Acta Derm Venereol (Stockh) 1984; 64: 227–232

Leg and Foot Ulcers

An Epidemiological Survey

EVA ANDERSSON, CARITA HANSSON and GUNNAR SWANBECK

Department of Dermatology, University of Gothenburg, Sahlgren's Hospital, Gothenburg, Sweden

Andersson E, Hansson C, Swanbeck G. Leg and foot ulcers: An epidemiological survey. Acta Derm Venereol (Stockh) 1984; 64: 227–232.

Medical records for leg and foot ulcer patients have been investigated, 1377 patients were found. The median age for women was 76 years and for men 70 years. Totally there was a majority of women, 61 %. The age specific frequencies for leg and foot ulcer patients did however not differ between men and women. Thirty percent of all patients had ulcers on the feet only. The ratio between men and women for feet ulcers was 1 : 1. Men got their feet ulcers 5–10 years earlier than women. Seventeen percent of all patients had ulcers on the medial side of the calf only. Seventy percent of these patients were women. A rough estimate of the prevalence of leg and foot ulcer patients was made to between 0.2–0.4 % of the whole population. The involvement of different medical disciplines in the care of leg and foot ulcer patients in Gothenburg is reported. *Key words: Varicose ulcer; Medical specialities; Age factors; Sex ratio.* (Received June 10, 1983).

C. Hansson, Department of Dermatology, University of Gothenburg, Sahlgren's Hospital, S-413 45 Gothenburg, Sweden.

Leg and foot ulcers is not an uncommon problem among old people. It is usually caused by a vascular disease where venous insufficiency has been regarded the most common etiological factor (1, 2). In the individual patient several etiological factors are often operating.

Depending on local tradition these patients are taking care of by different branches of the medical profession. In Sweden leg and foot ulcer patients occupy a significant number of beds in the dermatological wards. Now when the money spent for medical care is being cut down it is important to scrutinize that the care we give for these diseases, is the most effective, not unnecessarily expensive, and giving the best quality of life to the patient. The purpose of the present study is to get an estimate of the number of leg and foot ulcer patients in Gothenburg and where they are being treated for their disease.

Epidemiological studies of leg and foot ulcers in a large population are difficult to make for several reasons (3). Most patients are old and can be expected having difficulties answering epidemiological questionaires sent to them by mail. The patients are distributed among a number of clinics and wards of different disciplines. Unfortunately it is not so common that clinics have patient registers with respect to diagnosis so that patients with a certain disease easily can be found.

We have therefore had to abandon the hope to get data based on records from all patients being treated for leg and foot ulcers.

Instead we have tried to get complete data from some clinics and wards and from others only a representative sample as a base for our estimation.

MATERIAL AND METHODS

The population studied was the city of Gothenburg with close to half a million people (1980 there were 434 699 inhabitants) (4). The method used has been to investigate medical records for all leg and foot ulcer patients in hospital wards and clinics that have patient registers with respect to diagnosis, and

that might be suspected to have patients with leg and foot ulcers. In clinics with no register for diagnosis, a large enough sample of the medical records was scrutinized in order to get a reasonable estimate of the number of leg and foot ulcer patients. Medical records only from 1980 have been included.

Practically all hospital care is non-private. Out-patient care is approximately 80% non-private (5). We have assumed that all leg and foot ulcer patients were taken care of by dermatologists, surgeons (general, orthopedic and reconstructive), geriatricians, specialists in infectious diseases and general practitioners.

Included are all ulcers on the feet and legs which are regarded as dependent on vascular disorders. International "Classification of Diseases, Systematic Catalogue 1968, Third Edition", register for diagnosis is used by hospital wards and some out-patient clinics. Diagnosis numbers: 250.09; 443.10; 445.00; 446.00; 447.08; 453.09; 454.00; 454.99; 686.00; 707.09; have been used in the investigation. For out-patients in dermatological clinics the diagnosis A22, D12, D14, D15, D17, D18, D23, D24, D25, D26, D30, D35, D48, E9, H11, S54, S55, S59, have been selected from "E. H. Herman, Dermato-Venereologica, Classification Generalis et Classificatio Aetiologica".

From the records of leg and foot ulcer patients of the fully investigated clinics and wards the following information has been collected: age and sex of the patient, type of clinic or ward, localization of the ulcer(s) and some other information to be reported later.

In the clinics where only a sample of the records were investigated, patients born on days 1, 2 and 3 of the month were included. To get an estimate of the total number, the obtained figures were multiplied by 10.15 (365.25/36).

RESULTS

Completely investigated

In the completely investigated clinics and wards 940 patients with leg and foot ulcer were found. Checks have been made for double registrations to see if the same patient had visited more than one clinic or ward. Of these 940 patients, 570 were women and 370 men. Before the correction for double registrations was made, the total number of patients found was 1 089.

