

NATURAL AND PREFORMED PHYSICAL FACTORS IN THE IMMUNOREHABILITATION OF PSORIASIS PATIENTS: THE COMPARISON OF EFFECTIVENESS

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Abstract

64 psoriasis patients with moderate to severe form of the disease in its stationary stage and associated pathology of main excretory and detoxification systems were investigated. All patients were treated according to two medical complexes (MC). 32 patients were treated according to MC-1, which included sulphide mud applications at temperatures 42⁰ C for 10-30 minutes; artificial brine baths of sodium chloride concentration of 60-120 g/l at a temperature of 38⁰ C for 10-30 minutes; artificial ultraviolet irradiation up to 2 biodoses and daily (except Sunday) sessions of haloaerosoltherapy (artificial analogy of salt mine’s aerosol) lasting 60 minutes. The treatment duration was 3 weeks. Another group of patients (32 persons) received MC-2. This complex included procedures, according to MC-1, completed with additional internal use of carbonic middle-mineralised boric bicarbonate sodium mineral water Luzhanskaya-7 (the type of Vichy) with the aim of detoxification.

It was found that complex recovery treatment based on non-medicinal factors - photobalneotherapy and haloaerosoltherapy (MC-1) has a positive effect on the clinical symptoms of psoriasis and immune status of patients. These positive changes were testified by the corresponding change in the PASI- index (Psoriasis Area and Severity Index), ΔPASI and dynamics of some immunological parameters. At the same time more pronounced positive dynamics of cutaneous manifestations of psoriasis and higher percent of patients with significant improvement by the end of treatment was achieved under the influence of MC-2. In addition, normalization of the neutrophils’ absorbtive capacity by the level of PhAN (phagocytic activity of neutrophils – percentage of neutrophils wich ingurgitate latex) and certain improvement of their oxygen-dependent metabolism was observed under the influence of MC-2. The level of CD3⁺- CD8⁺-lymphocytes had also a tendency to increase in the group of patients who received MC-2 in with contradiction to MC-1. A significant decrease of B-lymphocytes level was also observed in this group of patients. The higher indirect imunorehabilitative effect of MC-2 including mineral water Luzhanskaya-7 intake enriched with sulfates may be conditioned by the corrective influence of mineral water on the functional digestive and urinary disorders, reduction of endogenous intoxication manifestations and antigens flow from the gastrointestinal tract to lymphoid follicles.

Conclusion: The received data testified the expediency of non-medicinal supplementation of rehabilitation treatment of psoriasis patients by internal use of bicarbonate sodium mineral water in case of associated pathology and more severe immunological disorders.

Key words: psoriasis, photobalneotherapy, haloaerosoltherapy, mineral water, immunity.

Introduction

The steady increase of the incidence of psoriasis and high frequency of its severe, complicated forms, as well as a high level of rejuvenation of the disease are the ground for the actuality of scientific investigations concerning new technologies of treatment of patients with psoriasis.

Scientists are still debating on the etiologic and pathogenetic value of different factors as the cause of the psoriasis and its progression. Most of them are inclined to believe that psoriasis is poly-etiological disease [12]. The most frequent provocative factors of the disease are stress, severe acute respiratory syndrome, some medications, professional risks, surgical intervention, skin's trauma etc [12, 13]. A number of immunological disorders are developing under the influence of triggering factors, mainly in the presence of inherited genetic defects [14]. They stipulate epidermal hyperproliferative changes.

However, skin manifestations, as it is known today, are only the external (superficial) signs of psoriasis. In fact, alongside with the skin lesion changes occur in the inner organs too [7]. This is testified by the high incidence of associated pathology in psoriasis patients [6, 8]. Lesions of cardiovascular system and development of metabolic syndrome are characteristic for psoriasis patients, but the most frequent is associated pathology of the gastrointestinal tract, hepatic-biliary and urinary systems [8, 10, 11, 15]. These changes promote further formation of endogenous intoxication syndrome, which reserves the pathologic process on the skin [2]. Although the non-specific character of intoxication syndrome in various pathological conditions, just the presence of associated pathology determines the pathogenesis and specifies the clinical picture of the main disease, provides intoxication syndrome individual-specific features [5]. Accounting the above mentioned the comprehensive treatment of

psoriasis should combine medications for local and systemic therapy. On the stable stage of the disease rehabilitations measures are expedient.

Natural curative factors with multi-component mechanism proved to be very effective in the rehabilitation of psoriasis patients [1, 9]. They contribute to the inhibition of psoriatic process by influence on the basic pathophysiological mechanisms of the disease. In addition, natural and preformed physical factors may correct associated pathology and have a mild effect on the immune system. A considerable detoxifying effect of drinking mineral waters of different composition was revealed in clinical investigations of patients with pathology of gastrointestinal and urinary systems. This effect was conditioned by the differential corrective influence of mineral waters on the main digestive and urinary dysfunctions [4].

