Punch-grafting to Enhance Healing and to Reduce Pain in Complicated Leg and Foot Ulcers

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Sir,

Chronic, difficult-to-heal leg and foot ulcers cause suffering for patients and generate increased costs for patients and society, which can be counteracted by speeding the ulcer healing with grafting. Split-skin grafts performed in the operating theatre are often applied to large ulcers (1). Punch grafting of leg ulcers has not been studied previously, although several studies have been performed with pinch grafting (2–7). These procedures can be performed as an outpatient treatment. Accessibility for grafting can be further enhanced and waiting time decreased if nurses in the wound healing team perform the grafting themselves.

The aim of this study was to investigate the healing rates and the effect on pain in ulcers after punch grafting. We also wanted to study whether punch grafting can be performed by a nurse in the ambulatory setting using topical anaesthesia of the donor site.

MATERIALS AND METHODS

Twenty-two consecutive patients (10 men and 12 women, age range 44–90 years) with chronic (older than 6 weeks) clean, granulated leg and foot ulcers took part in the study. The mean age was 71 years (men 66 years, women 75 years). A complete medical history was taken. All the patients were examined in order to establish the ulcer diagnosis. Fourteen patients had venous ulcers, 5 had combined arterial-venous ulcers, one had a hydrostatic ulcer, one a rheumatic vasculitic ulcer and one a diabetic foot ulcer. The cleanest ulcer was chosen as the study ulcer in the 6 patients with more than one ulcer. The duration of the ulcer before grafting was between 11 weeks and 6 months for 7 patients, between 6 months and 2 years for 6 patients and more than 2 years for 9 patients (mean 1816 days). The patients themselves could choose if they wanted to be grafted as inpatients or outpatients, they were not randomized. Thirteen patients were grafted as outpatients and 9 as inpatients. Of the latter, 7 had venous ulcers. Digital images and drawings on plastic foil were made of the ulcers at the time of grafting. The ulcer in the 6 patients with more than one ulcer was chosen as the study ulcer.

For statistics, non-parametric, unpaired Mann-Whitney U tests were used.

RESULTS

Six patients had infiltration anaesthesia and 15 EMLA (patch or cream and plastic foil). Ten percent (1/10) of the patients receiving the EMLA patch had to be supplemented with infiltration anaesthetics, compared with 60% (3/5) of the patients receiving EMLA cream (not significant (ns)).

All the donor sites were healed in 14 days, irrespective of the dressing that was used.

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ulcers was 18 cm². For the 11 patients where the ulcers healed, the mean initial ulcer size was 14.8 cm² (median 12.5) and for the others, the mean initial ulcer size was larger 20.9 cm² (median 12.9).

The mean ulcer duration before grafting was 702 days (median 365 days) for the 11 patients with ulcers that healed, compared with 2929 days (median 720 days) for the 11 that did not heal (ns).

Three patients did not attend the 6-month follow-up (one because of an ulcer infection after one month, 2 patients after 3 months as they wanted re-grafts). Of the 8 remaining non-healers, 3 ulcers had almost healed (99% smaller), 3 had ulcers 0.3–53.5% smaller and 2 had ulcers 20–37.7% larger.

There was no significant difference in healing if the grafting was performed in the out- or inpatient setting; 6/13 (46%) vs. 5/9 (56%) (ns).

When analysing the pain with VAS, 4 patients had impaired sensation in the ulcer area, while another patient did not understand the VAS. Among the remaining 17 patients, mean ulcer pain was 4.2 before grafting, compared with 0.8 one week later (ns). The mean VAS value for the 10 outpatients was 3.8 before grafting and 1.1 after one week. For the 7 inpatients, the mean VAS value was 5.5 before grafting and 0.7 after one week. After one month the mean VAS was 0.7 for the 17 patients, after 3 months 0.9 (11 patients) and after 6 months 0.5 (5 patients) in the remaining non-healed ulcers.

**DISCUSSION**

We chose the punch-graft method (2–7), which has been used in our department for many years with good results, although no previous reports of its use in leg or foot ulcers have been reported. Punch grafting has, however, been studied in other diseases, such as in the treatment of vitiligo (8), chondrodermatitis nodularis helicis (9) and acne scars (10).

Today, grafting is, as far as we know, performed by physicians. In this study, we have shown that punch-grafting can be performed by a nurse in outpatients, as well as inpatients. An advantage of outpatient care is that the grafting can be performed without delay when the ulcer is most likely to be in a suitable condition for grafting, and with decreased cost compared with inpatient grafting. The advantage of inpatient care is that it is easier to help patients rest with their legs in a supine position. Profuse ulcer exudation otherwise reduces the ability of the grafts to take. In this study, the ulcers that were grafted on inpatients were larger and more painful compared with the outpatients.

In our patients, the pain decreased after punch-grafting, which has also been shown in other studies for pinch-grafting (6). EMLA generally has a very good pain-relieving effect even on intact skin; the depth of the anaesthesia depends on how long it is allowed to work (11). We chose 2 h for practical reasons. EMLA patches are easier to apply, especially for the patients themselves, than the cream, which needs an occlusive plastic film on top. The patches come in only one size, 6 × 6 cm. EMLA cream was therefore used when anaesthetizing larger donor sites. In this study, several patients needed supplementary infiltration anaesthesia more frequently after the EMLA cream than after the patches. In spite of time-consuming instructions the EMLA was often applied incorrectly and did not give a good enough anaesthesia.

One way of following the healing is with photographs until the ulcer is completely healed. A first sign of graft healing is vascularisation, when the capillaries grow into the grafts and change the colour of the graft from white to pink and purple (Fig. 1), which may start as early as during the first 24 h.

This first study of punch grafting leg ulcers shows that half of the ulcers were healed in a mean of 2.5 months (76 days). The healing results are at least as good as the results of studies with pinch grafting, in which Ahnlide et al. (2) showed 36% healing in 3 months in 145 leg ulcers, Christiansen et al. (3) found 38% healing in 32 months in 46 patients with 412 ulcers, Tarstedt et al. (4) found 54% healing after 6 months in 143 patients with 288 ulcers, Öien et al. (6) reported that 8 of 20 patients (40%) healed in a median in 3 months, and Öien et al. (7) found that 33% healed in 3 months in 85 patients with 126 ulcers.

**REFERENCES**