

Prognostic Significance of Digital Blood Pressure in Leg Ulcer Patients

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In a consecutive series of patients with ulceration of the lower leg referred to the dermatological in-patient department during a 9-month period, a systolic digital blood pressure level (SDBP) below 60 mmHg was used to identify patients with complicating arterial occlusive disease (AOD) of the legs. AOD was diagnosed in 25 patients and stasis ulcers from venous disease (SDBP \geq 60 mmHg) in 38 patients of the same ages. Patients with ulceration from other causes were excluded. After 1 year, 48 % of the patients with AOD and 5 % of those with stasis ulcers had died. In the AOD group, 11 legs were amputated. Our figures show that the SDBP is valuable in identifying high-risk patients.

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Patients with chronic ulceration of the lower leg are resource-consuming in the health service. Thus, in 1984 a Danish investigation (1) revealed 24 % of the in-patient capacity of dermatological departments to be occupied by this category of patient. Despite the fact that this proportion seems to be increasing, no definite breakthrough in the treatment of chronic ulcer patients has occurred.

The aim of the present prospective study was to

evaluate the prognosis in patients with leg ulcers according to the presence and the degree of arterial occlusive disease (AOD).

MATERIALS AND METHODS

Ninety-seven consecutive patients submitted to the dermatological in-patient department during a 9-month period from April 1986 through December 1986 were included in the study. The inclusion criterion was ulceration of the lower leg and/or foot, regardless of duration.

The patients were questioned about duration of ulceration, previous ulcers, diabetes mellitus, ischaemic leg pains as defined by pains subsiding in the depending position, and the patients were clinically evaluated. The size of the ulcer(s) was categorized in the following ulcer size groups: <1 cm², ≥ 1 cm², <25 cm², ≥ 25 cm², <100 cm², ≥ 100 cm², <200 cm², and ≥ 200 cm². The systolic ankle blood pressure (SABP) and the systolic digital blood pressure (SDBP) of the hallux were measured by the strain gauge technique (2) at the time of inclusion. A SDBP of less than 60 mmHg was taken as the criterion for the presence of significant AOD (3) whereas the SABP turned out to be measurable in only 21 legs due to the ulceration. In a few patients, no distal blood pressures were measured but in these patients the ulcers could be classified by conventional clinical examination.

Ischaemic ulcers

This group consisted of 21 patients with SDBP <60 mmHg and 4 patients with clinically obvious AOD (11 males and 14 females, range 55–91 years, median age 76 years). Nine of these patients had diabetes mellitus, and 1 was insulin-dependent. Twenty-four of the 35 ulcerated legs had lower

Table I. Results at one-year follow-up in 35 ischaemic ulcer legs

	Ulcer healed or improved	Ulcer increased	Amputation	No follow-up because of death
SDBP >30 mmHg	3	5	0	4
SDBP ≤30 mmHg	4	1	10	4
Not measured	1	0	1	2
	8	6	11	10

leg ulcers, 6 had ulcers on both the lower leg and foot, and 5 legs had foot ulcers. The SABP levels in 11 legs measured were <100 mmHg.

Stasis ulcers

Thirty-one patients with SDBP ≥60 mmHg and 7 patients with clinically obvious venous disease lacking signs of ischaemia (15 males and 23 females, range 29–92 years, median age 74) were grouped as stasis ulcer patients. Four of the patients had diabetes mellitus and none were insulin-dependent. The group consisted of 58 ulcerated lower legs. The SABP levels in 10 legs measured were ≥100 mmHg.

Miscellaneous aetiologies

Thirty-four patients submitted for ulcers of various other aetiologies such as bullous erysipelas and vasculitis were excluded from the present study.

Re-evaluation

Approximately one year after discharge, the patients with ischaemic ulcers having stayed in the department in periods from 6–70 days (median 22), and patients with stasis ulcers in periods from 1–86 days (median 16) were re-evaluated. For those deceased, information about the cause of death was obtained from death certificates and information about amputation or ulcer development from case records.

Statistics

Fisher's exact test was used for comparison of patients in the different groups. A *p*-value >0.5 was chosen as level of significance.

