

Assessment of the Dermatological Index of the Symptom Scale in Patients with Seborrheic Dermatitis and Opportunistic Infection Based On the Use of Natural Silicon Oxide

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Abstract

The article presents the results of the external treatment of seborrheic dermatitis using moisturizing, tonic, silicon-salicylic cream - "Fatisalik". Clinical studies have shown that Fatisalik cream helps to reduce the severity of the dermatological scale of symptoms, eliminate subjective sensations, and improve the dynamics of the skin-pathological process.

In dermatological practice, there is an increasing trend in allergic skin diseases with chronic, often recurring and resistant forms of the clinical course. [1,2,8,10] The etiopathogenesis of these allergic skin diseases is due to opportunistic infections caused by staphylococcus spp., Candida spp. and infections caused by Herpes simplex virus. [3,4,8,9,10,17] According to studies, peptidoglycan of the cell wall of St.aureus, when this microorganism colonizes the skin of patients with atopic dermatitis, induces atopic keratinocyte production of inflammatory mediators and cytokines, including GM-CSF, in the lesions. Moreover, dysfunction of a specific toll-like receptor, TLR2, can cause staphylococcal persistence in patients with allergic dermatoses as a result of impaired induction of antimicrobial peptides by the example of beta-defensin - 2. [18]

According to Ginzburg A.L., Ilyina T.S. et al. (2003), in the metabolic processes of microorganisms and their ability to form biofilms, micronutrients are of great importance. [6] Iron is an important trace element that is part of respiratory enzymes and helps accelerate oxidative processes. Also, for the implementation of respiration and activation of enzyme systems, microorganisms need copper, potassium, and magnesium. According to N. Kaletin (2007), the concentration of

magnesium ions in the cell affects the energy production processes that occur in the mitochondria of microorganisms. [7]

The qualitative and quantitative composition of trace elements can be associated with metabolic processes occurring in microbial cells and can affect the degree of virulence of these pathogens. [13]

Studies have shown that in the anti-infectious protection, chelating proteins play an important role; one of them is calprotectin, which is found in neutrophils. In inflammatory processes, there is a large release of neutrophils into the area of inflammation, which creates an anti-inflammatory effect. It was also found that calprotectin binds zinc, manganese and iron, calcium, thereby inhibiting the spread of bacteria, opportunistic fungi, as well as viruses.

One of the ways to suppress the growth of opportunistic microorganisms is the activation of chelating proteins in neutrophils - calprotectin -during the disease, which will induce the activity of the body's immune system against the pathogen.

At the present stage, the search for new opportunities in the particularly external treatment of allergic skin diseases is an urgent and on-demand problem of dermatological practice. Since in recent years there has been a steady increase in the share of allergic dermatoses among skin diseases, which is 73.7% according to the latest data. Chronization, frequent recurrence and resistance to ongoing basic therapy pose a number of serious problems for clinicians and pharmacists in terms of developing new methods of therapy.

It should be noted that in the development of allergic diseases, the skin condition, i.e. epidermal barrier, is of critical importance. Irritants and allergens will primarily come into contact with human skin, through which the peptidoglycans of opportunistic microorganisms will contribute to the occurrence of inflammatory processes in the human body. [3]

Modern dermatology offers drugs of various nature and purpose for the treatment and prevention of allergic and pyoinflammatory affections of the skin and mucous membranes. However, the need for highly effective, affordable domestic medicines is not fully satisfied. The most commonly used anti-inflammatory drugs to treat this pathology, namely topical corticosteroids and other synthetic chemotherapeutic agents, not only cause drug resistance, but also lead to complications, which contributes to the persistent course of dermatoses. [9,10,11]

External therapy in dermatological practice is a leading part of therapeutic measures. External agents are evaluated not only by their local actions on the pathological process but also by their ability to produce a reflex action on the central

and autonomic nervous system and metabolism, affecting through nerve receptors. The importance of the use of external agents for uncomplicated forms of skin diseases is assigned to the elimination of symptoms, in some cases, they have a direct etiological effect, while not being inferior to the effectiveness of systemic treatment.

