Pelotherapy With Fatiderm M In The Therapy Of Infiltrative-Suppurative Form Of Trichophytosis In Children

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Abstract

In order to expand the knowledge of dermatologists, this article presents the results of a study based on the main aspects of the application of an innovative method of treatment using a mud mask "FATIDERM-M" in sick children with infiltrative-suppurative form of trichophytosis. The additional inclusion of mineralized mud mask with the background traditional therapy in sick children demonstrates a high effectiveness of the treatment (97.5%-100%) regardless of the location of the pathological process (scalp or smooth skin). This was confirmed by an earlier regression of clinical manifestations, reduction in the persistence term of mycosis infection and the time patients stay in the hospital.

Key words: Trichophytosis, infiltrative-suppurative form, treatment, pelotherapy, Fatiderm M, mud mask.

INTRODUCTION

Due to the trend of increasing prevalence of zooanthroponous trichophytosis in the whole world, including the Republic of Uzbekistan, where the incidence increased 1.3 times per 100 thousand of the population for the period 2017-2021, as well as a large proportion of the latter in the structure of dermatological diseases in children, the study of the problem of trichophytosis remains an urgent one today[4.11].

A characteristic feature of trichomycosis and trichophytosis is a gradual change in the microbiota with a change in the proportion of zoophilic and anthropophilic pathogens. If earlier the most frequent pathogens were anthropophilic fungi, now they occupy a little more than 1% [3]. Among the agents of dermatomycosis, the most socially significant ones are Trichophytom verrucosum and T.mentagrophytes due to their high susceptibility and development of more severe forms of the disease, and in particular, infiltrative-suppurative forms of trichophytosis [2,4,6].According to the clinical classification of trichophytosis, there are 6 forms (superficial, chronic and infiltrative-suppurative lesions of smooth skin and scalp, respectively), of which in more than half of the cases (53.7%) trichophytosis poceeds in an infiltrative-suppurative form [5,8]. This form of zooanthroponous trichophytosis is a complicated variant of mycotic infection, the outcome of which is the development of atrophic scars with a cosmetic defect, significantly decreasing the quality of life of the patients [9,10,11]. In relation to that, timely and effective therapy can prevent adverse outcomes of trichophytosis. In the range of therapeutic methods for the treatment of trichophytosis, pelotherapy occupies a certain place. It is a

therapeutic and cosmetic procedure characterized by the effect of therapeutic mud – peloids. The main mechanism of action of peloids is the transformation of biologically active substances with the consequent influencing the progress of metabolic processes in skin cells and increasing the immune reactivity of the body, ultimately activating effects such as regeneration and healing [3,12,13,14]. Among those mud treatment methods an effective domestic mud mask "FATIDERM-M", developed by Professor Mavlyanova Sh.Z., has now appeared on the pharmaceutical market. It was proposed as a new innovative method in the therapy of atopic dermatitis, fungal diseases, neurodermatitis, seborrheic dermatitis, eczema, acne, lymphoproliferative skin diseases and psoriasis. Due to its unique mineral composition, FATIDERM-M mud mask can also be used for dyschromia, vitiligo and pigmentation disorders [1,2].

Taking into account the abovementioned data, **the objective** of the study was assessment of the effectiveness of pelotherapy with application of Fatiderm-M mud mask in the therapy of infiltrative-suppurative form of trichophytosis (INF) in children.

MATERIALS AND METHODS

The object of the study were 60 children with infiltrative-suppurative form of trichophytosis (37 children with lesions of the scalp and 23 children with lesions of smooth skin), aged 2-18 years old. Among them there were boys 60% and girls 40%, who applied to the RSSPMC of Dermatology and Cosmetology of the MH of the RUz for check-ups and treatment within the period 2021-2022.

In the diagnosis of IST we used *clinical, laboratory* (ELISA for total IgE, secretory IgA, procalcitonin and IgG candida albicans, UAC with the calculation of the intoxication index, PCR MRSA, Mycososcreen); *microbiological* (bacteriological sowing from lesions), *mycological* (direct immunefluorescent analysis and culture sowing for fungi) and *instrumental* (ultrasound of internal organs) examination methods. The leukocyte intoxication index was calculated according to the modified formula of V.K. Ostrovsky (LIIm) [14]:

LIIm = mye. + st. + young+ pl. + seg.

lym. + mon. + eoz. + bas.

where: lym. – lymphocytes; mon. – monocytes; eos. – eosinophils, baz. – basophils; mye. – myelocytes; young. – young; st. – stab; seg. – segmented neutrophils; pl. – plasma cells.

