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Leg ulcers in New Zealand: age at onset, recurrence and provision of care in an urban population

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Abstract

Aim To describe the age at onset, recurrence rate, and provision of care for people with leg ulcers in New Zealand.

Methods Between 1997 and 1998, people with current leg ulcers were identified from the North Auckland and Central Auckland health districts via notification from relevant health professionals and by self-referral. All ulcer types were investigated. Identified cases, aged between 40 and 99 years and on the general electoral roll, were interviewed as part of a case-control study. Descriptive information relating to interviewed cases is presented.

Results 241 people with leg ulcers were interviewed. The average age was 75 years and almost 60% were women. The average age at ulcer onset was 65 years, 59% of people had recurrent ulcers, and 24% had been hospitalised in the last five years because of their leg ulcers. Those people with recurrent leg ulcers had lived with their condition for an average of fifteen years, with an average time to healing for their last ulcer of thirteen months. Treatment of this condition was largely community-based, with 136 different treatment options employed.

Conclusions Leg ulceration remains a chronic and recurring condition, with substantial practice variation in terms of treatment. Urgent attention needs to be given to the management of leg ulcer patients in this country, particularly given that New Zealand has a rapidly ageing population.

Leg ulcers primarily affect people aged 65 years and over.[1-4] Although a number of studies have been conducted on the burden of illness associated with the condition, results are not directly comparable due to a variety of methodological problems. In particular, the studies vary with respect to case definition, the type of population, the type of ulcers, and the age groups investigated. This is partly why reported occurrence varies greatly between countries. Given this variability, it was considered appropriate to investigate leg ulcer patients in a New Zealand setting. Descriptive data about leg ulcers (including ulcer frequency, ulcer location, age at onset, and recurrence) would give an indication of the potential benefits from improvements in treatment. Data on the types of care patients receive would help delineate major areas of practice variation, and hence clinical uncertainty. This paper presents the results of this research.

Methods

The Auckland Leg Ulcer Study involved the identification and interview of people suffering from leg ulceration. A leg ulcer was defined as any break in the skin on the leg (below the knee) or on the foot, which had been present for more than six weeks. People of all ages were included in the study,

regardless of the cause of the leg ulcer. A case was considered to be the person and not the ulcer. The study was conducted over a twelve-month period in the North Auckland and Central Auckland health districts. Patient accrual was by referral from health professionals and by self-referral. Full details of the case identification procedures are detailed in a previous publication.[4]

Notified cases were interviewed as part of a case-control study if they had a current leg ulcer, were aged between 40 and 99 years, and were on the general electoral roll for the study region. If a person could not be interviewed because of cognitive impairment, appropriate next of kin were approached for information. Data described in this publication were collected using an interviewer-administered questionnaire. Age was considered age at notification and ethnicity was self-identified. All data were self-reported and were not verified against medical records. Information on ulcer size was not collected nor was cost data relating to treatment. To determine the location of the ulcers, the lower leg was divided into three regions: the foot, the gaiter, and the calf. The gaiter region was considered the area 2.5 cm below the malleoli to the point at which the calf muscles became prominent posteriorly.[5]

Subgroup analysis according to ulcer type was undertaken using ankle:brachial pressure index (ABI) readings, using a bi-directional MD2 Multi-Doppler with an 8 MHz probe to assess arterial function.[6] Individuals were classified as having either venous (ABI $\geq$ 0.6), non-venous (ABI < 0.6) or diabetic leg ulcers.

All statistical analyses were conducted using SAS for Windows (version 6.12) and EpiInfo (version 6.04). Statistical comparisons between continuous variables were made using the independent two sample t-test.[7] Skewed data were transformed before undertaking statistical analysis so that the data were more normally distributed.[7] The non-parametric Mann-Whitney two sample test was used to compare independent groups of data that were not normally distributed.[7] All p-values reported are two-tailed.

