



# **Indicators of the Spectrum of Lipids of the Water-Lipid Mantle of the Skin Before and after Pathogenetically Sound Therapy of Patients with Psoriasis**

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

**Aim:** The aim of the study is to analyze the features of the spectrum of lipids of the water-lipid mantle of the skin before and after pathogenetically sound therapy of patients with psoriasis.

**Methods:** Comparative evaluation of the therapeutic efficacy of monotherapy with the immunobiological drug Humir (adalimumab), as well as its combination with a non-hormonal drug based on natural components Psori Active (cream) in the examined patients with psoriasis vulgaris was performed according to the dynamics of regression of dermatoses clinical manifestations erythema, infiltration, peeling of the skin psoriatic rash, changes in the index PASI, PGA, BSA.

**Results:** The study involved 137 patients. Changes in the level of other components of the lipid spectrum of the water-lipid mantle of the skin, in particular phospholipids, cholesterol and cholesterol esters in patients of the first observation group changed insignificantly compared to

their values before treatment. When comparing the normalization of the level of the studied spectrum of lipids of the water-lipid mantle of the skin in patients of the second group with different seasonal types (autumn-winter, spring-summer, off-season) and previously diagnosed with varying severity treatment, no statistically significant differences were found between seasonal types of dermatosis.

**Conclusion:** Analysis of the results of clinical follow-up of the examined patients with psoriasis of the first and second groups after completion of treatment and achieving clinical clinical remission indicates significant benefits of systemic immunobiological therapy in combination with topical therapy with Psori Active.

*Keywords: Psoriasis; features of lipid metabolism; inunopathogenesis; immunobiological therapy.*

## 1. INTRODUCTION

Accumulated so far significant material [1] indicates the role of immune [2], endocrine, metabolic disorders, as well as genetic factors in the development of psoriasis [3]. The main in the pathogenesis of this disease are immunological and genetic factors [4]. The main characteristic of the pathological process is recognized as immune inflammation, accompanied by activation of T-lymphocytes [5] and excessive production of mediators of the immune response [6]. The pathological process is also characterized by an imbalance of lipid metabolism, in particular a decrease in the level of high-density lipoprotein (HDL) and an increase in low-density lipoprotein (LDL) [1]. The pathological process of cholesterol accumulation (cholesterol) triggers the production of pro-inflammatory cytokines, such as tumor necrosis factor alpha (TNF- $\alpha$ ), and also leads to monocyte aggregation and adipocyte differentiation [7]. Oxidized LDL not only exacerbates inflammation, but also causes the accumulation of cholesterol in lysosomes, leading to cell death [8]. On the other hand, HDL performs the function of reverse transport of cholesterol, exhibiting antioxidant capacity and anti-inflammatory properties by regulating dendritic cell differentiation and reducing T cell activation and interleukin (IL) -12 production [9]. However, these properties are reduced in the presence of chronic inflammation, such as psoriasis [10]. The results of current research have brought us closer to understanding the immunological pathway of psoriasis, but the relationship between psoriasis and lipid profile pathology remains unknown [11]. Thus, the identification of the relationship between dyslipidemia and the immune system of the psoriatic process is important for the development of new therapeutic perspectives in the treatment of psoriasis [12]. The aim of the study is to analyze the features of the spectrum of lipids of the water-lipid mantle of the skin

before and after pathogenetically sound therapy of patients with psoriasis.

## 2. MATERIAL AND METHODS

Under our supervision on the clinical basis of the Department of Dermatology and Venereology of the National Medical University named after O.O. Bogomolets, in particular in the dermatological and venereological department of the Alexander Clinical Hospital in Kyiv, in the conditions of permanent inpatient and day inpatient treatment were 137 patients with psoriasis with limited and disseminated forms of the lesion at the stage of progression or with the inpatient stage of cutaneous psoriatic process. The first clinical group included 66 patients with psoriasis, including 8 patients with mild clinical course, 48 - with clinical course of moderate severity, 10 - with severe clinical course of dermatosis. 53 patients in this group were diagnosed with the autumn-winter type of psoriasis, 4 with the spring-summer type, and 9 patients with the off-season (mixed) type of dermatosis. The second clinical group included 71 patients with psoriasis, including 7 - with mild clinical course, 49 - with clinical course of moderate severity, 15 - with severe dermatosis. 58 patients of this group were diagnosed with the autumn-winter type of psoriasis, 4 with the spring-summer type, and 9 patients with the off-season (mixed) type of dermatosis. Patients with psoriasis vulgaris enrolled in the first clinical observation group (66 patients) were prescribed treatment with systemic immunobiological action Humir 40 mg once every two weeks subcutaneously for three months. Patients with psoriasis enrolled in the second observation group (71 patients) were also prescribed treatment with Humir 40 mg once every two weeks subcutaneously for three months. At the same time, all patients of the second observation group were prescribed to lubricate the skin affected by psoriatic rash with the drug Psori Active (cream) twice a day for

three months. Comparative evaluation of the therapeutic efficacy of monotherapy with the immunobiological drug Humir (adalimumab), as well as its combination with a non-hormonal drug based on natural components Psori Active (cream) in the examined patients with psoriasis vulgaris was performed according to the dynamics of regression of dermatoses clinical manifestations erythema, infiltration, peeling of the skin psoriatic rash, changes in the index PASI, PGA, BSA.