Aim

The main aim of our work was to develop a technology of rehabilitation treatment in psoriasis patients with associated pathology of the digestive and urinary systems on the base of natural factors of Transcarpathia (sulphide mud, mineral water, brine) and preformed physical agents (artificial ultraviolet radiation and aerosol medium of rock salt – haloaerosoltherapy).

Materials and methods

64 psoriasis patients with moderate to severe form in stationary stage of the disease and associated pathology of main excretory and detoxification systems were investigated. Age of the patients was from 16 till 61 years old ($39,9 \pm 1,5$ years). The average duration of psoriasis was about $15,2 \pm 1,32$ years. All patients had undergone clinical, laboratory and immunological examinations. The dermatological changes were evaluated using PASI index calculation – Psoriasis Area and Severity Index. The clinical efficiency of the therapy was evaluated by

determining regression of this index under the influence of treatment by calculating

the percent value of ΔPASI using the following formula:

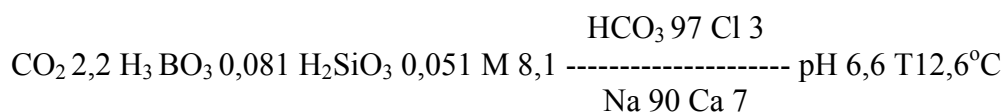
$$\Delta\text{PASI} = \frac{(\text{PASI before treatment} - \text{PASI after treatment})}{\text{PASI before treatment}} \times 100\%$$

Significant improvement is determined at ΔPASI ≥ 76%, improvement – at 26% ≤ ΔPASI <76%, without therapeutic effect – at ΔPASI value <26% of its initial level [2].

Immunological examination included evaluation of non-specific resistance and cellular immunity. The non-specific resistance was defined using phagocytic activity of neutrophils (PhAN – number of active cells per 100 neutrophyls) and phagocytic number calculation (PhN – number of latex spheres, absorbed by one neutrophile). Inert latex spheres with a diameter of 1,5 microns were used as a test system. In addition, a test was performed with nitroblue tetrazolium (NBT-test). This NBT-test (spontaneous and cycloferon induced) reflected the function of superoxide anion-radical and allowed to evaluate the antibacterial properties of the organism (FR – functional reserve). Cellular immunity was studied using the method of indirect immunofluorescence with monoclonal antibodies to human lymphocytes CD3⁺, CD22⁺, CD4⁺, CD8⁺.

All patients were treated using two medical complexes (MC). 32 patients were treated using MC-1, which included everyday sulphide mud applications at

temperatures 42⁰ C for 10-30 minutes; artificial brine baths of sodium chloride concentration of 60-120 g/l at a temperature of 38⁰ C for 10-30 minutes; artificial ultraviolet irradiation up to 2 biodoses and daily, except Sunday, sessions of haloaerosoltherapy for 60 minutes. The concentration of rock salt aerosol (haloaerosol) maintained within the 15-30 mg/m³ the sizes of the salt particles were 10-30 microns while their content of the air was 50-60%. The treatment duration was 3 weeks with the number of treatment days about 15 - 17 for a course of treatment. Another group of patients (32 persons) received MC-2. This complex included procedures according to MC-1 with additional internal use of carbonic middle-mineralised boric bicarbonate sodium mineral water Luzhanska-7 (the type of Vichy) which has a positive influence on the main detoxifying organs – digestive and urinary systems. According to the Kurlov's formula the main composition of the mineral water may be expressed as following:



Dry salt of magnesium sulfate (2-4 g per 1 liter) was added to the mineral water. It has antispasmodic, sedative, diuretic effects, regulates the synthesis and catabolism of nucleic acids, anti-inflammatory, anti-toxic and desensibilizing effect, play role in the regulation of processes of cellular immunity.

23 practically healthy persons formed the control group. The results of all laboratory methods were treated using the

method of variation statistics with computer program Excel.

Results

Both MC had a positive effect on the skin manifestations of psoriasis – a gradual decrease in colour intensity, scaling, itching, and infiltration of psoriatic plaques with subsequent regression of lesions. These positive changes were reflected in the significant reduction of affected area and PASI index (table 1).

TABLE 1: Dynamics of cutaneous manifestations in psoriasis patients under the influence of rehabilitation treatment

| Indices and their units | MC-1 (n=32) | MC-2 (n=32) | P ₁₋₂ |
|---|-------------|-------------|------------------|
| The affected area, % before treatment | 9,74±1,18 | 9,59±1,38 | |
| after treatment | 6,08±1,04 | 4,93±0,65 | <0,3 |
| P | <0,05 | <0,01 | |
| PASI, e.u.(equivalent unit) before treatment | 11,4±1,23 | 12,0±1,42 | |
| after treatment | 5,08±0,84 | 3,86±0,47 | <0,2 |
| P | <0,001 | <0,001 | |
| Δ PASI, % | 60,5±3,25 | 65,5±2,89 | <0,3 |

Notes: P – reliability of the difference before and after treatment; P₁₋₂ – reliability of the difference after treatment between both MC.