Blood sampling with the calculation of the leukocyte formula was performed on the 3rd and 10th days of hospitalization, and with the values of LIIm $\geq$ 2.50 r.u. the effectiveness of the therapy was considered to be low, while with the values of LIIm $\leq$ 2.49 r.u. it was high. The control group consisted of 30 actually healthy children[14,15,16].

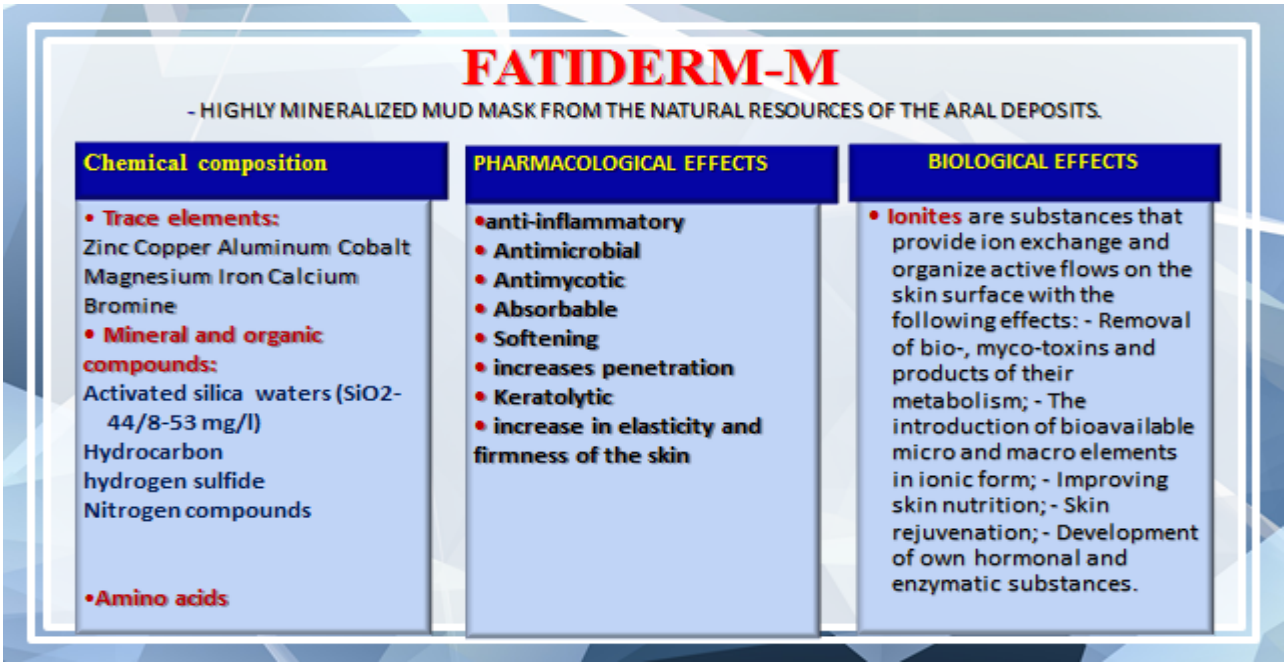
In the course of the study, sick children with IST were divided into two groups depending on the location of the pathological process and the kind of therapy: group I with 37 children with lesions of the scalp (innovative – 20; traditional - 17); group II with 23 children with lesions of smooth skin (innovative – 12; traditional - 11).

*Traditional t*herapy included 2 stages:

Stage I - anti-inflammatory therapy with the use of antiseptic lotions (Etacridine, Furacillin)and ointments (Ichthyol, sulfur-tar).

Stage II included detachment of the stratum corneum of the epidermis using 10% lactic-salicylic collodion; manual hair removal of downy hair and application of fungicidal drugs (Terbinafine, Itraconazole).

Innovative therapy was daily application of mineralized mud mask "FATIDERM-M" to lesions (once a day) with an exposure of 20 minutes together with basic traditional anti-inflammatory therapy for 14 days. For the reference the composition and main pharmacobiological effects of FATIDERM-M mud mask are listed below[1,2].