Despite the large pharmacy arsenal of external drugs used in dermatological practice, the problem of external therapy in the treatment of allergic skin diseases still remains relevant. [16,17,18,20]

In the course of basic research, the geochemical characteristics of siliceous solutions were evaluated and their anti-inflammatory and antibacterial studies were investigated by experiment, which contributed to the development of new therapeutic products for dermatological practice. [2]

In the framework of the applied grant PZ-20170922154 “Development of new medicines for external therapy for allergic dermatoses prepared on the basis of natural raw materials of Uzbekistan”, a new domestic therapeutic and cosmetic external use preparation silicon-salicylic cream “Fatisalik” was developed, which has moisturizing, tonic and regenerative effect.

The aim of our research was evaluation of the therapeutic effectiveness of the silicon-salicylic cream “Fatisalik” moisturizing cream in patients with seborrheic dermatitis.

Keywords: seborrheic dermatitis, external therapy, silicon-salicylic cream, Fatisalik cream

Material and research methods. 41 patients with seborrheic dermatitis aged 19 to 53 years were examined. Among them, males were 26 and females - 15. All patients underwent clinical (DISS index determination), microbiological and pathomorphological studies before and after treatment.

All patients underwent clinical, microbiological studies. Also, patients were consulted by other specialists (endocrinologist, general practitioner, ophthalmologist, neuropathologist, gastroenterologist, allergist). A clinical study consisted of determining the Dermatological Index of the Symptom Scale (DISS), which was evaluated by the following parameters: erythema, edema, weeping, lichenification, papules, dryness (xerosis), desquamation, erosion, itching. Parameters were evaluated on a 3-points scale, except for itching (4 points). The DISS indicators were evaluated according to the following criteria: a 95% decrease in DESS the indicators was taken as clinical remission, 75-95% - a significant improvement, 50-75% - an improvement, 25-50% - a slight improvement.

Microbiological studies of the skin consisted of culture of skin squamosa of lesions. For bacteriological studies, 5% blood agar, Endo, Levine medium and salt agar with mannitol were used. The culture was incubated in a thermostat at a temperature of 36.80 ° C. The culture was taken from control healthy individuals (34) and the patients of the main group (39).

According to the standard and clinical protocol for the treatment of skin diseases, all patients underwent basic therapy, which included the administration of detoxification, hyposensitization, antihistamine treatment, vitamin therapy and external therapy (the main group received silicon-salicylic cream “Fatisalik” cream (n = 22) and the control group (n = 17) –3% salicylic cream).

Fatisalic cream is a domestic external use preparation by Fatilyuks LLC, which has a unique composition: lanolin, high-quality olive oil, and activated siliceous solutions. Fatisalic cream was applied to the lesions twice a day for 10 days.

When prescribing a new cream, we used the following criteria in the study:

1. The age of the patient is 12-65 years.
2. Light and moderate severity of the skin pathology.
3. Administration for the last 3 months of external therapy in the form of indifferent ointments and creams (without glucocorticosteroids)
4. Voluntary informed consent of patients.

The exclusion criteria from the study were:

1. Administration of systemic glucocorticosteroids for 16-30 days before inclusion in the study.
2. External use of steroid therapy in the last 1-2 months before the visit.
3. Pregnant and lactating women.
4. Alcohol, drug or medicine addiction
5. Failure to meet the requirements of the medical staff and the researcher.

Statistical processing of the research results was carried out by the method of confidence intervals. To calculate the accuracy of estimating the interval of values of a random variable, the Student and Laplace-Gauss distributions were used. In the case of a small number of patients (n = 6), the Student distribution was applied with the number of degrees of freedom $v = 2 (n-1) = 10$.

Results and discussion. The clinical evaluation of external therapy was performed based on the general status, the skin-pathological process, and the microbiological and pathomorphological findings. As a result, the main criteria for the effectiveness of therapy were: the onset of complete or incomplete clinical remission of the skin pathology, a decrease in the DISS index, microbiological negativity in the skin pathology lesion, and the frequency of backsets.

Thus, the results of the study showed that the dynamics of the skin-pathology resorption in group I patients, receiving external therapy with Fatiderm cream, differed significantly compared to group II. (Table 1).