There was a certain difference between the clinical effects of two MC – under the influence of the MC-2 with mineral water intake compared with the MC-1 the tendency of reducing the affected area, index PASI, and the tendency of increasing the rash regression (ΔPASI) was observed. After MC-2 a

higher percentage of patients discharged with a significant improvement was registered (fig. 1), indicating greater effectiveness of this treatment complex as a result of its corrective influence on the associated pathology and reduction of endogenous intoxication manifestations.

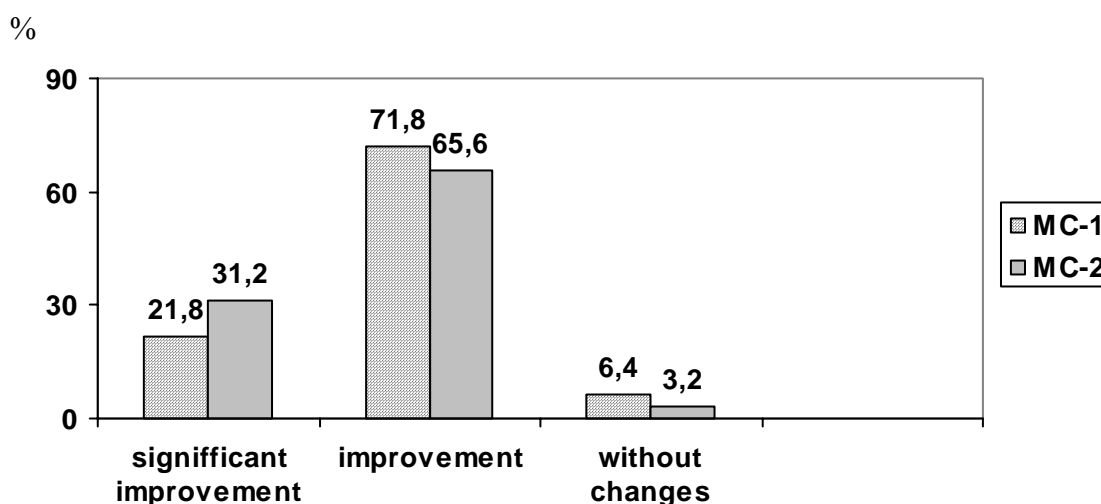


Fig 1. Clinical effectiveness of psoriasis patients' treatment

The positive clinical dynamics was associated with marked immunomodulation effects of both MC (table 2). A tendency of increasing the PhAN and PhN levels was registered indicating some improvement in the neutrophils' absorbance. At the same time, indices of

oxygen-dependent metabolism of neutrophils and their functional reserve only slightly varied under the influence of this MC and remained significantly lower than normal. Normalization of PhAN, spontaneous NBT-test, the levels of stimulated NBT-test, and FR had only a

tendency to decrease in comparison with the normal values under the influence of MC-2. Comparing two MC revealed that the magnitude of PhAN after MC-2 was significantly higher than after treatment using MC-1. The percentage of formazan-positive cells in the NBT-test also had a tendency to increase after MC-2 compared with the MC-1. These data indicated a higher immuno-modulation efficiency of MC-2 effects on non-specific defence

mechanisms of the organism. This fact may be conditioned by the fact that additional internal use of mineral water (MC-2) promotes improvement of the functional state of the main excretory and detoxification systems. As a result, decrease of antigenic flow from the gastrointestinal tract to lymphoid follicles stipulated a positive effect on the immune system.

TABLE 2: Dynamics of non-specific resistance indexes in patients with psoriasis under the influence of recovery treatment

| Indices and their units | The control group (n=23) | MC-1 (n=32) | MC-2 (n=32) | P ₁₋₂ |
|--|--------------------------|------------------------------------|------------------------------------|------------------|
| PhAN, % before treatment after treatment P | 52,7±1,50 | 46,9±1,11** 49,8±1,28* <0,1 | 48,6±0,99** 53,3±1,18 <0,01 | <0,05 |
| PhN before treatment after treatment P | 3,76±0,08 | 3,22±0,07** 3,39±0,08** <0,1 | 3,28±0,07** 3,40±0,07** <0,2 | - |
| NBT-spontaneous, % before treatment after treatment P | 25,0±0,75 | 23,7±0,59** 23,8±0,52** | 23,6±0,89** 24,7±0,66 <0,3 | <0,3 |
| NBT-stimulated, % before treatment after treatment P | 32,8±0,84 | 30,2±0,76** 30,3±0,70** | 30,0±0,79** 31,7±0,71* <0,2 | <0,2 |
| FR before treatment after treatment P | 7,84±0,34 | 6,56±0,41** 6,84±0,28** | 6,34±0,32** 7,03±0,35* <0,2 | - |

Notes:

- 1) P – probability of difference of indices before and after treatment;
- 2) P₁₋₂ – probability of difference of data after treatment between different MC;
- 3) * Tendency to changes of indices compared with the control;
- 4) ** Valuable changes of indices compared with the control.

