

## Surgical Treatment of Chronic Leg Ulcers

Sir,

The prevalence of chronic leg ulcers was 0.15% in a Scotch study (1) and from 0.2 to 0.4% in a Swedish study (2). The figure was as high as 1% in the older age groups (1). The patients consume plenty of health care resources, since most of the ulcers remain open over a year (2). In Great Britain these patients are mainly treated in the primary care, but in the Nordic countries they are often treated – at high expense – at dermatological wards as well. If conservative treatment of the leg ulcer fails, surgery is recommended but not often performed. The operative procedures before immediate (3) or delayed (4) skin grafting have varied from radical excision (5) or layered shaving (6) of the ulcer to grafting directly on the granulation tissue (7). Only a few authors have presented follow-up studies with the recurrence rate (4, 7–9). In the present study, 51 patients with

hemi- or bilateral unhealing leg ulcers were operated with the use of radical local excision and immediate skin grafting. In order for us to find out the long-term effects of these operations, in addition to the immediate results, the patients were followed-up for a period of 10–36 months.

The study population consisted of 51 consecutive patients (33 women and 18 men) with 60 chronic leg ulcers operated at the Department of Plastic Surgery in the Helsinki University Central Hospital. The pre- and post-operative treatment was performed at the Department of Dermatology. The mean age of the patients was 64 years (women 70, men 50, range 29–88 years). The mean duration of the ulcers was 5.2 years, with eight ulcers existing less than 2 years and ten ulcers more than 13 years. The location of the ulcer was most often the leg or lateral malleolus. The ulcers were mainly venous of origin and the aetiology of the

Table I. *The number of ulcers according to aetiology and the status of the ulcer at the follow-up*

Aetiology	Number of ulcers	Healed at follow-up	Small ulcer at follow-up	Failure (large ulcer)
Venous	21	17	2	2
Varicose veins operated	9	7	2	–
Ligation of perforating veins	8	5	2	1
Arteriosclerotic	2	2	–	–
Combined	2	2	–	–
Traumatic	9	8	1	–
Other reason	12	8	1	3
Total	46	37 (80%)	4 (9%)	5 (11%)

ulcers is described in detail in Table I, in which the group "other reason" comprises for instance 3 patients with rheumatoid arthritis, 2 patients with diabetic ulcers, one patient with vasculitis and one with post-radiotherapy ulcer. Eight patients had cardiac incompetence. There were 8 diabetic patients, 2 being treated with insulin and 6 with tablets. Varicose vein removal had been performed in 9 cases and ligation of the perforating veins in 8 cases. Thirteen patients had a history of previous skin grafting procedure which had been successful in 8 cases but failed in 5 cases.

If necessary, the patient was hospitalized 1 or 2 weeks before surgery to reduce the oedema and apparent infection. The operation was performed under spinal anaesthesia. The excision was made radically, including the skin of poor quality around the ulcer and as deep as necessary to achieve unscarred healthy tissue. All underlying varicose veins and incompetent perforators were removed in the same block. If exposed, devital tendons or dead bone were removed to achieve a vascularized bed for skin grafts. The wound was covered immediately with split thickness sheet grafts or 1.5:1 meshed skin grafts and compressing saline dressing in 57 cases. In some cases, extra reconstructions were needed to optimize the healing circumstances: local fasciocutaneous flap in 2 cases, muscle transposition and skin grafting in 3 and microvascular free-flap in 2 cases. The dressings were changed daily after the 2nd post-operative day. All patients were confined to bed for 5 days post-operatively. On the 5th day they were allowed to sit in a wheel-chair and on the 7th day to walk with pressure support and crutches. They were examined 10 to 36 months (mean 21) post-operatively. Of the 51 patients operated, 5 could not be traced and 5 had died before the follow-up visit. The follow-up therefore comprised only 41 patients with 46 ulcers.

The immediate results were good in 47 patients (92%). In 4 patients (8%) the ulcers did not heal after the first operation, obviously due to insufficient excision leading to persistent ulcerations at the edge of the graft. They were, however, successfully reoperated from 2 weeks to 12 months after the first operation. At the follow-up, 37 ulcers (80%) of the 46 examined ulcers remained completely healed. Four (10%) of the examined 41 patients had a small residual ulcer (less than 10% of the grafted area) and 5 patients (12%) had recurrent ulcerations larger than half the grafted area and were recorded as failures. The ulcers healed well regardless of the aetiology, as shown in Table I. There was no correlation between the failure rate and the size of the ulcer or the age of the patient.