The results of clinical and laboratory studies were processed by the method of variation statistics using the Student's t-test according to Exel-2010 special software. The values were considered reliable with $p<0.05$.

RESULTS AND DISCUSSION

The distribution of sick children according to the location of IST showed the higher prevalence of lesions of the scalp (66.6%), with higher rates among boys (62.9%). In cases of smooth skin trichophytosis (33.4%), there were no gender differences (Fig. 1). Apparently, that can be associated not only with violations of sanitary and hygienic norms among males, but also possible genetic predisposition, thereby proving the phenomenon of a high incidence among boys [17,18,19].

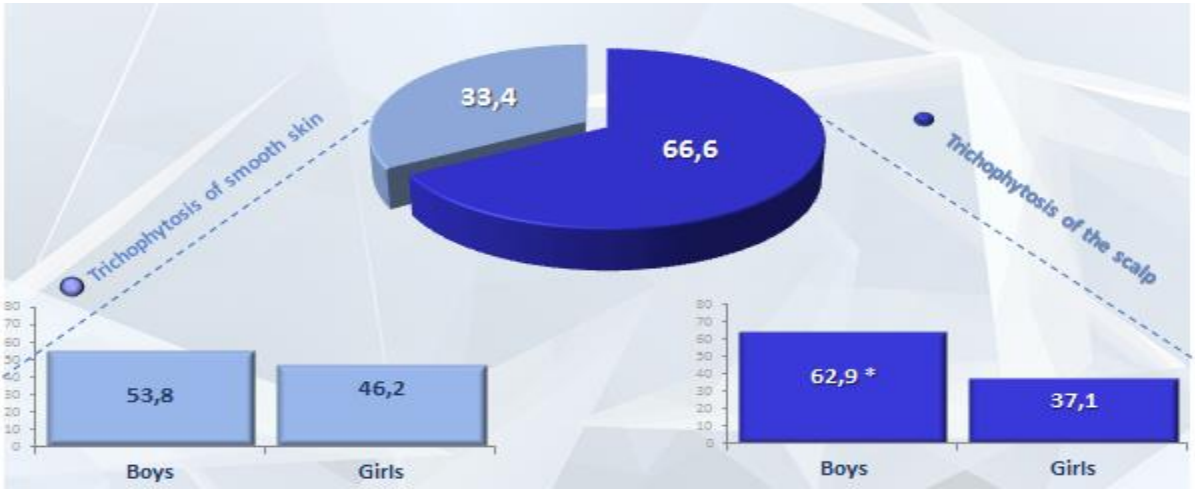


Figure (1): Differentiation according to gender and distribution of sick children according to IST location, %.

The clinical criteria for the effectiveness of the therapy were the cessation of itching, burning, regression of pathological elements and mycological cure[26]. According to the results of clinical observation of sick children, elimination of clinical symptoms of IST revealed a more effective positive dynamics among the children who received innovative therapy (Table 1).

Table (1): Prevalence of clinical symptoms of IST in children after innovative (IT) and traditional therapy (TT)

IST symptoms	Scalp IST		Smooth skin IST	
	IT	TT	IT	TT
Cessation of itching, days	18.5±0.73 *	21.4±0.86	10.7±0.59 *, **	14.4±0.63
Cessation of burning, days	10.1±0.34 *	14.5±0.42	9.6±0.57 *	12.6±0.76
Disappearance of hyperemia, days	19.6±1.06 *	22.4±0.97	12.8±0.69 *, **	16.0±0.59
Resorption of infiltrates, days	14.0±0.61 *	18.0±0.83	10.1±0.51 *, **	12.6±0.45

Note: * - reliability of differences between the groups receiving innovative and traditional therapy; ** - between the groups receiving innovative therapy dependent on location of IST ($p<0.05$-0.001)

Thus, symptoms such as itching, hyperemia, infiltrates and pustules were significantly statistically leveled with the background additional application of Fatiderm-M mud mask ($p<0.05$-0.001 to the group of children who were on traditional therapy). together with the background innovative treatment, the elimination of pathological elements in the form of infiltrate resorption among the patients with trichophytosis of the scalp and smooth skin occurred on 14.0±0.61 and 10.1±0.51 days, respectively, which in general was 3.25±0.17 days (or 18.5%) superior to traditional therapy ($p<0.01$). Considering the complex of clinical symptoms, the effectiveness of treatment was confirmed by earlier leveling of clinical symptoms (by 3.2 ± 0.17 days).