Sample tests

At the out-patient department of the surgery clinic in the Östra Hospital, 3 640 records were investigated and 12 patients with leg and foot ulcers were found. This gives us an estimated number of leg and foot ulcer patients of 122 (with 95% confidence interval of 53–191).

At the out-patient department of the clinic for infectious diseases 1 117 records were investigated and 5 leg and foot ulcer patients were found. This gives an estimated number of 51 leg and foot ulcer patients (with 95% confidence limits of 7–95).

At the general practitioners, 6 008 records were investigated and 26 leg and foot ulcer patients were found, giving an estimate of 264 leg and foot ulcer patients (with 95% confidence limits from 163–365).

Total number

A crude estimate of the number of leg and foot ulcer patients in Gothenburg would thus give (940+122+51+264) = 1 377 patients (with 95% confidence limits 1 247–1 507). The confidence interval only refers to the statistical error due to the sampling and does not include possible systematical errors in the whole procedure.

Age frequency

The age frequency of the 940 patients on which we have complete data is given in Fig. 1.

Age specific relative frequency

The 940 patients from the fully investigated wards and clinics comprise 68% of all (1 377) patients. We assume that these 68% are representative of the whole group of leg and foot

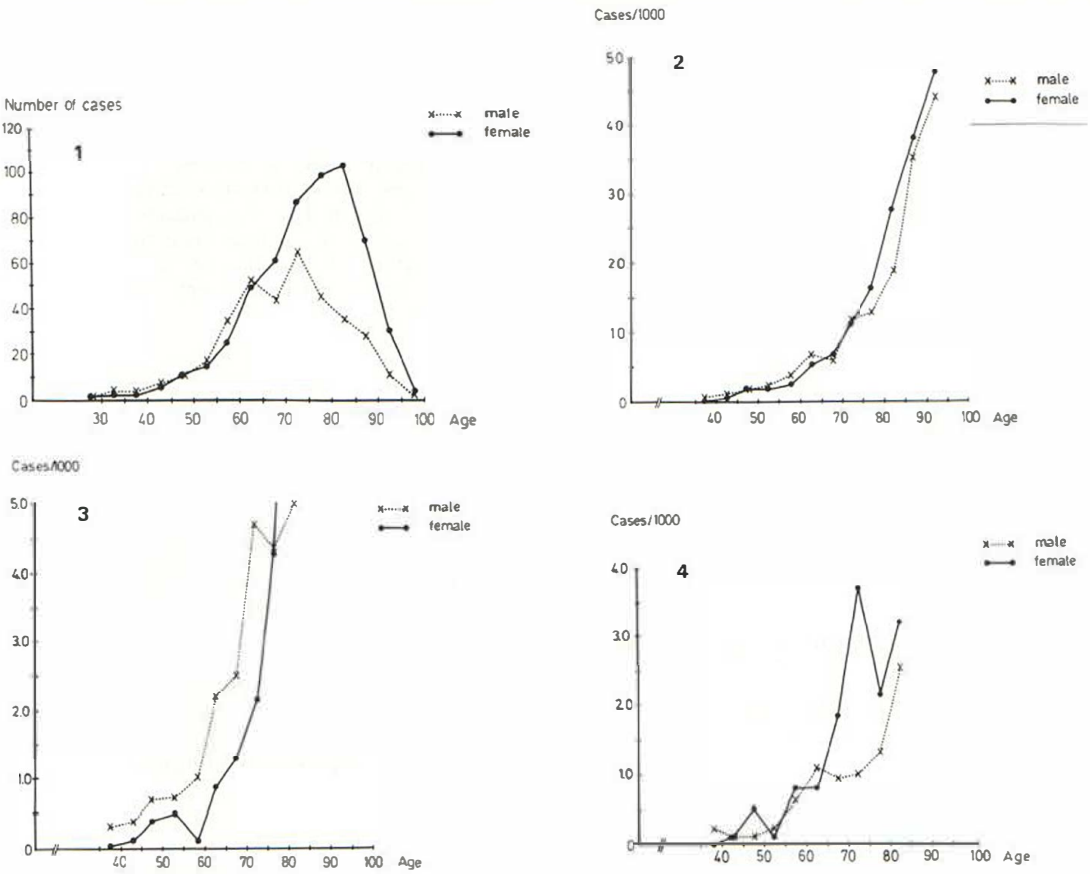

Fig. 1. Age frequency of the 940 patients from the fully investigated clinics and wards.

Fig. 2. Sex and age-specific relative frequencies of the 940 patients of Fig. 1. The ordinate scale has been multiplied by a factor 1.5 to give an estimate of the percentage of leg and foot ulcer patients in different age groups in the city of Gothenburg.

