51%) patients, among whom three patients with acute ischemia had successful embolectomy, 24 were treated endovascularly, and five patients surgically. Thirty (47%) patients were treated conservatively, and one patient with primary amputation. The patient status was reassessed after an average of 24 months, range 19 to 33 months. Among the 18 patients with claudication, two patients died, one from stroke and the other due to worsening of chronic obstructive pulmonary disease with respiratory failure, however, all patients retained their limb during the survival or follow-up, 15 after revascularization procedure and 18 with conservative treatment. Nine (21%) patients had amputation, four below and five above the knee. One amputation was primary, 2 amputations followed endovascular treatment, and 6 were performed after conservative treatment. During the follow-up period, 13 (31%) patients with chronic critical ischemia died, five from stroke, three from acute myocardial infarction, and five due to unknown causes. Our results have confirmed that lower limb ischemia can be treated relatively successfully in diabetic patients, but that mortality remains high, especially in patients with chronic critical ischemia.

Introduction

Diabetic angiopathy is a special entity where macroangiopathy intervenes with microangiopathy and neuropathy. Clinical signs usually include a combination of ischemia and infection. A rapid development of ischemia and infection with poor revascularization conditions often result in amputation¹. Most authors mention diabetes as an important risk factor in the development of chronic critical ischemia (CCI) and consequent amputation². Recent reports speak about better revascularization

possibilities in patients with CCI, a majority of them with diabetic angiopathy^{3,4}. We show the results in a group of diabetic patients selected among 138 patients who had arteriography performed in 1998 at the Clinical Institute of Radiology.

Patients and methods

Among 138 randomly selected patients who had arteriography performed in 1998 due to lower limb ischemia, we selected 63 (46%) diabetic patients, 27 female and 36 male, mean age 73.5 years. An indication for arteriography was intermittent claudication (IC) in 18, CCI in 42, and acute ischemia (AI) in three patients. An av-

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erage IC measured less than 100 m and in no case exceeded 200 m. CCI was defined as at least 14-day rest pain requiring analgetic therapy, chronic ulceration or gangrene of the foot or toe, and systolic ankle pressure below 30 mm Hg. Patients with AI experienced rest pain, sensory and motor disorders of the limb, and lowering of the ankle pressure below 30 mm Hg. Data on the associated risk factors and diseases were analyzed, and results are shown in Tables 1 and 2.

on clinical judgment, hemodynamic measures and arteriography. The patients in whom revascularization procedures could not be performed were treated conservatively or with primary amputation.

Evaluation of the results was performed at an average of 24 (range 19-33) months, based on medical follow-up. Patients with no clinical follow-up were interviewed directly or indirectly (relatives) by telephone. Data were collected on limb salvage or level of amputation, and sur-

Table 1. Patients with diabetes and associated risk factors for peripheral vascular disease (PVD)

Clinical stage and No. of pts	Hypertension	Hypercholesterolemia	Smoking
Intermittent claudication (n=18)	16	12	5
Chronic critical ischemia (n=42)	27	16	17

Table 2. Patients with lower limb ischemia, diabetes and additional diseases

Clinical stage and No of pts	Ischemic heart disease	Cerebrovascular disease	Renal insufficiency	Respiratory insufficiency
Intermittent claudication (n=18)	1	4	3	1
Chronic critical ischemia (n=42)	4	7	3	0

IHD-ischemic heart disease, CVD-cerebrovascular disease, respiratory and renal insufficiency

Table 3. Way of treatment according to clinical stage of peripheral vascular disease

Clinical stage	No. of patients	Endovascular treatment	Operative treatment	Conservative treatment	Primary amputation
Intermittent claudication	18	11	1	6	-
Chronic critical ischemia	42	13	4	24	1
Acute ischemia	3	-	3	-	-

Table 4. The segment of most important stenosis or occlusion treated endovascularly in patients with IC and CCI

Treated segment	IC	CCI
Aortoiliac segment	2	1
Femoropopliteal segment	6	7
Cleft arteries	3	5

The localization and morphology of the lesions were determined by arteriography, including hemodynamic evaluation of the lesions and proposed treatment, endovascular or operative. The decision on treatment was based

vival. The results were evaluated according to the clinical stage of peripheral vascular disease and mode of treatment.

