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Topical Steroids under Wet-Wrap Dressings in Atopic Dermatitis – A Vehicle-Controlled Trial

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Key Words
Wet-wrap dressings · Mometasone furoate · Atopic dermatitis · *Staphylococcus aureus*

Abstract
Background: The wet-wrap dressing technique has proved to be beneficial in cases of exacerbated atopic dermatitis (AD) skin lesions. ***Objective:*** The effect of wet-wrap dressings was investigated in a controlled trial comparing a steroid (mometasone furoate 0.1%)-containing and a steroid-free (vehicle) preparation in an inpatient comparison study. ***Methods:*** 20 children aged 2–17 years with exacerbated AD were treated twice daily with wet-wrap dressings over a 5-day period. ***Results:*** AD in treated areas significantly improved in both study arms; however, the effect was significantly better in the mometasone-treated group ($p < 0.01$). Transepidermal water loss improved in both arms without any significant differences. *Staphylococcus aureus* colonization decreased during the first 3 days of active treatment independently of the therapeutic modalities chosen. At day 5, colony counts further dropped on the steroid-treated lesions. ***Conclusion:*** Application of the wet-wrap dressing technique for exacerbated AD lesions is effective, combination with a topical steroid being superior to a steroid-free application without bearing the risk of a bacterial superinfection.

Introduction

Atopic dermatitis (AD) is a frequent disease very often affecting children. Disease management includes both adequate treatment of active skin lesions and identification and avoidance of provocation factors [1, 2].

The wet-wrap dressing technique has proved to be beneficial in cases of exacerbated AD skin lesions. The application of these dressings using emollients only [3], emollients in combination with antiseptics [4] or with topical steroids [5] has been reported to be effective. Since acute lesions of AD usually show high colonization with *Staphylococcus aureus* [6], some authors do not recommend this technique for superinfected lesions [7]. In the present study, data are presented comparing the effect of wet-wrap dressings with and without steroid-containing preparations on AD lesions with special reference to the development of barrier properties and microbial colonization.

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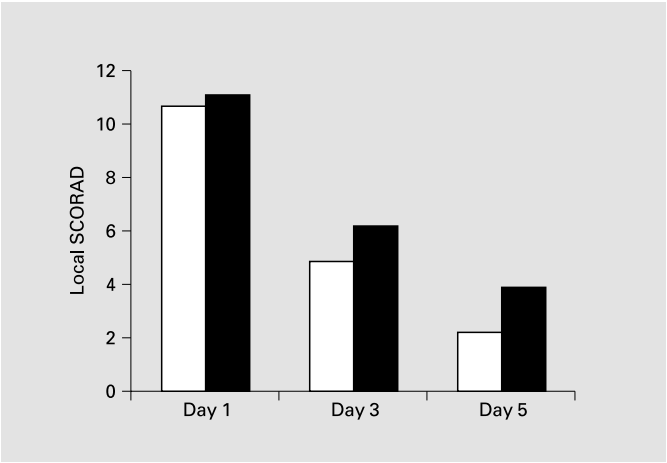

Fig. 1. Improvement of local SCORAD during active treatment with wet-wrap dressings with (□) and without (■) topical steroid comedication.

Table 1. Wet-wrap technique [10]

1	Cut appropriate lengths of Tubifast® bandages, two lengths for each arm/leg you want to treat, the same works for the trunk
2	Soak one set in warm water
3	Apply lipid-rich cream generously
4	Squeeze excess water from the wet bandage
5	Apply the first, wet layer of tubular bandage
6	Pull on the second, dry layer of tubular bandage

Patients and Methods

Study Design

The clinical trial was designed as a randomized, controlled, double-blind monocentric inpatient comparison study. The protocol was approved by the ethical committee of the Medical Department of the Technical University of Munich.

Patients

Twenty patients aged 2–17 years (medium age: 7.2 years) presenting at the outpatient department due to exacerbated AD were included. All patients fulfilled Hanifin and Rajka's [8] criteria. No systemic treatment with steroids or antibiotics, or topical steroid preparations was allowed 7 days prior to enrollment into the study.

Disease Extent

The medium SCORAD was 52.6 ± 16.9 (range: 21.5–82.2) [9]. Skin lesions symmetrically affecting either inside of elbows or back of knees were taken as inclusion criteria.

Study Protocol

In the morning and evening of day 1–5 either the steroid preparation (mometasone furoate 0.1%, Ecural Fettcreme) or its vehicle was applied to the test area in a left-right study covered by wet wraps. Tubifast bandages, kindly provided by Schuhmacher, Krefeld, Germany, were applied twice daily. Parents and their children were thoroughly instructed how to perfom the wet-wrap dressing technique (table 1). During the night, test areas were not covered by bandages. Adjuvant basic therapy was allowed on all other body areas.

Clinical Evaluation

The intensity of AD lesions in tested areas was graded before the treatment and at 3 and 5 days by applying a local SCORAD [11], which assesses the clinical symptoms erythema, edema/papulation, oozing/crusts, excoriations, lichenification and the subjective parameter local pruritus. Each item was graded on a 4-point scale (0 = absent; 1 = mild; 2 = moderate; 3 = severe) resulting in a maximum count of 18 points.

Barrier Function

To gain information on the barrier function during treatment, transepidermal water loss (TEWL) was measured in areas under investigation before initiating therapy and at the end of the active treatment following the guidelines of Pinnagoda et al. [12].

S. aureus *Colonization*

Using the scrab method developed by Williamson and Kligman [13], test areas were quantitively screened for *S. aureus* before, at day 3 and at the end of the active treatment period.