Fig. 3. Sex and age-specific relative frequencies of the patients with ulcers on the feet from the fully investigated clinics and wards. The ordinate scale has been multiplied by a factor 1.5, to give an estimate of the percentage of feet ulcer patients in different age groups in the city of Gothenburg.

Fig. 4. Sex and age-specific relative frequencies of the patients with ulcers only on the medial side of the calf from the fully investigated clinics and wards. The ordinate scale has been multiplied by a factor 1.5 to give an estimate of the percentage of patients with ulcers on the medial side of the calf in different age groups in the city of Gothenburg.

ulcer patients. Therefore we multiply the frequency figures by 100:68=1.5. The age specific relative frequencies for these patients per 1 000 inhabitants in the city of Gothenburg is given in Fig. 2 for men and women respectively. It shows us that the larger number of female cases of leg and foot ulcer patients probably depends on a larger number of women in the higher age groups.

Ulcer localization and age distribution

From the records it has not been possible with certainty to state if the ulcers have been due to an arterial insufficiency, a venous insufficiency or a combination of the two. Usually an

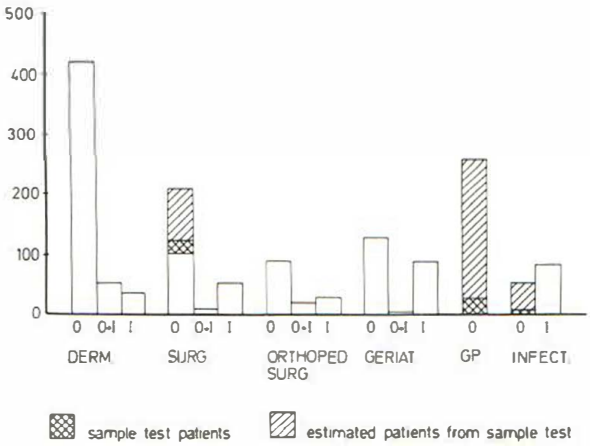

Fig. 5. The distribution of the leg and foot ulcer patients between the different clinics and wards. 0 stands for out-patient clinic, I for patients in a ward and 0+I indicates that the patients have been both at an out-patient clinic and an in-patient ward during 1980.

ulcer on the feet only, depends on an arterial circulatory insufficiency (arteriosclerosis and/or diabetes) and an ulcer only on the medial side of the calf depends mainly on venous insufficiency (6). We found that 275 patients out of 940 had their ulcer(s) on the feet only. Of these 133 were men and 142 women. Their age specific relative frequencies per 1 000 individuals of the population is given in Fig. 3 (also multiplied with 100 : 68 = 1.5). The feet ulcers thus seem to come at least 5 years later for women than for men.

156 patients of the 940 patients from the fully investigated clinics and wards had their ulcer only on the medial side of the calf. Of these 156 patients, 48 were men and 108 were women. A similar plot as in Fig. 3 is made for these two groups in Fig. 4 (also multiplied with 100 : 68 = 1.5).

Total number of patients distributed among different clinics

The distribution of the total number of patients with leg and foot ulcers among the different clinics and wards is given in Fig. 5. The data of Fig. 5 is of course not corrected for double registration. In fact there were a few patients that had even visited 3 clinics for their ulcer. Those are then contributing to three bars in Fig. 5. To test how representative the 940 patients of the fully investigated clinics are for all leg and foot ulcer patients, we have compared the sex distribution and median age of this group with the 43 sample patients from the other clinics. Also the number of patients with ulcers on the feet only and on the medial side of the calf has been compared. See Table I.

DISCUSSION

The available epidemiological data on leg and foot ulcers gives diverging information on the frequency of this disorder (7, 8, 9). Modern planning of medical care requires accurate data. It is also of importance to know where in our medical care system these patients are taken care of. Changes in the age profile of the population might significantly alter the number of patients that seek medical care for leg and foot ulcers. In a country with socialized medicine most patients with leg and foot ulcers seek medical care. We have therefore found it most relevant to make our epidemiological survey by investigating medical records from clinics and wards where such patients are admitted. As all clinics do not register patients according to diagnosis, but have a large amount of patients, all clinics could not be fully investigated. For some clinics a representative sample had to be used, to make an estimation of the number of leg and foot ulcer patients. As is seen in Table I the

sample of 43 patients, does not differ much from the 940 patients of the fully investigated clinics and wards with respect to sex distribution, median age, and localization of the ulcers.

There may mainly be two types of errors in the presented data, besides the statistical error caused by the sampling. Other specialities than those investigated may take care of leg and foot ulcer patients. It seems unlikely that this error is of importance. The other error is the number of patients with leg and foot ulcers that only go to private practitioners. About 20% of all visits to doctors in Gothenburg are to doctors in private practice. An inquiry amongst private practising dermatologists indicates that the proportion of the leg and foot ulcer patients is lower in private practice than in community clinics. Then of course there may be some patients with leg and foot ulcers that do not go to any doctor during a year. It is our feeling that the present report underestimates the number of leg and foot ulcer patients with less than 20%.