Results

Treatment modalities

After arteriography, 32 of 63 (51%) patients were treated with revascularization, 24 endovascularly, five surgically with bypass grafts and/or thrombendarterectomy, and three with embolectomy. Thirty (45%) patients were treated conservatively and one (2%) with primary above-knee amputation. Patient distribution according to clini-

cal stage and mode of treatment is shown in Table 3. Twenty-four patients were treated by endovascular procedures. Localization of hemodynamically most important stenosis or occlusion, where percutaneous transluminal angioplasty (PTA) was performed, is shown in Table 4, separately for patients with IC and CCI. During the same session we often performed PTA of distal stenosis, so we combined the PTA of iliac arteries with PTA of femoral superficial artery or femoropopliteal artery with the arteries of the cleft.

Thirty of 63 (47%) patients were treated conservatively. The reasons for not performing the revascularization procedure were poor outflow of the cleft arteries in 16, too long occlusion segment with poor outflow in 9, unsuccessful procedure already performed in the past in 2 cases and obesity in one case, whereas in 2 cases the reason was not stated in the documentation.

One patient with developed gangrene of the foot was treated with primary amputation.

Limb salvage and survival rate according to clinical stage

All 18 patients in the clinical stage of IC saved their limb during the follow-up period. One of the six conservatively treated patients underwent transmetatarsal amputation. Sixteen patients survived, and two died (from the conservatively treated group), one from stroke and one from respiratory failure due to chronic pulmonary obstructive disease.

Thirty-three (79%) of 42 patients with CCI saved their limb during the follow-up. After revascularization, two patients had an amputation, one below and one above the knee, and from the conservatively treated group of patients 6 had an amputation, 3 above and 3 below the knee. One patient had primary amputation above the knee. Thirteen (31%) patients died: five from stroke, three from myocardial infarction, and for five patients we did not find the cause of death in their medical documentation.

All patients with AI were successfully treated with embolectomy, and survived the follow-up period with their limb saved.

Limb salvage and survival rate according to the way of treatment

Out of 24 endovascularly treated patients, 22 (92%) saved the limb during the follow-up. None of 11 patients in the clinical stage of IC had lost the limb or died during this period. Of 13 endovascularly treated patients in

the clinical stage of CCI, two had an amputation, one above and one below the knee. Six patients died, four from stroke, one from myocardial infarction, and one due to an unknown cause.

In the group of five surgically treated patients, all five saved the limb during the follow-up, one of them with transmetatarsal amputation. One patient died.

Among 30 conservatively treated patients there were six patients in the clinical stage of IC and 24 in the clinical stage of CCI. The patients from this group in the clinical stage of IC had no amputation during this period, only one of them had transmetatarsal amputation. In the group of 24 patients in the clinical stage of CCI, who were treated conservatively, 17 (75%) patients saved the limb, and six (25%) patients had an amputation, three above and three below the knee. During the period of 19-33 months, eight patients died, two in the clinical stage of IC and six with CCI.

Discussion

This paper shows the outcome in 63 patients with diabetes out of 138 randomly selected patients with peripheral ischemic vascular disease, with arteriography performed in 1998 at our institution. The percentage of patients with diabetes (45%) was lower than stated by other authors. The Rotterdam study⁴ reports on 70% of diabetic patients, together with other risk factors in the advanced stage of peripheral vascular disease. In the limb salvage study with endovascular treatment on iliac arteries, 75% of diabetic patients were found³. We think that our result may be lower because not all patients with diabetes and limb ischemia underwent arteriography. One half of non-traumatic amputations in the USA in patients over 65 years of age are associated with diabetes¹.

