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Influence of Trace Elements for the Development of Atopic Dermatitis in Children and Adolescents

Islamov Nurali Hikmatovich[1], Mamirov Asamiddin Egamberdiyevich[2], Ermanov Rustam Temirovich[2]

[1]Assistant of the Department of Skin and Venereal Diseases, Samarkand State Medical University
[2]Assistant of the Department of Epidemiology, Samarkand State Medical University

ABSTRACT

Atopic dermatitis (AD, atopic eczema, atopic eczema/dermatitis syndrome) is a chronic inflammatory skin disease that usually begins in early childhood and may continue or recur in adulthood.

The study of atopic dermatitis remains one of the most urgent problems of modern dermatology due to its wide distribution, severe course, frequent relapses, and the disease of people of the most childhood age. According to statistics, in children it occupies one of the first places for the reasons for the appeal of patients to a dermatological clinic, it causes 30-40% of all skin diseases and 30-40% of cases of hospitalization in a dermatological hospital. The disease occurs in both sexes and in different age groups. The incidence ranges from 6.0% to 15.0%.

KEYWORDS: *topical dermatitis, children, microelement status*

Introduction

In recent years, due to the deterioration of the environmental and economic situation, the problem of deficient conditions caused by a lack of essential trace elements (ME) has become particularly relevant. Recent studies show that the provision of micronutrients to children is below physiological needs. In a significant part of children, multivitamin deficiency is combined with insufficient intake of a number of macro- and microelements and a decrease in their content in biological fluids [1,2].

Unbalanced nutrition leads to violations and an increase in the frequency of violations of the microelement status of children. Concern is caused by the fact that every third child is already sensitized to certain antigens from the neonatal period. Micronutrient deficiency is also one of the important risk factors for disease in children [3,4].

The mechanisms of development of microelement deficiency in a child are different. Traditionally, they are associated with malnutrition, and the role of ecopathological factors is practically not taken into account [5]. At the same time, many regions in Uzbekistan have a pronounced imbalance of microelements in the environment[6].

Essential trace elements play an important role in the functioning of the human body, directly or indirectly participating in all life processes. Their imbalance can have an extremely negative impact on the viability of cells and the functional state of the body as a whole. This is especially true in situations involving allergic components [7,8].

In the modern world, medical technologies for increasing the functionality of the body by optimizing mineral metabolism with the use of preparations containing the necessary macro- and microelements, vitamins and other biologically active substances are beginning to become widespread [9].

Possessing efficiency comparable to traditional drugs, they have a number of advantages, including the absence of side effects, a more adequate and targeted correction of metabolism, the immune system and their regulation. This opens up the possibility of a targeted impact on the functional state of the human body, but requires an understanding of the relevant interdependencies.

Purpose of the study: The main purpose of the study was to examine the violations of the microelement state of the body in patients with atopic dermatitis and their role in the course of the disease.

To achieve this goal, the task was to assess the microelement balance (Zn, Fe, P, Cu, Se, Na, Ca, K, Mg) in blood serum in patients with atopic dermatitis.

Materials and Methods: The study involved 28 patients with various forms and severity, aged from 2 months to 18 years. Analysis of the content of microelements in the blood serum was performed in the laboratory of the "Regional Multidisciplinary Children's Hospital" (Samarkand) by atomic absorption spectrophotometry (AAS). Trace elements, selenium were determined by the atomic absorption method on the Japanese atomic absorption spectrophotometer "Hitachi"-208, macroelements: zinc and magnesium by the kinetic method of copper, iron, potassium, calcium - by the colorimetric method on the photometer "Hospitex, Master plus" (Finland).

Results and discussions: In order to establish dependencies, correlations between indicators of elemental status and severity were studied in 28 patients (Table 1).

The obtained results on the content of zinc, potassium, calcium, selenium, iron, magnesium, copper, sodium and phosphorus in the blood of patients generally coincide with the literature data. In most patients (respectively 25, 7, 22, 21, 26, 19, 2, 5, 12), the level of zinc, potassium, calcium, selenium, iron, magnesium, copper, sodium and phosphorus in the blood was reduced and ranged from 5, 8 to 10.0 mmol / l, (normally 11.0-22.0 mmol / l.), on average 7.86 mmol / l; 3.0-3.3 mmol / l, (normally 3.5-5.5 mmol / l.), on average 3.07 mmol / l; 1.99-2.16 mmol / l, (normal 2.2-2.7 mmol / l.), On average 2.08 mmol / l; 7.4-10.0 mmol / l, (normal 10-30 mmol/l.), on average 8.7 mmol/l; 0.60-0.72 mmol/l (normally 0.78-1.10 mmol/l.), on average 0.66 mmol/l ; 8.0 - 28.0 mmol / l, (normal 12.0-25 mmol / l.), on average 18 mmol / l; 127-152 mmol / l, normal (135-155 mmol / l), in an average of 139.5 mmol / l; 0.60-0.76 mmol/l, normal (0.68-1.81 mmol/l), on average 0.68 mmol/l. respectively.

Table number 1.

trace elements (mmol/l)	Number of patients (norm)	Number of patients (decrease)	Severity	
			Average (mmol/l)	Heavy (mmol/l)
Zn(11-22)	3	25	6,4	5,2
K(3,5-5,5)	21	7	3,1	2,1
Ca(2,20-2,70)	6	22	1,9	1,7
Se(1,14-1,9)	7	21	1,06	0,8
Fe(10-30)	2	26	8,7	4,8
Mg(0,78-1,10)	9	19	0,66	0,20
Cu(12-25)	26	2	17,5	5,6
Na(135-155)	23	5	139,5	110
P(0,68-1,81)	16	12	0,68	0,25

The level of trace elements in the blood of patients with moderate and severe forms of the disease looked somewhat unusual. A decrease in the level of microelements: zinc, potassium, calcium, selenium, iron, magnesium, copper, sodium and phosphorus in moderate form was observed in all patients, the blood content averaged 6.4 mmol/l; 3.1 mmol/l; 1.9 mmol/l; 1.06 mmol/l; 8.7 mmol/l; 0.66 mmol/l; 17.5 mmol/l; 139.5 mmol/l; 0.68 mmol / l, respectively, and a total deficiency of trace elements was noted in all 12 patients with a severe form.

With a pronounced clinical manifestation of the disease, there was also a deficiency of all essential trace elements: zinc, potassium, calcium, selenium, iron, magnesium, copper, sodium and phosphorus.

Conclusions: The results obtained convincingly indicate the relationship of microelement status with the severity of the disease, the degree of clinical manifestation of atopic neurodermatitis. In addition, in atopic neurodermatitis, positive correlations were found between the content of selenium, zinc, iron, and an increase in the level of Ig E, which is most pronounced in patients with a severe degree of the disease. The revealed changes in the microelement status in atopic neurodermatitis indicate violations of the protective properties of the body, and the expediency of a comprehensive study of the immune and microelement status to determine ways to correct immune disorders using microelements.

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