Results

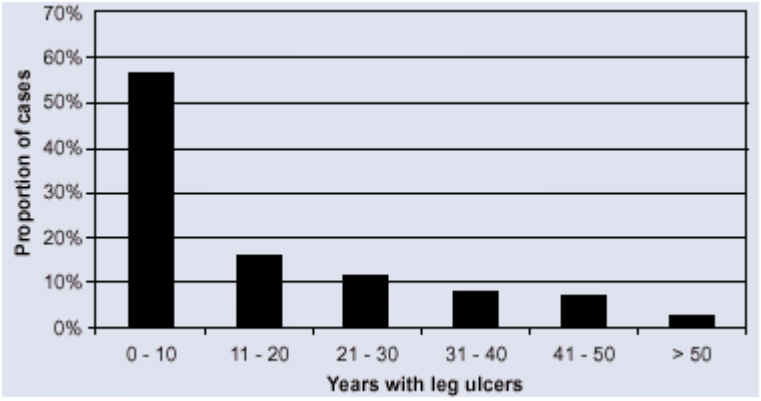
380 notified cases met the inclusion criteria for the study. A total of 128 people declined to participate, giving an overall response rate of 66%. Of the 252 people who were eligible for the study and agreed to participate, 11 (4%) died before the interview date. Consequently, 241 people were interviewed. Next of kin were used to obtain data for 3% of interviewed cases. ABI readings were available for 230 (95%) cases, of whom 42 (18%) had a history of diabetes, 168 (73%) had an ABI that indicated venous insufficiency, and 20 (9%) had an index suggestive of non-venous aetiology.

The average age of interviewed cases was 75 years (median = 77, interquartile range [IQR] 70 – 84). Over half (59%) of the cases were women, with an average age of 76 years (median = 78, IQR 70 – 85). The average age of men in the study was 74 years (median = 76, IQR 70 – 81). Cases were predominantly European (96%), with the remaining cases of Maori (2%), Pacific Island (1%) or Asian (1%) descent.

Ulcer details Although 241 people had a leg ulcer at the time of enrolment, only 205 (85%) had a leg ulcer at the time of interview. On average, people had two leg ulcers at the time of interview. 38 (19%) people reported bilateral leg ulcers. Of the remaining cases, there was no clear difference in the number reporting ulcers on their right leg only compared to those reporting ulcers on their left leg only (44% right versus 37% left, p = 0.2). The majority (71%) had ulcers in the gaiter region of their lower legs, 18% on their feet, and 11% had ulcers on their calves. The average number of leg ulcers experienced in a lifetime was four (median = 2, IQR 1 – 5). 15% (37) of people stated that they had had six or more leg ulcers in their lifetime. 32% reported that they had their first leg ulcer develop when they were under 60 years of age, although the average age at ulcer onset was 65 years (median = 69, IQR 53 – 78). Of the 205 people with a leg ulcer at the time of interview, 83 (40%) were experiencing their first-ever leg ulcer and 121 (59%) had recurrent leg ulcers. Data

were unavailable from one person. Recurrent cases had suffered from leg ulcers for an average of fifteen years (median = 9, IQR 4 – 24) (Figure 1). People with recurrent ulcers were asked the approximate duration of their last ulcer. 24 (20%) people could not remember how long their ulcer had lasted, and data were unavailable from five people. Of the remaining 92 people, the average duration of their last ulcer was thirteen months (median = 5, IQR 2 – 12).

Figure 1. Number of years with leg ulcers (recurrent cases only).



Provision of care All people with current leg ulcers at the time of interview were asked who they were currently receiving treatment from for their leg ulcers. 63% were receiving care from more than one caregiver group, with general practitioners and district nurses the most commonly used (Table 1). Few people were currently receiving treatment from specialist health professionals, such as vascular surgeons, general surgeons, physiotherapists, podiatrists, dermatologists, plastic surgeons, or rheumatologists. 36% cared for the ulcer themselves in addition to seeking help from other people (Table 1). In terms of a single caregiver, district nursing groups (including staff from the Auckland ulcer team) were the most commonly used (13%). 9% of people were self-treating their ulcer and 8% sought care only from a general practitioner/practice nurse (Table 1).

Information on the current treatment regimen was available from 205 (85%) people (Table 1). 136 different topical and systemic treatment products were used. The most common treatment was a wound dressing (86%), while a third of people (33%) were treated with compression stockings or bandages. Other treatments are listed in Table 1. Ten (5%) cases did not have any current treatment. Treatments according to ulcer type are shown in Figure 2.

30 (15%) of the 205 cases had had surgery at sometime for their leg ulcers. Of this group, half (15) had had a skin graft and a fifth (6) had had some type of vascular surgery. Other less common treatment options included surgical debridement, amputation, chemical sympathectomy and lesion removal. Four people were unable to recall the procedure they had.

Almost a quarter (24%) of people stated that they had been admitted to hospital in the last five years because of their leg ulcers. A hospitalised case had been admitted twice, on average, in the last five years. The average length of hospital stay was 34.4 days (median = 14.5), with a quarter of people remaining in hospital for more than 42 days (Figure 3).

Table 1. Leg ulcer treatment.