The study of the species composition of the microbiota in the contents of the lesions before treatment revealed the contamination of bacterial flora in the majority of the cases, where the detection of Staphylococcus aures was registered in more than half of the cases (53%) and in a third of the patients – there was Staphylococcus epidermidis (35.3%). Quantitatively St.aures (57.3±0.23 CFU) and St.saprophyticus (51.2±0.84CFU) were dominant. Thus, after the innovative treatment (Fig.2), the quantitative indicators of the pathogenic bacterial flora decreased with St.aigeis 4 times reduction, St.epidermidis 2.9 times and St.saprophyticus 6 times reduction, and that once again testified to the positive effect of the additional use of the Fatiderm-M mud mask ($p<0.05$-0.001).

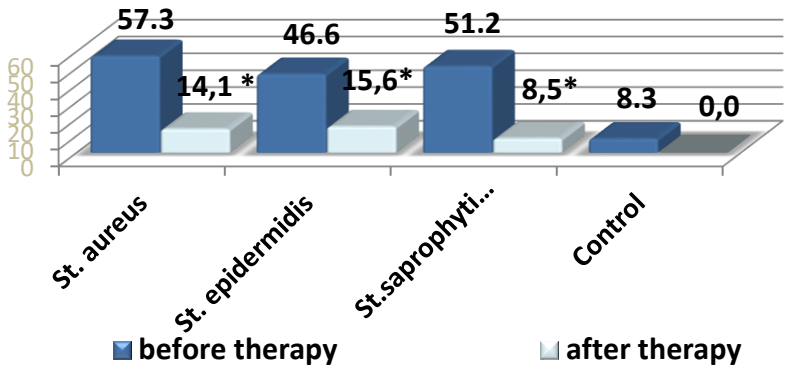


Figure (2): Dynamic quantitative composition of dermal microbiota in children with IST receiving innovative therapy, CFU

* - reliability of differences between the values before and after innovative therapy ($p<0.05$-0.001)

It is well known that infiltrative-suppurative trichophytosis is accompanied by the development of an acute inflammatory process with the participation of leukocytes and various inflammatory mediators [24,25]. Therefore, in this clinical variant of trichophytosis, as well as in purulent skin diseases, the study of the leukocyte composition of peripheral blood is of a great interest. It is possible to judge the activity of the inflammatory process in case of purulent skin disease according to the number of those [20,21]. In this regard, the leukocyte intoxication index in the modification of Ostrovsky V.K. (LIIm) was calculated in the examined sick children on the 10th day, and the level of endogenous intoxication and activation of tissue decay was judged on the basis of that value. Thus, after innovative therapy (Fig.3), the values of LIIm were reliably lower than the same indicator in the outcome of traditional therapy ($p<0.001$), in particular, among the patients with IFNT with lesions of the scalp 2.1 times and children with lesions of smooth skin 2.7 times.

