The Effect of a Hydrocolloid Occlusive Dressing (DuoDERM E) on Keratinization in Psoriasis Vulgaris

Sir,

Previous studies have reported on a beneficial effect of occlusion therapy in the treatment of psoriasis. Friedman reported that the efficacy of an occlusive hydrocolloid dressing was comparable to topical fluocinolone acetonide in a 10-week clinical trial. Also at the cellular level a reduction of the abnormalities has been documented (1). Baxter et al., observed a decrease of the mitotic index in the psoriatic lesion after 4 days' treatment with an occlusive dressing (2). Fry et al. also noted lowered epidermal mitotic counts in psoriatic plaques treated for 2 weeks with an occlusive dressing (3). Gottlieb et al. investigated the efficacy of Actiderm alone in the treatment of psoriatic plaques. Their results suggest that the dermatological patch is effective in treating psoriatic plaques but does not affect underlying immunopathological mechanisms after 2 weeks of treatment (4).

The purpose of the present study was to evaluate the effect of the hydrocolloid occlusive dressing DuoDERM E (Convatec®) on markers for keratinization (anti-Flaggrin and anti-Involucrin).

Nine patients suffering from psoriasis vulgaris were included in this study. DuoDERM E was applied on one psoriatic lesion and was renewed every 7 days. Clinical improvement was assessed using severity scores for erythema, induration and scaling. Before treatment and after 3 weeks of treatment with DuoDERM E, punch biopsies (3 mm) were taken from the psoriatic lesions.

An indirect immunoperoxidase technique with a monoclonal antibody against filaggrin (1:500, antiflaggrin, BTI, BT576) and a monoclonal antibody against involucrin (MON-150, 1:25, monoclonal antibody against involucrin) was employed (5).

All patients showed an improvement of the psoriatic lesions. After one week of treatment, we observed a statistically significant reduction with respect to desquamation (p ≤ 0.02) and induration (p ≤ 0.02). After 3 weeks of treatment erythema showed a considerable decrease (p = 0.07).

In normal healthy skin filaggrin staining is observed as a continuously intense staining pattern of the stratum corneum and stratum granulosum (6). In the biopsies of the psoriatic lesions before treatment filaggrin expression was absent or showed a discontinuous pattern in the stratum corneum and granulosum. After 3 weeks of treatment with DuoDERM E we noted a statistically significant increase with respect to the filaggrin expression in the granular layer (p ≤ 0.01), while the expression in the stratum corneum showed a borderline significant increase (p ≤ 0.06). Involucrin expression in normal human skin can be observed in the granular layer and the upper third of the stratum spinosum (6). Before treatment the involucrin expression in the psoriatic lesions extended to the deeper cell layers of the stratum spinosum. After treatment with DuoDERM E the interpapillar involucrin expression showed an almost statistically significant improvement (p ≤ 0.07). The involucrin expression observed above the dermal papillae did show a minimal decrease (p = 0.5).

Our results confirm the antipsoriatic potential of hydrocolloid dressing (DuoDERM E) as monotherapy.

Previous studies have already revealed that occlusion by prolonged application of tape or an occlusive dressing is effective in the treatment of plaque psoriasis (1–4, 7, 8). The mechanisms of the effects of occlusion, however, have not been elucidated. Psoriatic epidermis is characterized by an absent or only partially formed stratum granulosum, a feature we also observed in the biopsies taken before treatment. After 3 weeks of treatment we observed a re-establishing of the granular layer in most of the biopsies. This observation is in agreement with the finding of Fry et al. who also noted a reappearance of the granular layer in psoriatic epidermis after occlusive therapy with plastic film (3). Moreover, we also noted a statistically significant increase of the filaggrin expression in the granular layer after 3 weeks of treatment. Besides the capacity of aggregating keratin filaments, filaggrin also has a major function in maintaining a normal hydration state of the stratum corneum. After having fulfilled its role in aggregating keratin fibres and catalysing the formation of disulphide bonds between these fibres, filaggrin becomes enzymatically modified. An increasing acidity of the filaggrins loosens the keratin-filaggrin complex, allowing proteolytic attack on the filaggrins, which leads to the complete proteolytic destruction of these proteins. The free amino acids, resulting from the proteolysis of filaggrin, are retained within the corneocytes. Their role is in maintaining a normal hydration state of the stratum corneum despite increasing dryness of the environment (9). Hydration increases the permeability of the stratum corneum (10). The increase of filaggrin expression, as observed in the present investigation after 3 weeks of treatment with hydrocolloid dressing, resulting in a normalization of the hydration state of the stratum corneum with an increased permeability, could explain the pronounced antipsoriatic effect of corticosteroids applied under plastic occlusion, reported by other investigators (2, 11).

In the biopsies taken before treatment involucrin expression was extended to the lower cell layers of the stratum spinosum. After 3 weeks of treatment with DuoDERM E the interpapillar involucrin expression showed an almost statistically significant improvement. Several studies showing an increased expression of involucrin are characterized by an accelerated epidermal turnover (12–14). Taking these hypotheses into account, our observation that involucrin expression in psoriatic epidermis is decreased after 3 weeks' occlusion therapy with hydrocolloid dressing is in agreement with the findings of Baxter et al. and Fry et al. who noted a decrease of the mitotic index in psoriatic plaques after occlusion therapy (2, 3).

The present study shows that abnormalities with respect to epidermal differentiation are reduced during hydrocolloid dressing treatment. As immunological parameters remain unaffected during hydrocolloid dressing treatment (4), it is feasible that this mode of occlusion directly interferes with epidermal growth and differentiation.
REFERENCES


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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

<table>
<thead>
<tr>
<th>Aetiology</th>
<th>Number of ulcers</th>
<th>Healed at follow-up</th>
<th>Small ulcer at follow-up</th>
<th>Failure (large ulcer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venous</td>
<td>21</td>
<td>17 (80%)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Varicose veins</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Ligation of perforating veins</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Arteriosclerotic</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Combined</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Traumatic</td>
<td>9</td>
<td>8</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Other reason</td>
<td>12</td>
<td>8</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>37 (80%)</td>
<td>4 (9%)</td>
<td>5 (11%)</td>
</tr>
</tbody>
</table>

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