### 3. RESULTS AND DISCUSSION

In order to evaluate the therapeutic efficacy of the immunobiological drug adalimumab and the topical agent PsoriActive (cream) in the treatment of psoriasis vulgaris, as well as to determine their effect on skin lipids in areas affected by psoriatic rash and blood, all 137 patients examined were divided into two equivalent clinical groups. The appropriate division of patients with psoriasis into two equivalent clinical influenza observations took into account the age and sex of patients, the severity and type of dermatosis (autumn-winter, spring-summer, off-season) and the duration of the disease. The course of treatment of all patients was carried out at the stage of clinical exacerbation of the cutaneous psoriatic process, ie in the presence of patients with a progressive or inpatient stage of psoriasis. In particular, in patients with the autumn-winter type of psoriasis, it was mainly the autumn season, and in patients with the spring-summer type - mostly the spring season. Regarding the examined patients with psoriasis with off-season (mixed) type of course, it should be noted that the term of appointment of our proposed course of treatment was determined individually at the stage of clinical exacerbation of dermatosis in different seasons. After the prescribed courses of treatment in all patients with mild clinical course of dermatosis enrolled in the first and second groups of observation there was a decrease in the area of skin lesions (BSA,%) by 73.68% and 84.46% ( $p < 0.05$ ), respectively, erythema by 60% and 80.84% ( $p < 0.05$ ), respectively, skin infiltration by 57.44% and 78.39% ( $p < 0.05$ ), respectively, skin peeling by 72.58% and 84.72% ( $p < 0.05$ ), respectively. A more pronounced regression of cutaneous manifestations of the psoriatic process was found in patients enrolled in the second clinical observation group. After the prescribed courses of treatment in patients with clinical dermatosis of moderate severity enrolled in the first and second groups of observations

there was a decrease in the area of skin lesions (BSA,%) by 85.29% and 94.16% ( $p < 0.05$ ), respectively, erythema by 75.71% and 83.33% ( $p < 0.05$ ), respectively, skin infiltration by 76.41% and 84.42% ( $p < 0.05$ ), respectively, skin peeling by 69.23% and 86, 20% ( $p < 0.05$ ), respectively. There is a more pronounced regression of objective indicators of the psoriatic process in patients enrolled in the second clinical observation group. After treatment in patients with severe clinical dermatosis enrolled in the first and second groups of observation there was a decrease in the area of skin lesions (BSA,%) by 85.1% and 93.6% ( $p < 0.05$ ), respectively, a decrease in erythema by 65.71% and 78.57% ( $p < 0.05$ ), respectively, skin infiltration by 55.22% and 74.52% ( $p < 0.05$ ), respectively, skin peeling by 67.05% and 74.56 % ( $p < 0.05$ ), respectively. There was a more pronounced regression of objective indicators of the cutaneous psoriatic process in patients of the second clinical observation group. After the prescribed courses of treatment in all patients with a mild clinical course of dermatosis enrolled in the first and second groups of observations, there was a decrease in the PASI index by 75.16% and 85.43%, respectively. In the examined patients with psoriasis with a clinical course of moderate severity enrolled in the first and second clinical observation groups after treatment, there was a decrease in the PASI index by 82.19% and 89.04%, respectively. After treatment in patients with severe clinical dermatosis enrolled in the first and second groups of observations, there was a decrease in the PASI index by 82.69% and 90.23%, respectively. In order to determine the effectiveness of treatment regimens, including the duration of remission, all patients with psoriasis examined after completion of treatment were recommended to appear for a consultation after one, three, six, nine and twelve months. According to the results of clinical observation of patients in one, three and six months after completion of treatment in all patients of both the first and second groups, remission of the cutaneous psoriatic process continued. Nine months after the end of treatment, 2 (3%) of the 66 patients enrolled in the first observation group showed skin signs of recurrence of the psoriatic process. The increase in the area of skin lesions (BSA,%) in these 2 patients averaged 16.73%, and the PASI index increased by 15.93%, compared with after treatment. Clinical remission of dermatosis continued in other patients of the first group, as well as in all 71 patients of the second group of follow-up, nine months after the end of treatment.

Twelve months after the end of treatment, clinical recurrence of psoriasis was registered in 5 of 48 patients of the first group, as well as in 3 (5.76%) of 52 patients enrolled in the second group of observation. The increase in the area of skin lesions (BSA,%) in these patients of the first and second groups averaged 21.94% and 19.46%, respectively, and the increase in the PASI index - by 23.43% and 20.56%, respectively, compared with initial data after completion of treatment.

