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The cost of treating hard-to-heal venous leg ulcers: results from a Swedish survey

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KEYPOINTS

1. The weekly cost associated with treating large ulcers of long duration is more than twice the cost associated with treating small ulcers of short duration.
2. Patients at increased risk of delayed healing with standard therapy alone should be identified early and additional treatment options sought.
3. Use of alternative treatment choices in addition to compression for patients with hard-to-heal ulcers may result in increased healing rates, reduced costs and improved quality of life for this group of patients.
4. The health-economic benefits of this approach could be evaluated in well-designed modelling studies.

KEYWORDS

venous leg ulcers; hard-to-heal ulcers; treatment cost; survey

● **Treating venous leg ulcers can be time-consuming and costly, affecting patients' quality of life. In an earlier study, the costs for treating patients with venous leg ulcers were investigated through a questionnaire survey of dermatology, primary care and community nursing staff in Sweden. Data relating to staff time, wound care products, travel and institutional care (hospital and nursing home) were collected to calculate overall weekly treatment costs for each patient. Patients were categorised according to ulcer size and duration. In this study, data is presented on the cost associated with treating a sub-group of patients with large ulcers of long duration. This cost was more than twice that of treating small ulcers of short duration. To reduce treatment time and costs and improve patient quality of life, it would be useful to predict which patients are at increased risk of delayed healing with standard treatment. Additional treatment options could then be introduced at an early stage.**

Introduction

Leg ulceration is associated with substantial costs¹⁻⁸. One reason for this is the high prevalence of leg ulceration, estimated by previous population studies to be between 0.12 and 1.69%^{2,9-13} and rising sharply with increased age¹¹. Other important reasons may include duration of treatment – in some cases over a year – as well as frequent use of healthcare resources during the healing process^{2,5,13,14}.

In recent years a number of publications have focused on different strategies to reduce costs and increase health-related quality of life for patients through choice of cost-effective treatment options^{5,15,16}. However, a treatment strategy that is cost-effective for one ulcer type or patient group may not necessarily be as effective for others, with delayed healing and increased expenditure occurring for some patients.

To reduce the overall cost of leg ulcer care and tailor treatment more appropriately, it may be important to categorise patients according to ulcer severity and demand on resources. Since total time-to-healing is one of the most important factors influencing treatment costs³, a useful strategy may be to identify predictors associated with hard-to-heal ulcers. In a recently published study Margolis *et al* found that venous ulcer size and duration were reliable prognostic indicators of healing within 24 weeks of care with standard therapy alone (compression therapy)¹³, and that patients with large ulcers of long duration were most at risk of delayed heal-

ing. Similar results have been found in other studies^{17,18}. Based on these reports we have defined hard-to-heal ulcers in this study as venous leg ulcers with an initial area of 10cm² or greater and a duration of six months or more.

The aim of this paper is to summarise results from a survey of the cost of venous leg ulceration published in Sweden¹⁹ and, for the first time, to present the data on ulcer size and duration. It also sets out to highlight possible health-economic consequences of strategies to improve management of hard-to-heal ulcers for those patients identified as being at increased risk.

Method

Data collected in the survey were used to calculate the weekly cost of leg ulcer care. A sub-group of patients with hard-to-heal ulcers was identified from the initial survey. Previously unpublished data specific to this group was examined in order to present results of potential international interest on the economic consequences of hard-to-heal ulcers.

The survey

The original survey was carried out in 2003. Specialists in dermatology, primary care and community nursing were asked to participate. A total of 12 primary care units – including district nurse clinics and community nursing districts – and four dermatology

clinics agreed to take part in the study. Participants were asked to complete a daily questionnaire during a one-week period for each of their venous leg ulcer patients. No other inclusion or exclusion criteria were applied. The questionnaire could be completed either directly by the person carrying out the dressing change or indirectly by someone from the specialist clinic following telephone contact with the person carrying out the dressing change. Age, gender and place of treatment were recorded and retrospective information taken from patient records. Resources used at each dressing change were noted, including staff time, wound care products, travel and, if applicable, institutional care, that is in hospital or a nursing home.

Calculation of weekly cost

Staff costs were calculated with reference to grade of staff and time taken for each dressing change. Travel costs were included regardless of whether nursing staff travelled to the patient's home or the patient visited a medical institution. When nursing staff visited the patient at home a standard cost for travel time (equivalent to 30 minutes of staff time) was included in addition to the cost of transport. Staff time, travel, wound care products and, where applicable, institutional care, were used to calculate the weekly cost of care for each patient.

