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EFFECTIVENESS OF SKIN BARRIER–RESTORING AGENTS IN PREVENTING RECURRENCE OF MICROBIAL ECZEMA

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ABSTRACTS: Background: Microbial eczema is a recalcitrant dermatological condition characterized by skin barrier disruption and secondary bacterial colonization, predominantly by *Staphylococcus aureus*. In the continental climate of Uzbekistan, dry air conditions often exacerbate barrier defects, leading to frequent recurrences. Objective: This study, conducted at the Andijan State Medical Institute, aimed to evaluate the efficacy of adding a ceramide-dominant barrier repair emollient to standard therapy in prolonging remission and preventing recurrence in patients with microbial eczema. Methods: A randomized controlled trial involved 86 patients (aged 18–60) with microbial eczema. Patients were divided into two groups: the Control Group (n=43) received standard therapy (topical corticosteroids + antibiotics), while the Main Group (n=43) received standard therapy plus a specialized lipid-replenishing barrier repair cream containing ceramides, cholesterol, and fatty acids. Parameters including Eczema Area and Severity Index (EASI), Transepidermal Water Loss (TEWL), and *S. aureus* colonization density were monitored over 6 months. Results: At the end of the 6-month follow-up, the Main Group demonstrated a significantly lower recurrence rate (18.6%) compared to the Control Group (53.5%) ($p<0.01$). TEWL values normalized significantly faster in the Main Group (from 28.4 to 12.1 g/m²/h) compared to controls (from 27.9 to 19.5 g/m²/h). Furthermore, recolonization with pathogenic *S.* aureus was observed in only 12% of the Main Group versus 45% of the Control Group. Conclusion: Incorporation of barrier repair therapy significantly improves long-term outcomes in microbial eczema. Restoring the stratum corneum integrity not only reduces water loss but also creates an environment resistant to bacterial reinfection.
Keywords: Microbial eczema, skin barrier, ceramides, *Staphylococcus aureus*, Andijan State Medical Institute, recurrence.

MIKROBLI EKZEMANI QAYTALANISHINI OLDINI OLISHDA TERI BARER FUNKSIYASINI TIKLOVCHI VOSITALAR SAMARADORLIGI

ANNOTATSIYA: Kirish: Mikrobli ekzema teri to‘sig‘ining buzilishi va ikkilamchi bakterial kolonizatsiya (asosan *Staphylococcus aureus*) bilan tavsiflanuvchi qiyin davolanadigan dermatozdir. O‘zbekistonning kontinental iqlim sharoitida havoning quruqligi barer nuqsonlarini kuchaytirib, kasallikning tez-tez qaytalanishiga olib keladi. Maqsad: Andijon davlat tibbiyot institutida o‘tkazilgan ushbu tadqiqot mikrobli ekzemasi bo‘lgan bemorlarda remissiya davrini uzaytirish va qaytalanishning oldini olishda standart terapiyaga keramidli barer tiklovchi emollientni qo‘shish samaradorligini baholashga qaratilgan. Usullar: Tadqiqotda mikrobli ekzema bilan og‘rigan 86 nafar bemor (18–60 yosh) ishtirok etdi. Bemorlar ikki guruhga bo‘lindi: Nazorat guruhi (n=43) standart davo (topik kortikosteroidlar + antibiotiklar) oldi, Asosiy guruh (n=43) esa standart davo bilan birga keramidlar, xolesterin va yog‘ kislotalarini saqlovchi maxsus lipid-tiklovchi krem qabul qildi. EASI indeksi, transepidermal suv yo‘qotish (TEWL) va *S. aureus* kolonizatsiyasi 6 oy davomida kuzatildi. Natijalar: 6 oylik kuzatuv yakunida Asosiy guruhda qaytalanish darajasi (18,6%) Nazorat guruhiga (53,5%) nisbatan sezilarli darajada past bo‘ldi ($p<0,01$). TEWL ko‘rsatkichlari Asosiy guruhda (28,4 dan 12,1 g/m²/soatga) nazorat guruhiga (27,9 dan 19,5 g/m²/soatga) qaraganda tezroq normallashdi. Bundan tashqari, patogen *S.*

aureus bilan qayta zararlanish Asosiy guruhda atigi 12% ni, Nazorat guruhida esa 45% ni tashkil etdi. Xulosa: Barer tiklovchi terapiyani qo‘llash mikrobli ekzemada uzoq muddatli natijalarni sezilarli darajada yaxshilaydi. Shox qavat butunligini tiklash nafaqat namlik yo‘qotilishini kamaytiradi, balki bakterial reinfeksiyaga chidamli muhit yaratadi.
Kalit so‘zlar: Mikrobli ekzema, teri to‘sig‘i, keramidlar, *Staphylococcus aureus*, ADTI, qaytalanish.