	People with leg ulcers	
	N	%
Number of people with leg ulcers at enrolment	241	-
Number of people with an ulcer at time of interview	205	85%
Who provided current treatment (n=205)		
Multiple caregivers	129	63%
District nurse/ulcer team nurse only	27	13%
Self-care only	18	9%
General practitioner/practice nurse only	17	8%
Resthome/retirement village nurse only	7	3%
Private and public hospital staff only	6	3%
Partner, family member, or friend only	1	0.5%
Multiple caregivers (n=129)		
General practitioner/practice nurse	96	74%
District nurse/ulcer team nurse	89	69%
Self care	47	36%
Private and public hospital staff	18	14%
Resthome/retirement village nurse	13	10%
Partner, family member, or friend	13	10%
Vascular surgeon	13	10%
Dermatologist	9	7%
Diabetes clinic staff	4	3%
Rheumatologist	2	2%
Podiatrist	2	2%
Plastic surgeon	2	2%
Physiotherapist	2	2%
Other	4	3%
Current treatment regime (n=205)		
Dressings (primary and/or secondary)	176	86%
Leg elevation	89	43%
Compression stockings	43	21%
Oral medication	43	21%
Topical creams*	42	20%
Ankle rotation	30	15%
Compression bandages	28	14%
Natural medications	27	13%
Exercise	18	9%
No current treatment	10	5%
Weight reduction	10	5%
Paste bandages	5	2%
TED stocking	3	1%
Powders	2	1%
Intravenous medication	1	0.5%
Smoking cessation	1	0.5%
Other	6	3%

*Includes antibiotic, debridement, and moisturising creams

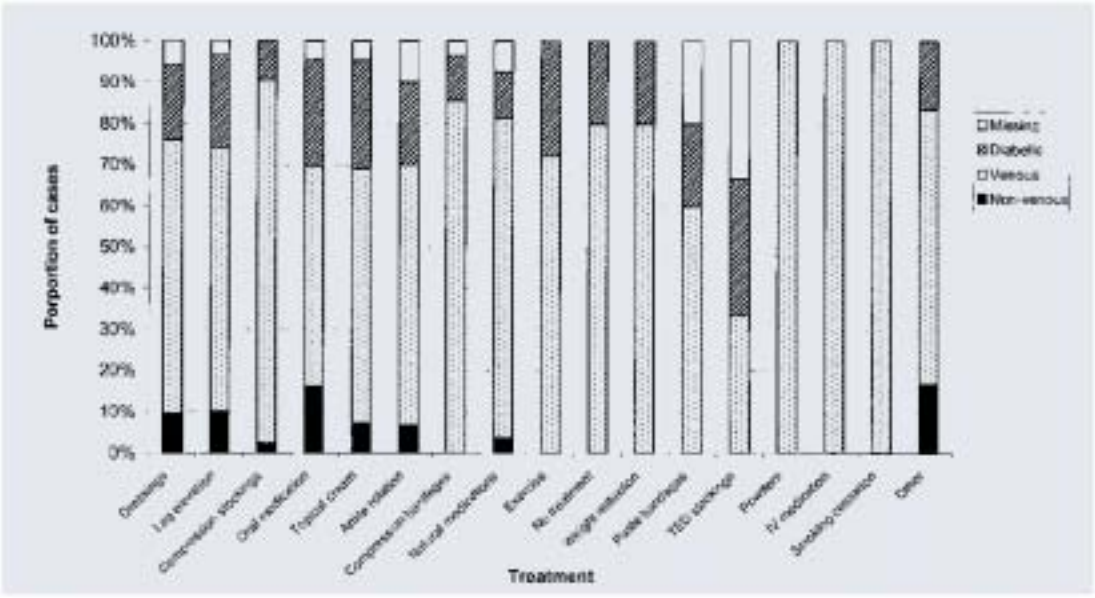
Patient's perceptions People were asked to identify the most significant problem having a leg ulcer caused them. Of the 238 (99%) who responded, 74 (31%) reported that pain was the main problem. Of this group, 11% had non-venous ulcers, 68% had venous ulcers, 17% had diabetic ulcers and 4% were unclassifiable. Other problems included impaired mobility (16%), frustration (8%), keeping the ulcer dry (7%) and getting the ulcer treated (6%) – in particular travelling to see a caregiver or waiting

for the caregiver to come to their home. Seven (3%) people reported that their ulcer did not cause major problems. Less than 5% of cases reported their main problem as having to rest the leg, the impact on their general lifestyle, the time the ulcer took to heal, or wearing shoes.