Costs were initially provided in Swedish krona (SEK) using 2002 prices, then updated to 2005 prices with reference to the consumer price index and converted into euros (€). The average exchange rate in 2005 was 1 SEK = €9.28 (The Swedish Central Bank, Riksbanken).

Results

Patients

Data were collected from a total of 138 venous leg ulcer patients treated during one week in 2003 (Table 1). Sixty-four patients (46%) were identified through specialist dermatology units. The remaining 74 patients were recruited from primary care (51%) and community nursing services (2%). However, the majority of patients were treated during the week by nurses from primary care or by community nurses and 89% of all dressing changes were performed in primary care units or the patient's home.

Most of the patients were over 65 years of age (85%). There was no statistically significant difference between patients with and

those without diabetes with regard to size of ulcer. In 56% (25 out of 45) of patients with ulcers 10cm² or larger and of six months duration or longer, the ulcer size had increased from the start of treatment to the week of the survey. This would suggest that patients with hard-to-heal ulcers may benefit from alternative treatments in addition to compression. Thirty-eight of the 45 patients (84%) in this group had an ulcer duration of 12 months or longer and had been treated for an average of 38 months (Table 2) (median 22 months).

Costs incurred

Ninety-three percent of patients were receiving compression therapy. Many wound care products were used (Table 3), including dressings and materials for cleansing, padding and compression.

The average number of dressing changes received by each patient during the week of the study was 2.7, ranging from 1.8 to 3.8 across the different sub-groups (Table 2). The demand on resources by patients with large ulcers of long duration was considerably greater than that of the other sub-groups. This was mainly due to the increased time spent by nurses on dressing changes, with an average of 3.8 changes per patient, each taking approximately 40 minutes. In addition, more wound care products were used for this group of patients.

The average weekly cost of venous leg ulcer treatment was approximately €71 per patient, excluding inpatient care, and about €103 in total (Table 2). Eight patients (6%) were treated at least once during the week of the study in an inpatient or other institutional setting. The total weekly cost associated with treating patients with large ulcers of 10cm² or greater and of six months' duration or longer was more than twice the cost of treating other ulcers. The weekly cost of dressing changes for this group was €116.3 compared to €49.3 for small ulcers of short duration, €48.4 for small ulcers of long duration, and €52.9 for large ulcers of short duration (Table 2). The weekly cost for patients who were identified early (less than six months duration) was €58 irrespective of ulcer size, while the corresponding cost for patients who had had their ulcers more than 12 months was more than twice as high at €125. The study did not show any statistically significant difference in treatment costs for patients with or without diabetes.

Discussion

The survey highlights the high costs involved in the provision of care for venous leg ulcer patients, particularly for those with hard-

TABLE 1: PATIENT CHARACTERISTICS

Characteristics	Number of patients (n=138)	Percentage	Mean	Median
Gender: males/females	41/97	30/70		
Age			77	81
Diagnosis of diabetes	17	12		
Initial ulcer size (cm ²)			36	8
Ulcer size at time of the survey (cm ²)			42	5
Duration of ulcer (months)			31	12
Duration of ulcer treatment (months)			21	9
Previous leg ulcer treatment on the same leg	74	54		
Compression therapy	128	93		

TABLE 2: TOTAL TREATMENT TIMES, DRESSING CHANGES AND WEEKLY COSTS FOR INDIVIDUAL PATIENTS WITH VENOUS LEG ULCERS (COSTS STATED IN EUROS AT 2005 PRICES) (N =138)

	Average weekly costs/ number of dressing changes	Ulcer size and ulcer duration			
		Size <10cm ² Duration <6 months (n=27)	Size <10cm ² Duration ≥6 months (n=57)	Size ≥10cm ² Duration <6 months (n=9)	Size ≥10cm ² Duration ≥6 months (n=46)
Total treatment time (months)	21	3	20	2.5	38
Dressings changes					
Frequency of dressing changes per week	2.7	2.6	2.1	1.8	3.8
Time per dressing change (min)*	32	23	29	30	40
Weekly cost					
Staff costs					
treatment time	32.2	19.9	19.5	23.8	57.3
travel time	16.2	12.8	9.0	9.1	28.6
Wound care product costs					
dressing products	14.9	10.7	12.2	12.1	21.5
compression	4.9	2.7	5.3	4.1	5.8
Travel costs for staff or patients					
	2.9	3.2	2.4	3.8	3.1
Total weekly cost of dressing changes	71.1	49.3	48.4	52.9	116.3
Inpatient care cost**	31.8	10.2	20.6	0.0	65.0
Total weekly cost	102.9	59.5	69	52.9	181.3

*Including time for arrangements before and after dressing changes **Equivalent to 'hotel costs' in specialist clinic or other institutional care

to-heal ulcers. Important variables influencing overall expenditure may include the number of patients, length of time to healing and frequency of dressing changes³, as well as organisation of care. A structured approach to leg ulcer management, taking into account as many factors as possible, including patient quality of life, is needed if costs are to be reduced. Continuous staff training and development aimed at improving the knowledge and skills of nurses dealing with various types of wounds is also important².