RESULTS

Survival of patients

As many as 12 out of the 25 patients (48%) with ischaemic ulcers died within one year, whereas only 2 out of the 38 patients (5%) with stasis ulcers died (*p* < 0.002). This should be seen against the fact that the age of the patients in the two groups were about the same. Seven of the patients with ischaemic ulcers who died had either suffered deterioration of the ulcer or had been amputated. The cause of death was mainly cardiopulmonary insufficiency, 4 in the ischaemic group had diabetes.

Survival of limbs

The same pattern appears from the figures of limb survival (Table I). As many as 11 out of 35 legs (31%) with ischaemic ulcer were amputated, vis-à-vis none of the 58 legs with stasis ulceration (*p* < 0.0001). Seventy-two percent of the ischaemic ulcer patients were either amputated or had died. With SDBP ≥60 mmHg 7 legs (15%) deteriorated, 12 legs (25%) were unchanged and 25 legs (52%) improved or healed.

Diabetes mellitus

In the ischaemic group there were 12 diabetic legs (34%) and in the stasis ulcer group there were only 7 (12%). In the stasis ulcer group similar results as in non-diabetic patients were obtained. In the ischaemic group, 6 out of 12 diabetic legs were amputated, vis-à-vis only 5 out of 23 legs without diabetes. This difference is not, however, statistically significant. The SDBP was lower among diabetic patients.

Clinical examination

The presence of ischaemic leg pains is a valuable sign in identifying patients with AOD. Fibrosis and edema are frequently present in both groups. Our data show moreover, that only 23% of the ischaemic legs had a history of previous ulceration against 52% in the stasis ulcer group. A short history of ulceration (≤6 months) was reported in 51% of the ischaemic ulcer legs. Eighty-two percent of the legs amputated within one year had no previous history of ulceration and the duration of the current ulceration was ≤6 months.

DISCUSSION

The main finding of this study was that the presence of AOD in leg ulceration seriously affects the prog-

nosis of the life and limb. While measurement of the ankle blood pressure, a method widely used to identify AOD of the legs, is usually not possible in patients with lower leg ulcers, the systolic digital blood pressure (SDBP) proved to be a valuable prognostic parameter under these circumstances. Our figures of 10 out of 19 legs amputated with SDBP ≤ 30 mmHg are consistent with those of Holstein & Lassen (4) and suggest moreover that the SDBP interval of 30–60 mmHg constitutes the borderline zone. The prognosis of the ulcer on this interval as regards healing is doubtful but the risk of amputation seems to be small.

In a previous investigation (5), we measured the SDBP in legs classified by physical examination as stasis ulcer legs. A wide range of pressures were found showing the coexistence of AOD in many cases. The present investigation shows that the combination of ischaemic leg pains and a short ulcer history is strongly successive of significant AOD. But it is difficult to discern by *clinical examination*, whether a given ulcer is non-healing or even deteriorating due to venous stasis, due to ischaemia or due to a combination. The poor outcome with SDBP ≤ 30 mmHg as found in the present study demonstrates that in such cases AOD is the dominating disease. In the study mentioned above (5), no correlation was found between the level of the distal blood pressure and the presence of ulceration. But once ulceration has developed in low pressure legs, a serious prognosis is suspected from the observations in the present study of a short ulcer history together with a high percentage of amputations within one year.

The classification according to the SDBP is also valuable in identifying high-risk patients as regards survival. In a recent study (6) the mortality rates for leg and ulcer patients were found to be twice as high as for the age-matched background population, pri-

marily due to an increased mortality rate from ischaemic heart disease. The question arises whether the mortality figures in our study are related to the very condition of the ischaemic ulcer patient, suffering from ischaemic leg pains and immobilization.

The present study has influenced our program for patients with ulceration of the lower leg. When the digital blood pressure is below 30 mmHg, reconstructive arterial surgery is considered. In all other cases, conservative ulcer treatment is attempted, but surgical correlation of venous disease – or perhaps both venous and arterial disease – can be considered if this treatment is not effective.

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