Discussion

Descriptive data presented in this paper indicate that leg ulceration is a chronic condition, recurrence is common, treatment is predominately community-based, and that current treatment strategies vary considerably. Overall, the findings appear similar to international research, despite methodological differences between studies. Previous research has shown that 70% - 90% of all leg ulcers occur in the gaiter region of the leg,[5,8,9] between 47% and 76% of cases have recurrent leg ulcers,[5,8,10] and the majority of cases develop their first ulcer before the age of 65 years.[5,10] Research also indicates that the majority of leg ulcers occur on the left leg as opposed to the right.[1,5,8,11] This finding is possibly related to compression of the left iliac vein by the right iliac artery, which results in decreased venous flow out of the left leg.[12] The Auckland data do not support this finding.

Figure 2. Treatment according to ulcer type.

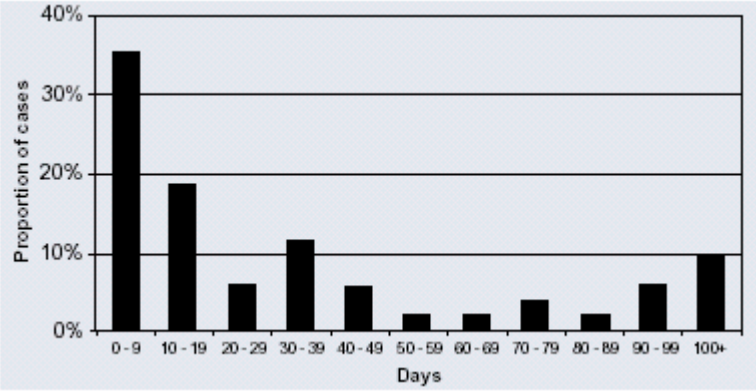


The observation that ulcer management is predominantly community-based has also been seen in other countries.[2,3,13-16] Additionally, international research has noted the variability in treatment regimens for leg ulcers.[14-17] Although there is strong evidence to support the use of compression therapy to increase the healing rates of venous leg ulcers,[18,19] there is limited or conflicting evidence regarding the effectiveness of other treatment options.[18,19] If other treatments did have a marked effect on ulcer healing, there would possibly be less diversity in current management strategies.

New Zealand hospital discharge data indicate that people hospitalised with a chronic ulcer of the skin (ICD9 code 707) stayed at a public hospital in 1996 for an average of 18 days,[20] and at a private hospital in 1995 for an average of 48 days.[21] The reported average of 34 bed days for an ulcer patient in the Auckland study was consistent with

the above data and considerably higher than the average length of stay for all conditions combined in a New Zealand public hospital (6 days)[20] or private hospital (26 days).[21] Similarly, Swedish researchers found that the average length of hospital stay for a leg ulcer patient in 1988 varied between 35 and 121 days, depending on the ward[1]. Although hospital discharge practices vary by country, the costs associated with hospital based care of leg ulcer cases remain high, given the long period of hospitalisation.

Figure 3. Number of bed days for cases hospitalised for leg ulcers.



The problems experienced by people with leg ulcers in the Auckland study also appear consistent with overseas studies. For instance, research has shown that leg ulcer cases have substantially higher levels of pain and more problems with mobility than controls.[22-24] The fact that a number of cases in the Auckland study reported problems with keeping the ulcer dry has also been noted in other countries,[25,26] which suggests that better communication is needed about the appropriate management of wounds, since moist wound healing is accepted practice.[27,28] A small proportion of cases in this study did not report any major problem with having leg ulcers, although it is unknown whether this finding was related to ulcer size. Similarly, 9% of cases in an English study reported that their ulcers did not bother them and 11% thought that having a leg ulcer was beneficial as it increased their level of social contact.[25]

The Auckland Leg Ulcer Study, unlike other studies in this area, attempted to obtain a representative sample of cases, to use a clear case definition and include all ulcer types. A number of limitations should, however, be acknowledged. First, incomplete ascertainment of cases and lower than expected participation rates may have led to some selection bias, which in turn will affect the generalisability of the study findings. Second, recall bias is also likely to have occurred in this study (given the participants' age), which will have resulted in some degree of misclassification. Finally, measurement error associated with the Doppler readings could have resulted in some misclassification of ulcer type.

The burden associated with leg ulcers in New Zealand patients appears broadly similar in that observed in other economically developed countries. The extent of this burden, however, suggests that urgent attention needs to be given to the management of leg ulcer patients in this country, particularly given that the number of New Zealanders with this condition is expected to double in the next 25 years.[4] Prolonged healing times indicate considerable scope for health benefits from improved treatments and from more uniform use of effective treatments. In an effort to

standardise treatment options in New Zealand, clinical practice guidelines for leg ulcers have recently been developed by the New Zealand Guidelines Group [http://www.nzgg.org.nz/], and incorporate results from this study.

