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CLINICAL AND IMMUNOLOGICAL CHARACTERISTICS IN CHILDREN WITH PSORIASIS

N. B. Bababekova
PhD, Associate Professor, Department of Dermatovenereology and Pediatric Dermatovenereology, Tashkent State Medical University.

Abstract

In recent years, cytokines have been recognized as crucial mediators in the regulation of immunopathological mechanisms, particularly in allergic responses. This study aims to evaluate the immunological profile of children with psoriasis. A significant proportion of patients exhibited a burdened allergic history and elevated IgE levels. It appears that the clinical severity of psoriasis is determined not merely by serum IgE concentration, but by the influence of specific triggers on the development of allergic inflammation. These findings provide a better understanding of immune system functional disorders in pediatric psoriasis and can be utilized to improve therapeutic management.

Keywords: Psoriasis, children, allergy, cytokines, immunity, immunopathogenesis, interleukins.

Аннотация

В последние годы цитокинам отводится ключевая роль в регуляции иммунопатологических механизмов, включая развитие аллергических реакций. Целью исследования является оценка иммунологического статуса у детей, страдающих псориазом. Установлено, что большинство пациентов имеют отягощенный аллергоанамнез и повышенный уровень IgE.

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Предположительно, тяжесть течения псориаза коррелирует не столько с абсолютным уровнем сывороточного IgE, сколько с воздействием триггерных факторов на развитие аллергического компонента воспаления. Полученные результаты позволяют глубже интерпретировать функциональные нарушения иммунной системы при детском псориазе и могут быть использованы для оптимизации терапевтических стратегий.

Ключевые слова: псориаз, дети, аллергия, цитокины, иммунитет, иммунопатогенез, интерлейкины.

Introduction

According to modern concepts, psoriasis is a multifactorial disease, the development of which is closely linked to genetically determined defects in the immune response and the triggering effects of environmental factors. It has been established that the combination of these factors determines the manifestation and rate of progression of psoriasis, especially in young children. Psoriasis remains one of the most significant medical and social problems due to the steady increase in incidence. Modern epidemiological data indicate a high prevalence of psoriasis in the pediatric population, ranging from 10% to 30% in different countries. Moreover, psoriasis debuting in childhood persists into adulthood in 40–60% of cases [1].

The aim of the study was to evaluate the features of immunological parameters in children suffering from psoriasis.

Materials and Methods

Between 2024 and 2026, 72 children aged 1 month to 18 years were under our observation. The main group consisted of 61 patients (mean age 4.8 ± 3.65 years), and the comparison group included 11 children (mean age 5.2 ± 1.9 years) without signs of dermatological pathology. The study was conducted at the

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Dermatology Department of the Tashkent Pediatric Medical Institute Clinic (currently the Multidisciplinary Children's Clinic at Tashkent State Medical University). Among those examined were 46 boys (63.8%) and 26 girls (36.2%). In 52 children (72.2%), the examination was performed during the exacerbation period, and in 20 (27.8%), during remission. The levels of pro-inflammatory (TNF-alpha, IL-6) and anti-inflammatory (IL-4) cytokines in blood serum were studied using enzyme-linked immunosorbent assay (ELISA). Blood sampling (capillary or venous) was performed into dry plastic tubes followed by centrifugation at 2500 g. The resulting serum was subjected to a single freeze at temperatures from -18°C to -24°C (storage period before analysis was no more than one month). The cytokine profile was assessed dynamically: in the first three days of the exacerbation period and one month after the start of therapy. Statistical processing of qualitative traits is presented as absolute and relative frequencies. The critical level of significance was set at $p < 0.05$. The study and interpretation of results were conducted in accordance with industry standards.

Results

When studying the content of the pro-inflammatory cytokine TNF-alpha in the blood serum, a pronounced direct correlation between its concentration and the severity of the clinical course of dermatosis was revealed. In patients with a mild course of the disease (n=18), a moderate increase in TNF-alpha levels to 28.4 ± 4.2 pg/ml was noted, while in moderate forms (n=24), this indicator significantly increased to 56.2 ± 6.8 pg/ml. The most significant, sharply elevated cytokine values were recorded in children with severe psoriasis (n=19), reaching 112.5 ± 14.3 pg/ml, which many times exceeded the values of the comparison group (12.6 ± 2.1 pg/ml). Characteristically, high cytokininemia persisted in patients with severe forms even during the remission period (42.8 ± 5.6 pg/ml), indicating the persistence of systemic immune inflammation even when skin manifestations subside.

