Introduction

The basic therapy of neurodermatitis mainly comprises a treatment of the dry skin and its secondary consequences, with suitable basic therapeutic products (1), which can positively affect skin moisture and transepidermal water loss (TEWL) and thus the skin barrier function. In patients with atopic dermatitis, however, oil-in-water (O/W) emulsions remove grease from the skin, due to the emulsifying agents they contain, and are therefore contraindicated (2,3). O/W emulsions only demonstrate a comparable effect to water-in-oil (W/O) emulsions (without the addition of moisturising factors) if glycerol or urea are added. But these can cause a burning sensation on the skin (4). The intrinsic positive effect of W/O emulsions on dry skin can be further increased by the addition of the moisturising factor glycerol, which, according to general recommendations, should be present at a concentration of at least 10% (5).

Method

The aim of this prospective, randomised, double-blind, intra-individual comparative study is to investigate the effect of the two W/O emulsions, Neuroderm Moisturising Cream with 20% glycerol and 30% lipids and Neuroderm Moisturising Cream Lipo with 20% glycerol and a higher lipid content of 50%, in patients with neurodermatitis, compared with anionic hydophilic cream SF (O/W emulsion) with a lower glycerol content of 5% and 31% lipids, on the basis of skin moisture and transepidermal water loss (TEWL).

In 20 adults (33–64 years of age; mean: 45.6 years) with confirmed neurodermatitis, a typical amount (approx. 0.2 g/100 cm²) of each cream was applied twice daily over a period of 28 days to predetermined areas of the inner forearms. A fourth skin region without any cream application served as an area of comparison. The use of further emollients was not permitted. On Days 0, 14 and 28, the parameter skin moisture was determined using corneometry and the parameter TEWL (as a measure of the barrier function) was determined using the Tewameter under standardised conditions. The statistical calculation was performed using ANOVA and the Tukey HSD test; a value of $p < 0.05$ was considered statistically significant. The investigations were performed by DermaConsult GmbH, Alfter, Germany.

Results

1. Skin hydration/skin moisture

In all participants, use of the three creams led to a statistically significant increase in skin moisture compared to controls ($p < 0.05$) after only 14 days, whereas no change occurred in the skin areas which had not been treated (Table 1, Fig. 1). Skin hydration increased further after a 28-day treatment. After 14 and 28 days, the increase in skin moisture was higher to a statistically significant extent ($p < 0.05$) in those skin areas to which the W/O emulsions Neuroderm Moisturising Cream and Neuroderm Moisturising Cream Lipo had been applied compared with the skin areas on which anionic hydophilic cream SF (O/W emulsion) was used.

II. Transepidermal water loss (TEWL)

After 14 and 28 days of treatment, all three products led to a reduced transepidermal water loss. However, the reduction in TEWL only achieved statistical significance ($p < 0.05$) for the skin areas on which Neuroderm Moisturising Cream and Neuroderm Moisturising Cream Lipo (W/O emulsions) were applied.

III. Tolerability

All three products were extremely well tolerated by all subjects. No symptoms of intolerance occurred.

Conclusion

Use of Neuroderm Moisturising Cream and Neuroderm Moisturising Cream Lipo achieved a statistically significant reduction in the transepidermal water loss (TEWL) and thus improved the skin barrier function. In addition, treatment with Neuroderm Moisturising Cream and Neuroderm Moisturising Cream Lipo (W/O emulsions with 20% glycerol) resulted in an increase in skin moisture that was statistically significantly higher than that achieved with anionic hydophilic cream SF (O/W emulsion with 5% glycerol); W/O emulsions with a high glycerol content of 20% thus demonstrably lead to greater skin hydration.

The use of Neuroderm Moisturising Cream and Neuroderm Moisturising Cream Lipo therefore complies with the general recommendation to give preference to W/O emulsions and to use glycerol as a moisturising factor at a concentration of at least 10% (5).

References

(1) Neurodermatitis-Leitlinie der Gesellschaft für Pädiatrische Allergologie und Immunologie e.V. (Neurodermatitis Guideline from the Association for Paediatric Allergology and Environmental Medicine e. V.)

(2) Gloor M, Therapiewoche 1992, 42(23):1410-1416; Körperpflege und externe Behandlung – Wenig waschen und viel cremen! (Personal hygiene and external treatment – Wash less and apply lots of cream!)

(3) Gloor M, Gehring W, Der Hautarzt 2003, 54:324-330; Eigeneinkäufe von Emulsionen auf die Hornschichtbarriere und –hydrierung (Independent effects of emulsion on the horny cell layer barrier and horny cell layer hydration)

(4) Gloor M, Skin Pharmacol Physiol 2004, 17:267-273; How dermatological vehicles influence the horny cell layer?


Table 1: Effect of topical basic therapy on skin moisture compared with Day 0

<table>
<thead>
<tr>
<th>Application/Product</th>
<th>Day 14</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cream (control)</td>
<td>0.2% (± 0.9)</td>
<td>1.3% (± 8.7)</td>
</tr>
<tr>
<td>Neuroderm Moisturising Cream</td>
<td>63.9% (± 19.3)</td>
<td>64.4% (± 17.8)</td>
</tr>
<tr>
<td>Cream Lipo (20% glycerol + 30% lipids)</td>
<td>70.8% (± 22.3)</td>
<td>71.3% (± 20.1)</td>
</tr>
<tr>
<td>Anionic hydophilic cream SF</td>
<td>44.5% (± 23.7)</td>
<td>43.6% (± 21.5)</td>
</tr>
</tbody>
</table>

Values as mean ± SD

1) $p < 0.05$ compared to control

Table 2: Effect of topical basic therapy on TEWL (g/h*m²) compared with Day 0

<table>
<thead>
<tr>
<th>Application/Product</th>
<th>Day 14</th>
<th>Day 28</th>
</tr>
</thead>
<tbody>
<tr>
<td>No cream (control)</td>
<td>0.1 (± 1.4)</td>
<td>– 0.4 (± 1.8)</td>
</tr>
<tr>
<td>Neuroderm Moisturising Cream</td>
<td>– 1.7 (± 1.9)</td>
<td>– 2.1 (± 2.2)</td>
</tr>
<tr>
<td>Cream Lipo (20% glycerol + 30% lipids)</td>
<td>– 1.7 (± 2.9)</td>
<td>– 1.8 (± 1.9)</td>
</tr>
<tr>
<td>Neuroderm Moisturising Cream Lipo</td>
<td>– 0.9 (± 1.5)</td>
<td>– 1.1 (± 1.9)</td>
</tr>
</tbody>
</table>

Values as mean ± SD

1) $p < 0.05$ compared to control

Fig. 1: Mean increase in skin moisture compared with Day 0

Fig. 2: Mean reduction in transepidermal water loss (TEWL) compared with Day 0

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