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References:

1. Hansson C, Andersson E, Swanbeck G. Leg ulcer epidemiology in Gothenburg. Acta Chir Scand (Suppl) 1988; 544: 12-6.
2. Lindholm C, Bjellerup M, Christensen OB, Zederfeldt B. A demographic survey of leg and foot ulcer patients in a defined population. Acta Derm Venereol (Stockh) 1992; 72: 227-30.
3. Nelzen O, Bergqvist D, Lindhagen A, Hallbook T. Chronic leg ulcers: an underestimated problem in primary health care among elderly patients. J Epidemiol Community Health 1991; 45: 184-7.
4. Walker N, Rodgers A, Birchall N et al. The occurrence of leg ulcers in Auckland: results of a population-based study. NZ Med J 2002; 115: 159-62.
5. Callam MJ, Harper DR, Dale JJ, Ruckley CV. Chronic ulcer of the leg: clinical history. BMJ 1987; 294: 1389-91.
6. Vowden K, Goulding V, Vowden P. Hand-held Doppler assessment for peripheral arterial disease. J Wound Care 1996; 5: 125-7.
7. Altman D. Practical statistics for medical research. London: Chapman & Hall; 1991.
8. Baker SR, Stacey MC, Jopp-McKay AG et al. Epidemiology of chronic venous ulcers. Br J Surg 1991; 78: 864-7.

9. Nelzen O, Bergqvist D, Lindhagen A. High prevalence of diabetes in chronic leg ulcer patients: a cross-sectional population study. Diabet Med 1992; 10: 345-50.

10. Nelzen O, Bergqvist D, Lindhagen A. Venous and non-venous leg ulcers: clinical history and appearance in a population study. Br J Surg 1994; 81: 182-7.

11. Nelzen O, Bergqvist D, Lindhagen A. Leg ulcer etiology: a cross sectional population study. J Vasc Surg 1991; 14: 557-64.

12. Hansson C, Andersson E, Swanbeck G. Location of ulcers on the lower limbs in relation to distal systolic blood pressure indices. Acta Derm Venereol (Stockh) 1990; 71: 502-5.

13. Callam MJ, Ruckley CV, Harper DR, Dale JJ. Chronic ulceration of the leg: extent of the problem and provision of care. BMJ 1985; 290: 1855-6.

14. Cornwall JV, Dore CJ, Lewis JD. Leg ulcers: epidemiology and aetiology. Br J Surg 1986; 73: 693-6.

15. Ebbeskog B, Lindholm C, Ohman S. Leg and foot ulcer patients: epidemiology and nursing care in an urban population in South Stockholm, Sweden. Scand J Prim Health Care 1996; 14: 238-43.

16. Hoskins A. The Illawarra Leg Ulcer Study. Prim Intent 1997; 5: 24-30.

17. Lees TA, Lambert D. Prevalence of lower limb ulceration in an urban health district. Br J Surg 1992; 79: 1032-4.

18. RCN Institute. Clinical practice guidelines: the management of patients with venous ulcers. York and Manchester: RCN Institute, Centre for Evidence-Based Nursing, University of York and the School of Nursing, Midwifery and Health Visiting, University of Manchester; 1998.

19. Scottish Intercollegiate Guidelines Network. The care of patients with chronic leg ulcer: a national clinical guideline. Edinburgh: Scottish Intercollegiate Guidelines Network; 1998.

20. Ministry of Health. Selected morbidity data for publicly funded hospitals 1996/97. Wellington: New Zealand Health Information Service, Ministry of Health; 1998.

21. Ministry of Health. Selected morbidity data for private hospitals 1995. Wellington: New Zealand Health Information Service, Ministry of Health; 1998.

22. Flett R, Harcourt B, Alpass F. Psychosocial aspects of chronic lower leg ulceration in the elderly. West J Nurs Res 1994; 16: 183-92.

23. Franks P, Moffatt C. Who suffers most from leg ulceration? J Wound Care 1998; 7: 383-5.

24. Price P, Harding K. Measuring health-related quality of life in patients with chronic leg ulcers. Wounds 1996; 8: 91-4.

25. Cullum N, Roe B. Leg ulcers: nursing management: a research-based guide. London: Bailliere Tindall; 1996.

26. Hamer C, Cullum NA, Roe BH. Patients' perceptions of chronic leg ulcer. J Wound Care 1994; 3: 99-101.

27. Alvarez O, Mertz P, Eaglstein W. The effect of occlusive dressings on collagen synthesis and re-epithelialization in superficial wounds. J Surg Res 1983; 35: 142-8.

28. Dyson M, Young S, Pendle C et al. Comparison of the effects of moist and dry conditions on dermal repair. J Invest Dermatol 1988; 91: 434-9.