Analyzing the treatment' influence on cellular immunity indices it was found that effect was enough expressed for both MC (Table 3). This effect manifested in significant increase in the level of T-lymphocytes and CD8⁺-cells in the

background of decrease in 0-lymphocytes number and the ratio of CD4⁺/CD8⁺ to normal values. It must be underlined that after the MC-2 the increase of CD3⁺ level was more expressed, indicating the restoration of normal relation of the main

subpopulations of T-lymphocytes, certain normalization of T-cell differentiation and fading the autoimmune inflammation symptoms. At the same time, the level of B-lymphocytes in the group of patients treated according to MC-1 had a tendency

to decrease whereas in another group treated using MC-2 their level decreased significantly. However, in both cases the number of CD22⁺-lymphocytes remained significantly higher than normal, indicating the presence of antigenic load on the body.

TABLE 3: Dynamics of cellular immunity indices at patients with psoriasis under the influence of recovery treatment

| Indices and their units | The control group (n=23) | MC-1 (n=32) | MC-2 (n=32) | P ₁₋₂ |
|--|-----------------------------|-------------------------------------|--------------------------------------|------------------|
| CD3 ⁺ , % before treatment after treatment P | 66,4±0,59 | 59,8±0,78** 62,5±0,42** <0,01 | 59,9±1,02** 63,5±0,40** <0,01 | <0,1 |
| CD22 ⁺ , % before treatment after treatment P | 13,6±0,31 | 18,9±0,65** 17,9±0,52** <0,3 | 18,6±0,58** 16,4±0,39** <0,01 | <0,05 |
| 0-лімфоцити, % before treatment after treatment P | 20,2±0,67 | 22,4±0,92* 19,6±0,85 <0,05 | 22,5±1,23* 20,3±0,73 <0,2 | - |
| CD4 ⁺ , % before treatment after treatment | 37,3±0,37 | 35,4±0,76** 36,0±0,41** | 36,5±0,81 36,0±0,34** | - |
| CD8 ⁺ , % before treatment after treatment P | 28,6±0,38 | 23,3±0,57** 26,5±0,43** <0,01 | 23,7±0,69** 27,4±0,42** <0,001 | <0,2 |
| CD4 ⁺ /CD8 ⁺ before treatment after treatment P | 1,31±0,02 | 1,58±0,06** 1,35±0,04 <0,05 | 1,57±0,06** 1,33±0,03 <0,001 | - |

Notes:

- 1) P – probability of difference of indices before and after treatment;
- 2) P₁₋₂ – probability of difference of data after treatment between different MC;
- 3) * Tendency to changes of indices compared with the control;
- 4) ** Valuable changes of indices compared with the control.

Thus it was found that the application of MC-2, compared with MC-1, resulted in the tendency to increase the levels of CD3⁺-, CD8⁺-cells and a significant decrease in the level of B-lymphocytes. This result testified the indirect intensification of immune

influence of this complex by eliminating effect of mineral water intake on the endogenous intoxication at patients with associated gastroenterological and renal disorders.

Conclusions

Marked clinical and immunomodulative efficiency of basic medical complex including photobalneotherapy and haloerosoltherapy (MC-1) was revealed consisting in considerable regression of psoriatic rash, improving of non-specific resistance and cellular immunity indices at psoriasis patients. At the same time more pronounced dynamic of psoriasis cutaneous manifestations and indices of immune reactivity were observed under the influence of MC-2 with mineral water intake. A greater percentage of patients discharged with a significant improvement, tendency to increase NBT-test, levels of CD3⁺- and CD8⁺-lymphocytes were characteristic for this group of patients. A significant increasing the level of PhAN and reduction the number of B-lymphocytes was reached in comparison with the MC-1. These changes indicate a greater immuno-modulative effectiveness of this complex.

High frequency of combined visceral pathology, including digestive and urinary organs in patients with psoriasis determine the expediency of additional drinking use of bicarbonate mineral waters as a component of medical complex. Their application makes it possible to stabilize the progression of the pathologic process in the skin by correcting the disturbed functions of the digestive and urinary systems and indirect effects on the immune status.

Moreover the revealed positive dynamics of immune indices indicate the expediency of different non-medicinal methods use in order to obtain better immuno-rehabilitative effect at psoriasis patients.

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