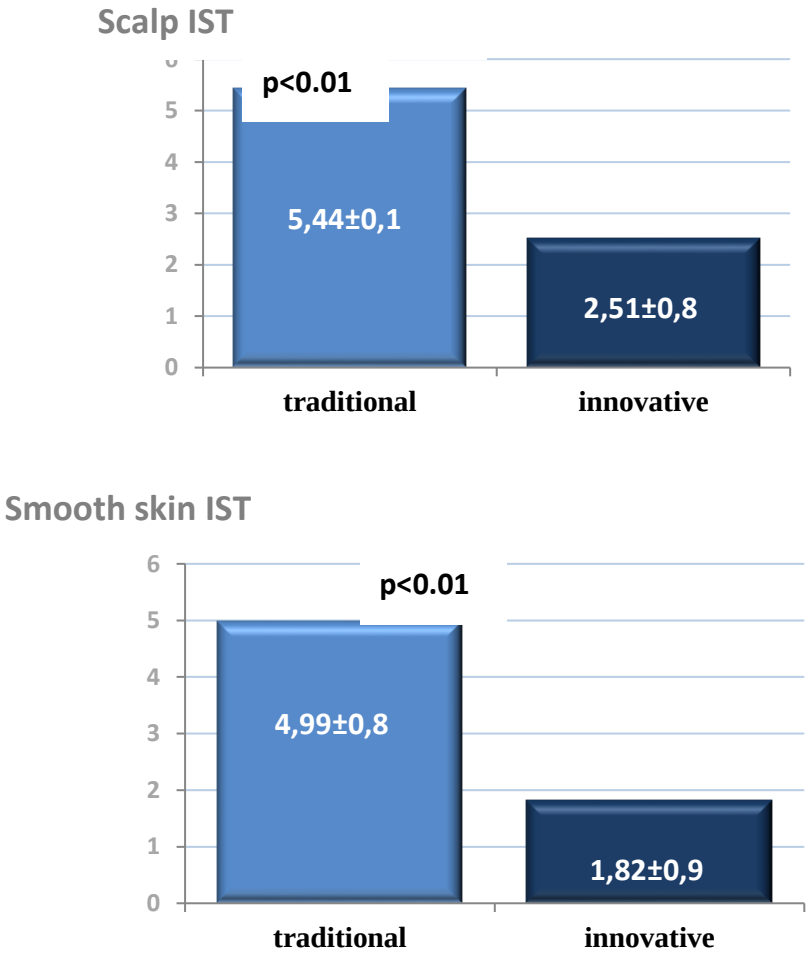


Figure (3): LIIm values in children with IST after various kinds of therapy, r.u.

During the therapy, the results of mycological tests of focal lesions also confirmed the high effectiveness of the additional inclusion of the Fatiderm-M mud mask in the treatment, which was characterized by a reliable ($p<0.05$-0.001) decrease in the contamination of fungal pathogenic flora (Trichophyton verrucosum, gypseum and violaceum), especially among children with smooth skin lesions (Table 2).

Table (2): Mycologic indicators in children with IST after innovative (IT) and traditional (TT) therapy,%

Method	Scalp IST		Smooth skin IST	
	IT	**TT**	**IT**	**TT**
Sowing for fungi (+)				
Trichophyton verrucosum	**5.0±4.8 ***	**23.5±3.2**	**0.0±0.0**	**0.0±0.0**
Trichophyton m. gypseum	**0.0±0.0 ***	**5.8±2.9**	**0.0±0.0 ***	**8.9±3.9**
Trichophyton violaceum	**-**	**-**	**0.0±0.0 ***	**8.9±3.9**
MICROSCOPY for fungi (direct immune fluorescent analysis)				
Detected	**5.0±2.8 ***	**17.6±4.2**	**0.0±0.0 ***	**9.0±4.3**

Reliability of differences: * - between the groups receiving innovative and traditional therapy ($p<0.05$-0.001)

For the illustrated example herein we provide photo of dynamic clinical improvement with background application of innovative therapy 1 and 2.

Case 1. Patient A., 18, with scalp infiltrative-suppurative trichophytosis on the 1st and 14th days of FATIDERM-M mud mask application

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Case 2. Patient B., 7, with scalp infiltrative-suppurative trichophytosis on the 1st and 10th days of FATIDERM-M mud mask application

Thus, the above stated results of the study made it possible to conclude that the additional inclusion of the mineralized mud mask "FATIDERM-M" into the anti-inflammatory therapy in children with infiltrative–suppurative form of trichophytosis showed high therapeutic effectiveness regardless of the location of the pathological process (scalp 97.5%; smooth skin 100%). The positive dynamics was confirmed by earlier leveling of clinical symptoms (by 3.2±0.17 days) of the infiltrative-suppurative form of trichophytosis, decrease in the stage of endogenous intoxication and the inflammatory process, reduction in the contamination of pathogenic fungal (T.verrucosum, T.gypseum and T.violaceum) and bacterial flora (St.aures and St.epidermis), which in general promoted improvement of the quality of life of sick children, especially in cases with smooth skin lesions. Taking into account high bioavailability and safety of the application of the mineralized mud mask "FATIDERM-M", its use in children with infiltrative-suppurative form of trichophytosis can be widely recommended in practical healthcare as a part of pelotherapy.

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