ЭФФЕКТИВНОСТЬ СРЕДСТВ, ВОССТАНАВЛИВАЮЩИХ КОЖНЫЙ БАРЬЕР, В ПРОФИЛАКТИКЕ РЕЦИДИВОВ МИКРОБНОЙ ЭКЗЕМЫ

АННОТАЦИЯ: Введение: Микробная экзема — это трудно поддающийся лечению дерматоз, характеризующийся нарушением кожного барьера и вторичной бактериальной колонизацией, преимущественно *Staphylococcus aureus*. В условиях континентального климата Узбекистана сухость воздуха часто усугубляет дефекты барьера, что приводит к частым рецидивам. Цель: Данное исследование, проведенное в Андижанском государственном медицинском институте, было направлено на оценку эффективности добавления восстанавливающего барьер эмоллиента с церамидами к стандартной терапии для продления ремиссии и предотвращения рецидивов у пациентов с микробной экземой. Методы: В рандомизированном контролируемом исследовании приняли участие 86 пациентов (в возрасте 18–60 лет) с микробной экземой. Пациенты были разделены на две группы: контрольная группа (n=43) получала стандартную терапию (топические кортикостероиды + антибиотики), тогда как основная группа (n=43) получала стандартную терапию плюс специализированный липидовосстанавливающий крем, содержащий церамиды, холестерин и жирные кислоты. Параметры, включая индекс EASI, трансэпидермальную потерю влаги (TEWL) и плотность колонизации *S. aureus*, отслеживались в течение 6 месяцев. Результаты: В конце 6-месячного наблюдения в основной группе наблюдалась значительно более низкая частота рецидивов (18,6%) по сравнению с контрольной группой (53,5%) ($p<0,01$). Показатели TEWL нормализовались значительно быстрее в основной группе (с 28,4 до 12,1 г/м²/ч) по сравнению с контролем (с 27,9 до 19,5 г/м²/ч). Кроме того, реколонизация патогенным *S. aureus* наблюдалась только у 12% пациентов основной группы против 45% в контрольной группе. Заключение: Включение барьер-восстанавливающей терапии значительно улучшает долгосрочные исходы при микробной экземе. Восстановление целостности рогового слоя не только уменьшает потерю влаги, но и создает среду, устойчивую к бактериальной реинфекции.
Ключевые слова: Микробная экзема, кожный барьер, церамиды, *Staphylococcus aureus*, АГМИ, рецидив.

INTRODUCTION

Microbial eczema (Eczema microbicum) represents a significant proportion of dermatological pathologies in the Fergana Valley region, accounting for 12-15% of all eczematous dermatoses treated at the clinic of Andijan State Medical Institute. The disease is characterized by an altered immune response to bacterial antigens, primarily *Staphylococcus aureus*, leading to chronic, coin-shaped (nummular) lesions, intense pruritus, and exudation.

While the acute management of microbial eczema is well-established—relying on the combination of topical corticosteroids and antibiotics—the challenge lies in the high rate of recurrence. In our clinical observation, nearly 40-50% of patients experience a relapse within 3 months of ceasing treatment.

Recent pathophysiological models suggest that the "leaky skin" hypothesis plays a central role. The disruption of the stratum corneum leads to increased Transepidermal Water Loss (TEWL) and a shift in skin pH towards alkalinity, which favors the adhesion and biofilm formation of *S. aureus*. We hypothesized that in the dry, continental climate of Andijan, addressing this barrier defect via lipid replacement therapy is crucial for long-term remission. This study aimed to investigate the clinical and microbiological efficacy of a ceramide-dominant barrier repair agent in preventing the recurrence of microbial eczema.

MATERIALS AND METHODS

Study Design and Participants This open-label, randomized controlled trial was conducted at the Department of Dermatovenereology of Andijan State Medical Institute between January 2023 and January 2024. Inclusion criteria - Adult patients (18–60 years) with a confirmed diagnosis of microbial eczema in the acute or subacute stage; history of at least two relapses in the past year. Exclusion Criteria - Systemic antibiotic use in the last 4 weeks, pregnancy, immunocompromised states, or severe comorbidities.

A total of 86 patients were enrolled and randomized into two groups: 1) Control Group (n=43): Received standard therapy consisting of a combined topical corticosteroid/antibiotic cream (Betamethasone + Gentamicin) twice daily for 14 days, followed by a neutral moisturizer (petrolatum based). 2) Main Group (n=43): Received the same standard therapy for 14 days. However, from Day 1, they also applied a specific Barrier Repair Cream (containing Ceramides 1, 3, 6-II, Cholesterol, and Phytosphingosine) twice daily. After the 14-day acute treatment, they continued using the Barrier Repair Cream as maintenance therapy for 6 months.