The follow-up period was relatively short in our study, i.e. 2 years on an average (range 19-33 months). During either follow-up period or survival time, 85% of the patients saved the limb, 91% of revascularized patients and 75% of conservatively treated patients. Major amputation above or below the knee was performed in nine of 63 (15%) patients, seven of 31 (22%) in the conservatively treated group. Fifteen of 63 (24%) patients died, 12 of them in CCI stage, where the 2-year mortality rate was 31%, and two in IC stage, where the rate was 11%. More patients died than lost the limb, which corresponds to the reports on 40% of CCI patients dying in 3 years⁶. We found no significant difference in the survival rate be-

tween the patients treated endovascularly or conservatively. Seven patients died in the former and eight in the latter group. The causes of death were mostly complications of atherosclerosis, such as myocardial infarction and stroke.

Our results are comparable with the results reported worldwide³⁻⁵, except that most authors deal with patients with diabetic angiopathy together with other patients in the context of CCI or limb salvage. Treatment results and survival are affected not only by the underlying disease, but also by the level of health care, social status, and ethnic ground of the patients as well as some other factors⁷.

Conclusion

Our study has proved that the treatment of diabetic angiopathy is possible. Limb salvage is more successful than life protection. Revascularization improved the possibility of limb salvage, with no major effect on survival.

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Sažetak

OČUVANJE UDOVA I PREČIPLJENJE DIJABETIČNIH BOLESNIKA S ISHEMIJOM DONJIH UDOVA

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Retrospektivno smo analizirali rezultate liječenja ishemijske donjih udova u 63 bolesnika sa šećernom bolešću (27 žena i 36 muškaraca, prosječne dobi 73,5 god.) izdvojenih iz skupine od 138 slučajno odabranih bolesnika među onima kojima je tijekom 1998. god. za vrijeme hospitalizacije na Odjelu vaskularne medicine Odjela za radiologiju Kliničkog centra u Ljubljani učinjena arteriografija donjih udova. Razlozi za arteriografiju donjih udova bili su: klaudikacija u 18 (29%), kronična kritična ishemija u 42 (66%) i akutna ishemija u 3 (5%) bolesnika. Poslije arteriografije, postupak revaskularizacije proveden je u 32 (51%) bolesnika, od kojih je u troje bolesnika s akutnom ishemijskom uspješno provedena embolektomija, 24 bolesnika liječeno je endovaskularno, a 5 bolesnika liječeno je kirurški. Tridesetoro (47%) bolesnika liječeno je konzervativno, a u jednoga je učinjena primarna amputacija. Status bolesnika ponovno je ocijenjen u prosjeku nakon 24 mjeseca (raspon 19-33 mjeseca). Od 18 bolesnika s klaudikacijom dvoje je umrlo, jedan zbog moždanog udara, a drugi zbog pogoršanja kronične opstruktivne plućne bolesti sa zatajenjem respiracije. U svih su bolesnika u razdoblju preživljenja ili tijekom praćenja udovi bili očuvani, u 15 nakon postupka revaskularizacije, a u 18 uz konzervativno liječenje. U 9 (21%) bolesnika učinjena je amputacija (u 4 bolesnika ispod koljena, a u 5 iznad koljena). Jedna je amputacija bila primarna, 2 su uslijedile poslije endovaskularnog liječenja, a 6 poslije konzervativne terapije. Tijekom razdoblja praćenja umrlo je 13 (31%) bolesnika s kroničnom kritičnom ishemijskom (5 zbog moždanog udara, 3 zbog akutnog infarkta miokarda, a 5 zbog nepoznatih uzroka). Naši rezultati potvrđuju da se ishemija donjih udova u bolesnika sa šećernom bolešću može liječiti razmjerno uspješno, no smrtnost je i dalje visoka, poglavito među bolesnicima s kroničnom kritičnom ishemijskom.