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Analysis of total IgE content showed no linear correlation between its level and the severity of the psoriatic process. In patients with a mild form of the disease, the IgE level was 381.5 ± 140.5 IU/ml; in moderate severity, it increased to 754 ± 69.86 IU/ml, and in severe psoriasis, the indicator was 749 ± 138.76 IU/ml. In the comparison group (healthy children), the IgE level was within the normative range and amounted to 42.3 ± 8.4 IU/ml. Thus, despite a significant excess of indicators in sick children compared to healthy ones, no significant differences were found between the moderate and severe forms of psoriasis. The data obtained allow us to conclude that the severity of clinical symptoms is determined not by the absolute level of serum IgE, but, apparently, by the combined influence of trigger factors and other components of immunopathogenesis on the development of the inflammatory reaction.

The study of the dynamics of the IL-6 interleukin profile in 38 patients showed a significant role of this cytokine in the formation of subjective sensations, in particular, intense skin itching. During the exacerbation period, the IL-6 level in children with a mild course was 18.2 ± 2.1 pg/ml, in moderate severity – 32.4 ± 3.5 pg/ml, and in severe cases reached peak values of 48.2 ± 5.1 pg/ml, which significantly exceeded the values of healthy children (4.1 ± 0.8 pg/ml). During the therapy, a positive dynamic was noted: by the 35th–40th day of treatment, the IL-6 level decreased on average to 15.4 ± 2.3 pg/ml, which correlated with the regression of rashes, the disappearance of itching, and the normalization of sleep in patients.

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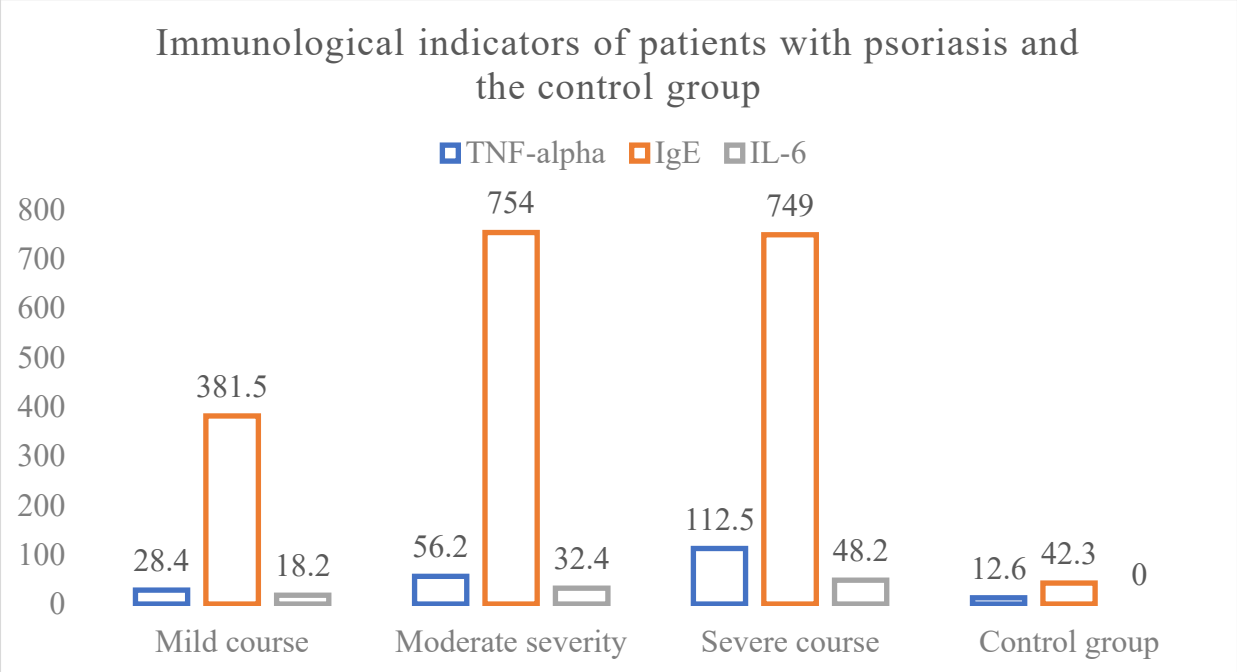