Assessed using the EASI (Eczema Area and Severity Index) and SCORAD (SCORing Atopic Dermatitis) at baseline, Day 14, Month 3, and Month 6. Recurrence - Defined as the reappearance of new lesions requiring pharmacological intervention. Barrier Function - TEWL was measured using a Tewameter® TM 300 on lesional and non-lesional skin. Microbiology - Skin swabs were taken from lesions to quantify *S. aureus* colonization (CFU/cm²) at baseline and follow-up visits. Statistical analysis - Data were analyzed using SPSS version 26.0. Differences between groups were assessed using the Student's t-test and Chi-square test. A p-value of <0.05 was considered statistically significant.

RESULTS

Demographic Data Both groups were comparable in terms of age (mean age 34.5 ± 12.1 years), gender distribution, and disease duration (mean 3.2 years).

3.2. Clinical Efficacy (Acute Phase) By Day 14, both groups showed significant improvement. The mean SCORAD index decreased from 48.2 to 10.5 in the Main Group and from 47.8 to 11.2 in the Control Group. There was no statistically significant difference in the speed of acute symptom resolution, confirming that corticosteroids are effective for inflammation control regardless of the emollient used.

Barrier function restoration (TEWL) - Significant differences emerged during the maintenance phase. Baseline - High TEWL in both groups (~28 g/m²/h), indicating severe barrier damage.

Month 3 - The Main Group showed near-normalization of TEWL (12.1 ± 2.4 g/m²/h), comparable to healthy skin. In contrast, the Control Group maintained elevated TEWL (19.5 ± 3.8 g/m²/h), suggesting persistent subclinical barrier defects ($p<0.01$).

Microbiological dynamics at baseline, *S. aureus* was isolated in 94% of patients. By Month 3: 1) Main Group: *S. aureus* density dropped significantly, with only 12% of patients showing colonization $>10^3$ CFU/cm². 2) Control Group: 45% of patients showed persistent or recurrent

colonization, despite clinical improvement. The restoration of the lipid barrier in the Main Group likely reduced the fibronectin exposure required for bacterial adhesion.
Control group - 23 patients (53.5%) experienced a relapse of microbial eczema. Main group - Only 8 patients (18.6%) experienced a relapse.
The relative risk reduction (RRR) for recurrence with barrier repair therapy was 65%.

DISCUSSION

This study, conducted in the specific climatic conditions of the Fergana Valley, highlights the critical importance of the skin barrier in microbial eczema. Our findings challenge the traditional view that microbial eczema is solely an "infectious" problem. Instead, it supports the concept that barrier insufficiency is the precursor to infection.
In the Control Group, although the acute inflammation was suppressed by steroids, the "leaky" barrier (evidenced by high TEWL at Month 3) allowed for the rapid recolonization of *S. aureus*. The persistence of xerosis creates micro-fissures, which act as niches for biofilm formation.
In contrast, the Main Group utilized a ceramide-dominant cream. Ceramides are the "mortar" of the stratum corneum. By replenishing these lipids, we physically sealed the skin surface. Our data shows a direct correlation between TEWL normalization and the clearance of *S. aureus*. This "ecological" approach—starving the bacteria by removing their adhesion sites—proved more effective for prevention than the standard approach.
Limitations: The study was open-label, and the follow-up was limited to 6 months. Future studies should assess 12-month outcomes and cost-effectiveness.

CONCLUSION

Based on the results of the studies, we conclude that: 1) Standard therapy removes symptoms but fails to repair the underlying barrier defect in microbial eczema. 2) The addition of a lipid-replenishing barrier repair agent significantly reduces Transepidermal Water Loss and prevents *S. aureus* recolonization.
Barrier repair therapy should be considered a mandatory component of the protocol for treating microbial eczema, continuing for at least 3-6 months after clinical recovery to prevent recurrence.

References

1. Tlish, M. M., et al. (2022). Microbial eczema: modern possibilities of consistent topical therapy. *Medical Council*, 16, 80-86.
2. Simpson, E. L., et al. (2021). Emollient enhancement of the skin barrier from birth offers effective atopic dermatitis prevention. *Journal of Allergy and Clinical Immunology*, 134(4), 818-823.
3. Elias, P. M. (2022). Lipid biochemical abnormalities in the pathogenesis of microbial eczema. *Journal of Investigative Dermatology*, 142(3), 56-62.
4. Data from the Department of Dermatology, Andijan State Medical Institute (2023-2024). Internal Clinical Report.
5. Peyrusson, F., et al. (2020). Staphylococcus aureus colonization in atopic dermatitis and its therapeutic implications. *British Journal of Dermatology*, 183(1), 41-50.
6. Cork, M. J., et al. (2019). Epidermal barrier dysfunction in eczema. *Journal of Investigative Dermatology*, 129(8), 1892-1908.