Results

Clinical Changes during Therapy

Data on the development of the local SCORAD are shown in figure 1. Initially, the severity of the lesions was almost identical on both arms, SCORAD values at day 3 and 5 continuously improved in both groups. However, in comparison to the emollient-only group, the improvement in the mometasone furoate group was significantly better ($p < 0.01$).

Looking at single parameters, the local SCORAD improvement was better for all analyzed items in the steroid-treated arm, but reached significance only for the parameter edema/papulation (fig. 2).

Barrier Properties

TEWL measurements improved in both study arms without reaching statistical significance (table 2).

S. aureus *Colonization*

Bacterial counts decreased in both study arms when first controlled at day 3. At day 5, however, an increase could be detected in the vehicle-treated arm, whereas *S. aureus* counts continued to decrease in the steroid-treated lesions (data not shown).

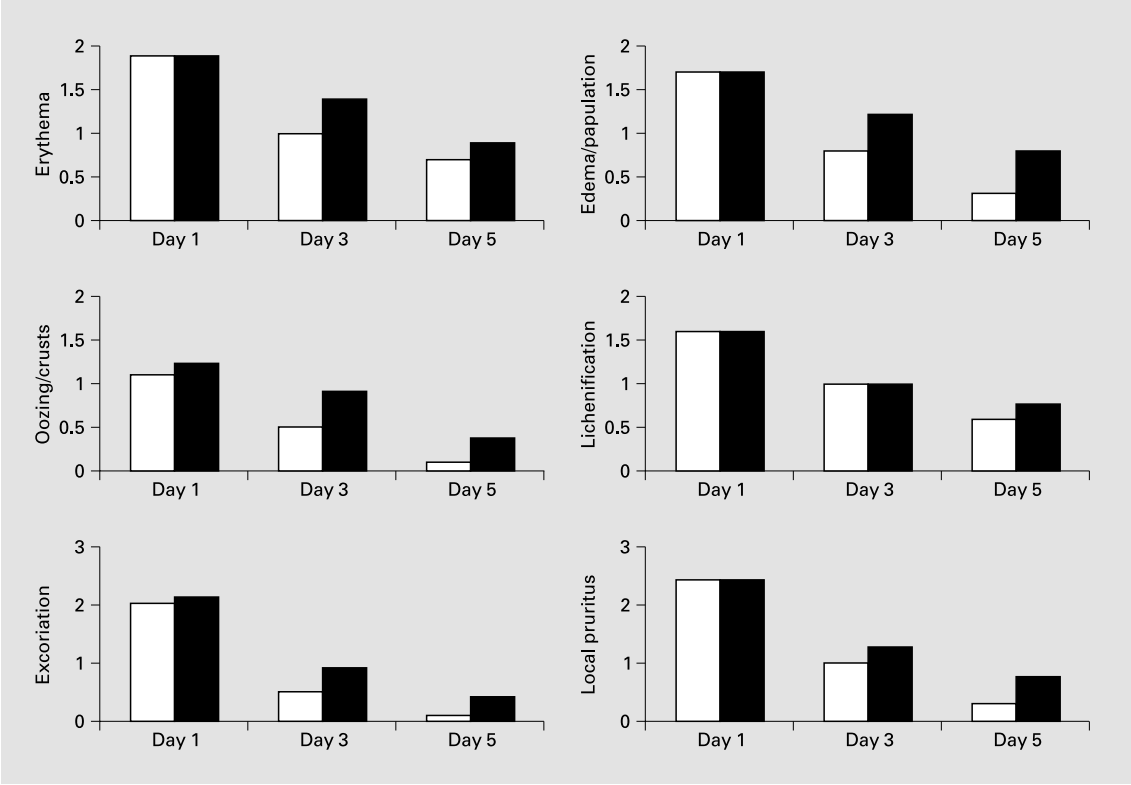

Fig. 2. Improvement of single items of the local SCORAD under wet-wrap dressings with (□) and without (■) steroid comedication.

Discussion

This study confirms the efficacy of the wet-wrap dressing technique for the treatment of exacerbated AD lesions [3–5, 7, 14]. It is the first to compare the use of a potent steroid preparation versus a steroid-free preparation in a half-side study. Although treatment with steroid-free basic ointments is helpful, the efficacy can be significantly improved by comedication with a potent steroid preparation such as mometasone furoate. The steroid effect is mainly due to its anti-inflammatory properties which was reflected clinically in a significantly stronger effect on the SCORAD parameter edema/papulation. For all other parameters, no significant superior effect in comparison to a mere steroid-free treatment was noted. This can be explained by the effect of the bandages as a textile protection against self-destruction resulting in erythema, oozing and excoriation. Barrier properties as measured by TEWL improved in both study arms probably due to intense lipid deposition.

Table 2. TEWL measurements during active treatment with wet-wrap dressings with and without topical steroid comedication

Time point	TEWL, g/m^2·h	
	mometasone furoate	vehicle
Day 1	36.2	35.2
Day 5	20.2	22.7

It is a well-known fact from routine clinical work with wet-wrap dressings that bacterial superinfection during active application is not a relevant side effect [3]. Quantification of lesional *S. aureus* in this study confirms the clinical experience that wet-wrap dressings do not lead to superinfection (neither in the steroid nor in the vehicle arm did any of the skin lesions show clinical signs of bacterial superinfection). The corresponding *S. aureus* counts correlated with clinical improvement of skin lesions.

Whereas for the vehicle-treated skin lesions bacterial counts started to increase between day 3 and 5, on the mometasone furoate side a steady decrease was noted during the whole study period. This is in agreement with previous reports which showed a reduction in the density of *S. aureus* as a result of a steroid-induced improvement of AD [15].

Acknowledgement

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