### 3.1 Discussion

Analysis of the results of follow-up of the examined patients with psoriasis enrolled in the first and second groups after completion of treatment indicates significant benefits of systemic immunobiological therapy with Humira (adalimumab) in combination with topical therapy with a non-hormonal drug based on natural components Psori Tertiv Active clinical remission of dermatosis in comparison with monotherapy only by means of systemic immunobiological action. We have proposed an improved treatment regimen for patients with psoriasis vulgaris, which provides a course of systemic immunobiological therapy with Humira (adalimumab) with a parallel appointment of a course of topical therapy with Psori Active (cream) can increase the effectiveness of treatment and prolong the duration of remission of dermatoses. According to the results of the study of the lipid spectrum of the sub-lipid mantle of the skin of the examined patients with psoriasis with autumn-winter, spring-summer and off-season types in different seasons of the year before treatment, certain features were identified. In particular, there are significant differences in the level of phospholipids, cholesterol, fatty acids, cholesterol esters in all patients with psoriasis with autumn-winter, spring-summer and off-season types of flow in all seasons (winter, spring, spring, summer). with practically healthy people. At the same time, the most significant values of the corresponding imbalance in the indicators of the lipid spectrum of the water-lipid mantle of the skin of patients with psoriasis, in comparison with healthy individuals, were registered at the stage of clinical exacerbation of the skin psoriatic process. In particular, in patients with autumn-winter type of psoriasis it was observed mainly in autumn, in patients with spring-summer type - mainly in spring, and in patients with off-season type clinical exacerbation was registered individually in different seasons. However, a comparative analysis of the level of lipid spectrum of water-

lipid mantle skin in groups of patients with psoriasis with different seasonal types of dermatosis, in particular autumn-winter, spring-summer and off-season, no significant differences were found in their imbalance between the respective groups. different seasons of the year. At the same time, it should be noted that a more significant but statistically insignificant imbalance of the spectrum of lipids of the water-lipid mantle of the skin in patients of the relevant observation groups was registered at the stage of clinical exacerbation of skin psoriatic process. Given the above, the level of lipid spectrum of hydrogen lipid mantle of the skin in the examined patients with psoriasis after completion of our proposed courses of treatment, in particular by conducting patients in the first clinical group of monotherapy with systemic immunobiological action Humir (adalimumab), and the patient appropriate systemic immunobiological therapy with topical therapy with a non-hormonal drug based on natural components of Psori Active (cream) for three months and the established achievement of clinical remission of the cutaneous psoriatic process. According to the results of studies in all 66 patients of the first observation group with previously diagnosed different seasonal types (autumn-winter, spring-summer, off-season) and different severity (mild, moderate, severe, severe) after completion of systemic immunobiological monoteriology. indicators of the spectrum of lipids of the water-lipid mantle of the skin (phospholipids, cholesterol, fatty acids, cholesterol esters), a statistically significant approximation to normal values (compared with the control group), only indicators of fatty acid levels, which were 7.2%, when normal 7.2%.

Changes in the level of other components of the lipid spectrum of the water-lipid mantle of the skin, in particular phospholipids, cholesterol and cholesterol esters in patients of the first observation group changed insignificantly compared to their values before treatment. However, in all patients of the second observation group with previously established different seasonal types and different degrees of severity of psoriasis, after completion of systemic immunobiological therapy with Humira (adalimumab) in combination with topical therapy with Psori Active (cream), in water statistically significant approximation to normal values (in comparison with practically healthy people) of all investigated components of a spectrum of lipids was established. In particular, the level of phospholipids in the water-lipid mantle of the skin

was 15.24%, at a rate of 14.16%; cholesterol - 24.0%, with normal - 24.06%; fatty acids 7.2%, at the norm - 7.14%; cholesterol esters - 46.8%, at a rate of 46.98%. It should also be noted that when comparing the normalization of the level of the studied spectrum of lipids of the water-lipid mantle of the skin in patients of the second group with different seasonal types (autumn-winter, spring-summer, off-season) and previously diagnosed with varying severity treatment, no statistically significant differences were found between seasonal types of dermatosis. In the future, we considered it inappropriate to conduct relevant studies during different seasons of the year (as it was conducted in patients before the appointment of the proposed advanced course of treatment). Thus, our proposed treatment regimen for patients with psoriasis, which includes systemic immunobiological therapy in combination with topical non-hormonal therapy allows to achieve normalization of all components of the lipid spectrum of the water-lipid mantle of the skin in different seasonal types of dermatosis.

#### 4. CONCLUSION

Analysis of the results of clinical follow-up of the examined patients with psoriasis of the first and second groups after completion of treatment and achieving clinical remission indicates significant benefits of systemic immunobiological therapy in combination with topical therapy with Psori Active. We proposed a modified treatment regimen for patients with psoriasis vulgaris, which provides a course of systemic immunobiological therapy with the drug adalimumab with the parallel appointment of Psori Active allows to increase the effectiveness of treatment and extend the duration of remission of dermatosis.

#### CONSENT AND ETHICAL APPROVAL

As per international standard or university standard guideline Patient's consent and ethical approval has been collected and preserved by the authors.

#### DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for

any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

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