In epidemiological studies one usually measures the incidence (I) or the prevalence (P) of a disease. The two are related by the following formula $P=I\times d$, where d is the duration of the disease. We found it impractical or even impossible to measure either the incidence or prevalence of leg and foot ulcers directly. Instead we have estimated the total number of patients during one year, which we may call Y. Then $Y=P(1+1/d)$ where d is the duration of the disease in years. The prevalence P is thus smaller than Y. Unfortunately d is not known for leg and foot ulcers. It is probably many years, as these ulcers either never heal or easily relaps (10).

As we had 434699 inhabitants in Gothenburg 1980 we get an approximative prevalence estimation of $1377\times 100/434699=0.32\%$. In the present report we have probably underestimated the number of leg and foot ulcer patients in one year (Y). The number of patients with leg and foot ulcers found during one year (Y) is however larger than the prevalence (P). These two types of errors therefore counteract each other. We feel that it is reasonable to assume that the prevalence is between 0.2 and 0.4%.

In earlier studies data on the prevalence of venous leg and foot ulcers are given. They are of the same magnitude as our figures or higher (7, 8, 9). It is however not clear if also arterial ulcers are included in those earlier data. The impression by Rook (6) that arterial insufficiency is becoming a more common etiological factor is in accordance with our findings. Thirty percent of our patients had ulcers on the feet only. The ratio between men and women was 1 : 1. The men got their feet ulcers at least 5 years earlier than women.

We have an impression from our clinical work that the number of leg ulcers caused by venous insufficiency has decreased over the last few decades. In this material 17% of the patients only had ulcers on the medial side of the calf. This might be in concordance with the large percentage of patients with ulcers only on the feet. This will however be looked

Table I. *Comparison between patients from fully investigated clinics and wards and patients from clinics investigated by sample*

	Men (%)	Median age[a] in years	Feet ulcers[a] (%)	Medial calf[a] ulcers (%)
Patients from fully investigated clinics and wards (n=940)	39.4	73.1	29.3	16.6
Sample patients (n=43)	44.1	71.1	30.2	9.3

[a] Both sexes together.

into further. The localization of an ulcer is not a reliable enought indicator for the etiology. Direct measurements of arterial and venous function should be made.

The percentage of the population with leg and foot ulcers seems to increase exponentially with age. As seen in Fig. 2 about 5% of the oldest age group had leg and foot ulcers. In spite of the age of the patients most were only attending out-patient clinics and only a minority were hospitalized. Fig. 5 shows that leg and foot ulcer patients, at least in Gothenburg, is a multidisciplinary problem. Utilizing the special expertise in different disciplines a cooperation in the management of leg and foot ulcer patients could give optimal results.

ACKNOWLEDGEMENT

Nils Blomqvist, Ph.D., has been consulted with regard to statistical work.

REFERENCES

1. Haeger K. Leg ulcers. In: Carlsten A, Jacobson S, Johansson S, Nylander G, Olow B, eds., Venous and lymphatic disorders of the leg. Chap. 7. Lund: Scandinavian University Books, 1966: 86–110.
2. Verdich J, Andersen BL. Leg ulcers. A retrospective investigation of a ten-year hospital material. Ugeskr Laeg 1980; 142: 3248–3250.
3. Allander E. Bensår. Epidemiologi och vårdkonsumtion. Socialmedicinsk Tidskrift 1977; 54: 4: 241–246.
4. Statistical Yearbook of Gothenburg, 80th vol. Kungälv: Göteborgs Offsettryckeri AB, 1980: 49.
5. Information from Social Insurance Office.
6. Ryan TJ, Wilkinson DS. Disease of the arteries. Diseases of the veins—venous leg ulcers. In: Rook A, Wilkinson DS, Ebling FJG, eds. Textbook of dermatology, Vol. 1. Oxford: Blackwell Scientific Publications, 1979: 1059–1102.
7. Hellgren L.: Personal communication.
8. Coon W, Willis P, Keller J. Venous thromboembolism and other venous disease in the Tecumseh community health study. Circulation 1973; 48: 839–846.
9. Da Silva A, Widmer LK, Martin H, Mall Th, Glaus L, Schneider M. Varicose veins and chronic venous insufficiency. Prevalence and risk factors in 4376 subjects of the Basle Study II. Vasa 1974; Band 3: Heft 2: 118–125.
10. Monk BE, Sarkany I. Outcome of treatment of venous stasis ulcers. Clin Exp Dermatol 1982; 7: 397–400.