Previous research suggests that large wound area and long ulcer duration are significant risk factors for delayed healing²⁰. This study appears to demonstrate that ulcers of 10cm² or larger and of six months duration or longer – defined in this study as hard-to-heal ulcers – place a greater demand on resources compared with other ulcer types. This is not only due to the length of treatment required but also to higher weekly treatment costs. The weekly cost associated with ulcers of long duration was more than twice that associated with ulcers of short duration, irrespective of ulcer size. This was mainly due to increased staff costs as a direct result of more frequent and lengthier dressing changes and a longer time to healing.

Patient profile

The patient profile in this study was felt to be similar to that of leg ulcer patients in other countries. As in several earlier studies^{5,6,10}, a large proportion (89%) of dressing changes were performed in the primary care setting or the patient's home. This applied regardless of whether the patient had been recruited to the study through a specialist clinic or directly through primary care. The gender and age distribution was also similar to that of previous studies^{2,5,10,14,15}, as was the proportion of people with diabetes²¹.

Distribution of ulcer size is generally poorly reported in the literature. In the Swedish study¹⁹, 39% of patients had wounds of

10cm² or greater, compared with only 23% in two previous Swedish studies^{10,22}. However, one British study found that 44% of patients had ulcers of 10cm² or greater²³. As in other reports^{22,24,25}, differences were found in our study between mean and median values for both ulcer size and duration. This can be explained by the presence of some patients with particularly large wounds and long ulcer duration.

Implications for practice

The study highlights incentives for identifying venous ulcers at an early stage and implementing strategies that might reduce the treatment cost of hard-to-heal ulcers. The importance of early assessment and accurate diagnosis to reduce costs has also been shown in a recent publication comparing leg ulcer care over time in one Swedish county²⁶. By predicting which patients are at increased risk of delayed healing, it may be possible to optimise treatment options and thereby reduce costs for this group.

In a recent study, ulcer size and duration were found to be the most important predictors of healing with standard therapy¹³. For example, a wound of 10cm² with a duration greater than 12 months had a 78% risk of not healing within 24 weeks of standard treatment, while a smaller ulcer of shorter duration had only a 29% risk of not healing within the same time. In our study, 56% of patients with large ulcers of long duration actually showed an increase in ulcer size during the treatment period. Results from our survey as well as from other studies indicate that 23-44% of patients have large ulcers^{10,19,22,23}. These findings suggest that strategies to ensure early diagnosis and rapid initiation of adequate treatment may significantly reduce demand on resources.

TABLE 3: DRESSING MATERIALS AND WOUND CARE PRODUCTS USED

Products	Number of patients treated* (n=138)	Percentage
Gels and gel dressings	21	15.2
Inert dressings, such as non-adherent gauze	44	31.9
Zinc products	18	13.0
Topical products with antibacterial properties	37	26.8
Polyurethane dressings	33	23.9
Hydrocolloid dressings	9	6.5
Alginates	7	5.1
Absorptive dressings	13	9.4
Hydrofiber® dressings	20	14.5
Other products	7	5.1

*The total exceeds the number of patients as some patients were treated with more than one type of product during the week of the survey.

Other publications have focused on the response to treatment over the initial three or four weeks of care as important predictors of healing^{17,18,27}. By identifying patients who are least likely to heal with standard therapy – that is newly diagnosed patients who have not responded to standard treatment in the first four weeks or patients with both large ulcers and ulcers of long duration – and introducing more advanced therapies in combination with compression, it may be possible to reduce total treatment costs. One potential outcome may be a faster time to healing, resulting in a reduction in total treatment costs. Thus any increase in expenditure associated with use of more advanced therapies may be offset by an overall reduction in costs due to faster healing and improved quality of life.

Conclusion

An important challenge for practitioners involved in venous leg ulcer management is to learn to identify at an early stage those patients at risk of delayed healing with standard therapy. Use of advanced treatment options for these patients may increase probability of healing, shorten treatment time, reduce the cost of care and improve patient well-being. The benefits of this approach could be further investigated in well-designed health-economic modelling studies.

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