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MOLECULAR BIOLOGICAL STUDIES OF THE AFFECTED SKIN OF PATIENTS WITH MICROBIAL AND TRUE ECZEMA

Abstract

The aim of the study was to investigate the immunophenotypic composition of inflammatory infiltrating cells in patients with microbial and true skin eczema.

37 biopsy specimens of patients for microbial and true eczema were examined by Immunohistochemistry method. The development of another form of eczema may be due to defects in the focus of inflammation itself. Consequently, it is unable to recruit distinct T-lymphocyte populations to the inflammatory process (CD4+ lymphocytes-for parenchyma and CD 8+

lymphocytes-for microbial eczema). Patients with eczema have also been shown to have decreased reactivity of some T-lymphocytes that circulate in the blood and pass through the focus of inflammation. It adequately responds to the signals of cell mediators of inflammation foci, cannot leave the vascular bed, and outside it participates in the formation of a qualitative effective inflammatory response.

Keywords:

immunohistochemistry, CD4+ lymphocytes, CD8+ lymphocytes

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МОЛЕКУЛЯРНО-БИОЛОГИЧЕСКИЕ ИССЛЕДОВАНИЯ ПОРАЖЁННОЙ КОЖИ У ПАЦИЕНТОВ С МИКРОБНОЙ И ИСТИННОЙ ЭКЗЕМОЙ

Аннотация

Целью исследования было изучить иммунofenотипический состав воспалительных инфильтрирующих клеток у пациентов с микробной и истинной экземой кожи. 37 биопсийных образцов пациентов с микробной и истинной экземой были исследованы методом иммуногистохимии. Развитие другой формы экземы может быть обусловлено дефектами в самом очаге воспаления. В результате он не способен привлекать различные популяции Т-лимфоцитов к воспалительному процессу (CD4+ лимфоциты — для паренхимы, и CD8+ лимфоциты — для микробной экземы). У пациентов с экземой также было показано снижение реактивности некоторых Т-лимфоцитов, которые циркулируют в крови и проходят через очаг воспаления. Они адекватно отвечают на сигналы клеточных медиаторов воспалительного очага, но не могут покинуть сосудистое русло и за его пределами участвовать в формировании качественного эффективного воспалительного ответа.

Ключевые слова:

иммуногистохимия, CD4+ лимфоциты, CD8+ лимфоциты

Introduction

Modern research leads us to the idea that the skin with its unique immunologic properties, manifested in its ability to locally process both internal and external antigenic signals, is the central point where imbalance or insufficiency of the local immune system is manifested by the development of pathologic processes with characteristic clinical manifestations [2]. At the same

time, the ratio of endogenous and exogenous factors in the development of subsequent processes may be different [3].

The study of immunity in eczema by determining the degree of blood cells involvement in the immune process is not a sufficiently complete informative indicator, since the main immune processes are carried out directly in the skin, and hematologic indices in this case reflect only the general mood of the body immune system [4].

The evaluation of the skin immune state, the most affected organ, should be of great importance in understanding the etiology of the eczema process, the results of which are interesting to compare with similar indicators in the peripheral blood [5]. This approach to the study of the etiology of eczema will allow not only to identify possible conditions for the development of its clinical form variants, but also to determine the direction of corrective therapy of the local immune system disturbed links [7].

The aim of the study was to investigate the immunophenotypic composition of inflammatory infiltrating cells in patients with microbial and true skin eczema.

Material and methods

Immunohistochemistry is a complex multi-step process, the result of which is influenced by a variety of factors, both outside the immunohistochemistry laboratory and within its walls. 37 biopsy specimens of patients for microbial and true eczema were examined by Immunohistochemistry method. Biopsy material was taken after the patient's written consent. The biopsy contained the patient's blood. Monoclonal antibodies CD3+, CD4+, CD8+, Cd1a+ and CD22+ were used for testing.

Quantitative ratios of reactive cells were determined in serial continuous sections. The number of epithelial cells and cells with characteristic expression of marker antigens in the epidermal layer were counted. The change in the

quantitative distribution of reactive cells was judged by the change in percentage.