All patients underwent clinical (DISS), microbiological and histological studies before and after the pathogenetic external therapy. (Table 1)

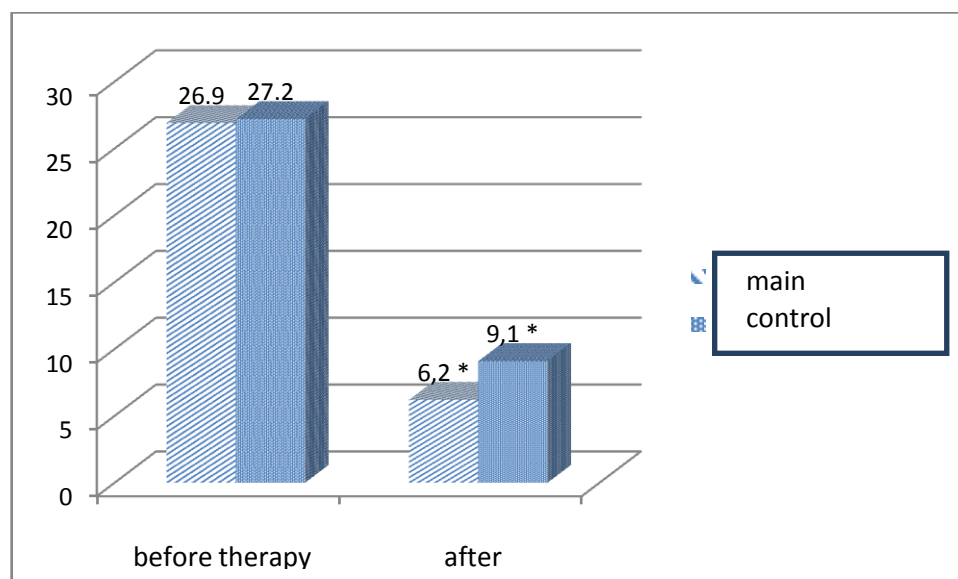


Fig. 1. Comparative characteristics of the DISS index against the background of external therapy. (points) (P<0,05)

The results of the study showed that the DISS severity in group I patients on average was 26.9 ± 0.1 points, while in patients of group II it made up 27.1 ± 0.1 points on average. Whereas in patients of group I against the background of the use of Fatisalik cream, the DISS index decreased by 4.3 times and averaged 6.2 ± 0.1 points, whereas in group II, the DISS index decreased by 2.9 times and amounted to an average of 9.1 ± 0.1 points. (P<0,05).

Table 1. Comparative characteristics of the DISS index against the background of external therapy. (points)

| | Dermatological Index of Symptoms Scale | | | | | | | | |
|---|--|----------------|-----------------------------|-----------------|-----------------|---------------|----------------|-----------------|-----------------|
| Groups | erythema | edema | oozing lesions (weeping) | Lichenification | papules | dryness | desquamation | erosion | itching |
| before treatment n=22 Fatisalik | 3,2 \pm 0,1 | 2,5 \pm 0,1 | 1,7 \pm 0,3 | 2,8 \pm 0,2 | 3,2 \pm 0,16 | 3,5 \pm 0,1 | 2,6 \pm 0,1 | 3,6 \pm 0,1 | 3,8 \pm 0,07 |
| before treatment n=22 | 1,04 \pm 0,07* | 0,4 \pm 0,1* | 0,8 \pm 0,1 | 0,6 \pm 0,1* | 0,7 \pm 0,09* | 0,7 \pm 0,1 | 0,7* \pm 0,1 | 0,75 \pm 0,09 | 0,5 \pm 0,1* |
| Control group n=19 before treatment | 3,1 \pm 0,2 | 3,1 \pm 0,2 | 1,9 \pm 0,2 | 3,4 \pm 0,14 | 3,05 \pm 0,3 | 3,6 \pm 0,1 | 3,0 \pm 0,2 | 2,3 \pm 0,1 | 3,7 \pm 0,1 |
| Control group n=19 after treatment | 0,8 \pm 0,1* | 1,2 \pm 0,1* | 1,0 \pm 0,1 | 1,2 \pm 0,09* | 1,5 \pm 0,1* | 0,8 \pm 0,1 | 0,7* \pm 0,1 | 0,7 \pm 0,1 | 1,2 \pm 0,15* |

Note:* - $P < 0.05$ reliability compared to before treatment.