## DISCUSSION

Chronic leg ulcer is one of the most common diseases in the ageing population of the developed countries. Most of these patients have been treated conservatively for years at considerable expense. According to the present study, 80% of the operated ulcers remained completely healed at the follow-up of 10 to 36 months. In previous studies the corresponding figure has varied from 63% to 89% after a follow-up time of 1 to 18 years (4, 7-9). Most of the recurrences in previous studies occurred within the first 6 to 12 months after surgery (4, 7-9) and recurrences after a year never exceeded 8% per year (7). The

follow-up time of 10-36 months in the present study therefore seems to offer a fair basis for evaluation of the long-term results, although some later relapses may occur.

The success of skin grafting for ulceration depends primarily on the thoroughness of the excision of the scar tissue (3). In the present study, 4 ulcers were not healed after the first operation due to insufficient excision, but after reoperation a good result was achieved. Our findings agree with previous findings to the effect that most recurrences occur at a site immediately bordering the graft edges, suggesting insufficient excision, whereas recurrences in the graft itself are uncommon (8, 9). In a large patient series Ponten (4) usually waited 2-4 weeks until granulation tissue had formed before grafting. However, in the present study, with the use of immediate grafting after radical excision comparable long-term results were achieved, which suggests that no delay after excision is needed. The hospital stay in the study of Ponten (4) averaged 42 days but was much shorter, i.e. 2-3 weeks, in the present study because of the difference in methodology.

It seems justified to suggest that all large leg ulcers showing no healing potential within 2-3 months should be treated with skin grafting to reduce costs and trouble caused by prolonged conservative treatment. The collaboration of dermatological and plastic surgery units in the organization of the operative treatment is valuable. We have created a weekly schedule for the treatment of large non-healing leg ulcers consisting of pre-treatment in the dermatological unit, transfer of the patient to the plastic surgery unit on Thursday evening, skin grafting on Friday morning and transfer back to the dermatological unit on Monday for further local treatment and patient counselling.

## REFERENCES

1. Callam M, Ruckley C, Harper D, Dale J. Chronic ulceration of the leg: extent of the problem and provision of care. *BMJ* 1985; 290: 1855-1856.
2. Andersson E, Hansson C, Swanbeck G. Leg and foot ulcers. An epidemiological survey. *Acta Derm Venereol (Stockh)* 1984; 64: 227-232.
3. Homans J. The etiology and treatment of varicose ulcer of the leg. *Surg Gynec Obstet* 1917; 24: 300-311.
4. Ponten B. Plastic surgery treatment of chronic venous ulcers of the leg. *Scand J Plast Reconstr Surg* 1972; 6: 74-82.
5. Brown J, Byars L, Blair V. A study of ulcerations of the lower extremity and their repair with thick split skin grafts. *Surg Gynec Obstet* 1936; 63: 331-340.
6. Quaba A, McDowall R, Hackett M. Layered shaving of venous leg ulcers. *Br J Plast Surg* 1987; 40: 68-72.
7. Trier W, Peacock E, Madden J. Studies on the effectiveness of surgical management of chronic leg ulcers. *Plast Reconstr Surg* 1970; 45: 20-23.
8. Julian O, Dye W, Schneewind J. Surgical treatment of ulcerative stasis disease of the lower extremities. *Arch Surg* 1954; 68: 757-768.
9. Andersen M, McDonald K. Results of surgical therapy of severe stasis ulceration of the legs. *Ann Surg* 1963; 157: 281-286.

Received May 31, 1994.

Markku Härmä<sup>1</sup>, Sirpa Asko-Seljavaara<sup>1</sup> and Jorma Lauharanta<sup>2</sup>, Departments of <sup>1</sup>Plastic Surgery and <sup>2</sup>Dermatology, Helsinki University Central Hospital, Topeliuksenkatu 5, SF-00260 Helsinki, Finland.