Results and discussion

Based on review of data, it was found that out of 37 cases, 21 (56.8%) patients were diagnosed with true eczema and 16 (43.2%) cases were diagnosed with microbial eczema [10]. 37 studied patients were divided by age as follows. In the group with true eczema, the age ratio was: young age (18-44 years) - n=11 (52.4%), middle age (45-59 years) - n=6 (28.6%), elderly age (60-74 years) - n=3 (14.3%), old age (75-90 years) - n=1 (4.8%), age of longevity (over 90 years) - n=0 (0 %). In the group with microbial eczema, these ratios were as follows: young age (18-44 years) - n=7 (43.7%), middle age (45-59 years) - n=4 (25%), old age (60-74 years) - n=2 (12.5%), old age (75-90 years) - n=1 (6.25%), age of longevity (over 90 years) - n=2 (12, 5 %).

The study included 9 (42.9%) men and 12 (57.14%) women with true eczema; and 9 (56.25%) men and 7 (43.75%) women with microbial eczema. In the dermal component of the affected skin of patients with microbial eczema, histopathological changes are observed in most cases:

CD4+ lymphocytes were observed as single cells in the reticular layer of the dermis and at the border with the epidermis, CD4+ cells tended to infiltrate the basal part of the epithelium, especially where there were pronounced trabecular processes. Very rarely, CD4+ lymphocytes were observed in the thickness of the epidermis between epithelial cells (Tab. 1).

Table 1

Number of inflammatory infiltrates in the dermis distributed in the perivascular area

№	Lymphocytes	(%)
1.	CD3+- lymphocytes	66.1±1.3%
2.	CD4+- lymphocytes	47.1±1.9%

3.	CD8+- lymphocytes	13.1±0.9%
4.	CD4/ CD8	1.4%
5.	CD1a+- lymphocytes	13.5±1,4 %
6.	CD22+- lymphocytes	11.3±0.9%
7.	HLA-DR	51.4±2.9 %

CD8+ lymphocytes were localized predominantly in the perivascular infiltrate; Like CD4+ lymphocytes, CD8+ lymphocytes tended to migrate to the subepithelial region and invaded the epithelium at the site of trabecular formation. CD8+ lymphocytes were rarely found in the deeper epithelial layers.

CD4+ lymphocytes made up for 46.2±1.8% of inflammatory infiltrates cells. CD4+-lymphocytes were distributed as single cells in the upper dermis, mainly along the border with the epidermis, between the cells of the basal section of the epithelial layer. Cell infiltration was also noted in places of dystrophic changes of the epithelium.

CD8+ lymphocytes constituted a rather small proportion of inflammatory infiltrates (9.03±0.81%.) CD8+ cells were consistently observed in the basal parts of the epidermis. However, they were not noted in its upper parts even under conditions of spongiosis or the formation of vesicular elements. The CD4+/ CD8+- lymphocyte ratio index was noted to be 3.7.

Analysis of changes in the lymphocytic component of immunity in various forms of eczema shows that each form is characterized by its own individual immunophenotypic profile. First of all, it should be noted that B-lymphocytes practically did not participate in the eczematous process.

Conclusion

The above specificity of each form of eczema can be related to two findings:

It can be assumed that there is a decrease in the reactogenic properties of a certain part of T-lymphocytes circulating in the blood and transiting the site of

inflammation and their inability to adequately respond to the signal of cellular mediators of the site of inflammation [8], to leave the vascular bed, beyond which to participate in the formation of qualitatively efficient inflammatory reaction. This defectiveness of a certain subpopulation of T-lymphocytes should manifest itself in a violation of the quality of the inflammatory process, which acquires the specific features of microbial eczema (defect of CD8+ lymphocytes) or true eczema (defectiveness of CD4+ lymphocytes).

The development of a certain form of eczema may be associated with a defective focus of inflammation itself, which is unable to attract a certain population of T-lymphocytes (CD4+ lymphocytes for true eczema and CD8+ lymphocytes for microbial eczema) to participate in the inflammatory process. In terms of the assumptions made, it is of interest to compare changes in each of the forms of eczema in the ratios of the T-lymphocyte population observed in the skin with changes in the ratios of T-lymphocytes in the blood.

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