As can be seen from the table, against the background of the use of Fatisalik cream the dynamics of the skin pathological process noticeably changed to the positive side: among the clinical symptoms, a significant decrease in erythema was noted by 67.5 times, decrease in swelling by 84% ($P < 0.05$), desquamation - 73.5%, resorption of lichenification and papular elements by 78.6% ($P < 0.05$). Against the background of resorption of the skin pathological process, a significant decrease by 86.8% in subjective sensations - itching - was noted, which amounted to 0.5 ± 0.1 . ($P < 0.05$).

A comparative clinical analysis of external therapy in patients with eczema receiving salicyl cream also showed identical positive efficacy of the drug. However, the intensity of subjective sensations decreased by 67.6% and amounted to 1.2 ± 0.15 points ($P < 0.05$).

The results of the DISS study in patients with allergic dermatoses who received Fatisalik cream as an external therapy showed a positive dynamics in the clinical course of the skin pathology, which actually did not differ from the comparative control group.

Thus, preliminary results of a clinical study show that Fatisalik cream has anti-inflammatory, antipruritic features.

Inspired by the results of experimental studies of activated silicon solutions, which showed that due to the rich composition of these solutions - minerals and trace elements, which are the components of Fatisalik cream, we became interested in evaluating the antimicrobial properties of the cream. Thus, microbiological studies of the skin of lesions in patients with allergic dermatoses showed increased growth of opportunistic microorganisms - *Staphylococcus* spp. - in an amount on average from 1132 to 2803 CFU per 1 cm. Moreover, among *Staphylococcal* flora, *St.aureus* was most often found with methicillin-resistant genotypes - MRSA in 33.3% of cases, which revealed the persistent form of staphylococcal infection in patients with allergic dermatosis.

The use of Fatisalik cream contributed to a decrease in the degree of staphylococcus colonization to an average of 87 - 112 CFU. The analysis of the microbiological findings indicates the suppression of the growth of *Staphylococcal* flora. It should be noted that during the use of Fatisalik cream, no patient had significant side effects that required canceling the course of the drug or some special treatment.

Pathomorphological studies of the skin biopsy samples of lesions in patients with atopic dermatitis before treatment revealed hyperkeratosis, detachment of the horny layer, spongiosis, thickening of the granular layer, uneven acanthosis with elongated epidermal processes, intercellular swelling of the cells of the spinous layer and vacuolization of the cells of the basal layer. In the papillary layer of the dermis, the following was found: edema, vasodilation, with lymphohistiocytic infiltration around them, containing neutrophils, eosinophils, and penetration of the infiltrate cells into the epidermis, impregnation of the horny layer with serous fluid, inter- and intracellular edema of the cells of the spinous layer with the formation of the intraepidermal bulla.

Whereas after treatment, in patients with seborrheic dermatitis the all skin biopsies showed slight hyperkeratosis, in some places smoothing of epidermal processes, and normal granular layer. There was a decrease in the intercellular edema of the cells of the spinous layer of the epidermis. There was slight swelling in the

basal layer. In the upper and middle thirds of the dermis, the vessels are dilated, with single lymphohistiocytic infiltrates around them, containing neutrophils, and normal collagen fibers are determined.

Thus, clinical and morphological studies have shown that silicon-salicylic cream "Fatisalik" cream has anti-inflammatory, keratolytic, bacteriostatic regenerating, , which can be recommended for widespread use as an external therapy in patients with seborrheic dermatitis.

Conclusions.

1. The use of silicon-salicylic cream- Fatisalik cream - the domestic preparation for external use - is effective for the for seborrheic dermatitis in view of its anti-inflammatory effect.
2. Cream "Fatisalik" has a bacteriostatic effect on opportunistic flora at the skin lesion.
3. Due to the unique composition, Fatisalik cream is recommended for widespread use in the treatment of dry skin, seborrheic dermatitis.

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