Discussion

Our findings confirm the key role of TNF-alpha in the immunopathogenesis of pediatric psoriasis, where it acts as the primary driver of systemic inflammation. The identified direct correlation between cytokine concentration and the severity of the process is consistent with the results of modern international studies. For instance, the work of Karam R.A. et al. (2025) demonstrated that serum TNF-alpha levels have a significant positive correlation with the PASI index, suggesting that this cytokine can be considered a reliable biomarker for monitoring disease progression [2]. Particular attention should be paid to the fact that the immune response in childhood is characterized by higher TNF-alpha expression compared to adult patients. A study by Kim J.C. et al. (2025) showed that TNF-alpha levels in the affected skin of children are significantly higher than in adults, regardless of the duration of the disease [3]. This explains the clinical picture we observed: even in mild cases, the cytokine level in children exceeds

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that of healthy controls, and in severe forms, it reaches extreme values. The persistence of high TNF-alpha concentrations during remission, noted in our study, may be due to genetic predisposition (TNF-alpha gene polymorphism), which maintains subclinical inflammation and creates a risk of early relapse. Thus, dynamic monitoring of TNF-alpha levels is critically important for evaluating therapeutic efficacy and predicting the course of dermatosis in children.

Analysis of total serum IgE levels in children with psoriasis demonstrates the absence of a direct correlation between this parameter and the severity of clinical manifestations (PASI index). Our results, showing comparable IgE values in moderate and severe forms of the disease, suggest that hyperproduction of this immunoglobulin should be viewed as a background condition reflecting general immunological reactivity and an atopic predisposition rather than a direct marker of psoriasis severity. In the scientific literature, this relationship remains debatable. For example, a study by El-Komy, M. et al. (2021) indicates that elevated IgE levels in psoriasis patients may be associated with the intensity of itching, but it is not an obligatory factor determining the area of skin involvement [4]. Similarly, Güngör, S. et al. (2020) note that high IgE levels are often a sign of concomitant sensitization, which may act as a trigger for exacerbations but does not directly correlate with the morphological severity of the process [5]. Thus, hyper-IgE-emia in pediatric psoriasis is likely a consequence of an imbalance in the Th1/Th2 cytokine response, where the Th2 pathway is activated compensatorily or under the influence of external allergens, complicating the course of the primary disease without determining its clinical stage.

Analysis of interleukin-6 (IL-6) content in the blood serum of the examined children revealed its significant role as a mediator of the acute phase of inflammation, closely linked to subjective symptoms and dermatosis severity. The correlation we identified between peak IL-6 values and the severity of skin itching in patients with severe forms of psoriasis is confirmed by modern research

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identifying this cytokine as one of the key pruritogens. According to Bocheva, G. et al. (2021), IL-6 can directly affect sensory neurons, lowering the sensitivity threshold and enhancing itch transmission, which explains sleep disturbances in children during exacerbations [6]. During therapy, we observed a statistically significant decrease in IL-6 levels, which aligns with the findings of Mizutani, H. et al. (2022) that the regression of psoriatic rashes is accompanied by a systemic decrease in pro-inflammatory interleukins, particularly IL-6, the level of which can serve as a predictor of treatment efficacy [7]. Thus, monitoring IL-6 levels in children allows not only for the objectification of the inflammatory process severity but also for the evaluation of the dynamics of resolving the pathological skin process.

Conclusions

Thus, it was established that serum cytokine levels reflect the current state of the immune system in patients with psoriasis. Summarizing the study of cytokine content in the serum of psoriasis patients with varying degrees of severity, it can be concluded that there is a tendency toward increased production of anti-inflammatory cytokines (IL-4 and IL-6) during disease exacerbation and enhanced synthesis of pro-inflammatory cytokines (TNF-α) during remission. This may indicate the activation of both Th2 and Th17 type cytokine production. Overall, the polarization of Th2 and Th17, aimed at increasing functional activity during the acute period, corresponds to classical concepts of the immunopathogenesis of psoriasis.

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