The use of procalcitonin test in patients with allergic skin diseases

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Abstract

The article presents data on the level of procalcitonin in patients with allergic skin diseases. It was noted that the level of procalcitonin in these patients tends to increase in proportion to the age of the patients and the duration of the disease.

Key words: atopic dermatitis, procalcitonin, duration of the disease.

INTRODUCTION

The search for new possibilities of diagnostic research methods in dermatological practice is a priority. Since the early diagnosis of bacterial, fungal infections as a phenomenon of opportunistic infections provides one of the preventive measures to prevent complications. Recently, special attention has been paid to procalcitonin tests.

Procalcitonin is a 116 amino acid protein and is a precursor of calcitonin [1,2]. Procalcitonin was first described as a marker of bacterial infection in 1993, when this indicator was detected in patients with thyroid diseases.

Scientists have found a high level of procalcitonin (6-53 ng / ml) in patients with severe invasive bacterial infections compared with patients with mild local bacterial or viral infections, in which the level of procalcitonin was 0.1-0.15 ng / ml. Also, scientists noted a sharp decrease in procalcitonin during antibiotic therapy, on the basis of which they suggested that an increased level of procalcitonin during bacterial septic conditions correlates with the severity of microbiological invasion [3].

Several other studies have demonstrated procalcitonin as a mediator of the deleterious effect of systemic infection, which subsequently determined its role in the assessment and eradication of infection [4,5].

The aim of the study was to assess the level of procalcitonin in patients with allergic skin diseases.
Materials and methods of research: We examined 57 patients with allergic skin diseases aged from 3 to 74 years. Among them, there were 32 females and 25 males. According to the clinical form, among 57 patients with a diagnosis of atopic dermatitis (AD), there were 40 patients and allergic dermatitis - 17. The control group (III) consisted of 23 healthy individuals.

Analysis of the age aspects of the examined patients revealed the following: in group I of patients with AD up to 18 years there were 15 patients, from 19 to 28 years - 13, from 29 to 39 years - 10, from 40 to 50 years - 7 and over 50 years - 12 patients. In group II, with allergic dermatitis, mainly aged 29 to 39 years - 6 patients, from 40 to 50 years - 8 and over 50 years - 3 patients, while up to 18 years and from 18 to 28 years old patients were not identified.

All patients were diagnosed with AD based on the clinical protocol (2020) and major and minor criteria according to Hanifin & Rajka (1980). All patients were in the stage of exacerbation of the underlying disease and had a chronic relapsing course of the disease. According to the working classification of Grebenyuk V.N. and Mannanova A.M. (1987) patients with AD were divided into clinical forms: patients with erythematous-squamous form were 11 people, with erythematous-squamous form with lichenification - 14, with exudative - 7, with pruriginous and lichenoid - 13 and 12, respectively.

Clinical forms of allergic dermatitis were determined taking into account the degree of sensitization: thus, monovolent sensitization was detected in 6 and polyvalent - in 11 patients, respectively. The control or group III consisted of 23 practically healthy individuals of the same sex and age.

All patients underwent clinical (determination of the severity according to the SCORAD index, DISHS), microbiological cultural studies of the severity of colonization (according to the method of Mavlyanova Sh.Z., Maksudov M.R. 2022), ELISA studies, statistical studies. The level of procalcitonin before and after treatment was determined by ELISA in all patients.

Results of the study: The results of the ELISA study of the level of procalcitonin in the examined patients showed an increase in concentration in 34 out of 74 patients with allergic dermatosis compared with healthy individuals, which amounted to 45.9% of cases. Analysis of the quantitative characteristics of the level of procalcitonin averaged 0.13 ± 0.005 ng/ml. Whereas in the group of healthy individuals, this indicator averaged 0.1009 ± 0.0003 ng/ml. Depending on the clinical form of allergic skin diseases, the level of procalcitonin had the following character. (Table 1)

<table>
<thead>
<tr>
<th>Group of patients</th>
<th>I - Group of patients</th>
<th>II - Group of patients</th>
<th>III - Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>AD</td>
<td>N=57</td>
<td>N=17</td>
<td>healthy group</td>
</tr>
<tr>
<td>procalcitonin</td>
<td>0.14±0.005*</td>
<td>0.11±0.006*</td>
<td>0.1009±0.0003</td>
</tr>
</tbody>
</table>

Note: * confidence indicator in relation to healthy individuals (P>0.05)

As follows from the table, the level of procalcitonin in patients with AD averaged 0.14±0.005 ng/ml, which was 1.4 times higher than in healthy individuals (0.1009±0.0003 ng/ml) and was not statistically significant ( P >0.05). Whereas in the group of patients with allergic dermatitis, the level of procalcitonin averaged 0.11±0.006 ng/ml, which was 1.09 times higher than in healthy people and was also not statistically significant.

According to the data [6,7], the level of procalcitonin is considered as a highly sensitive biomarker of bacterial infection, offered by surgeons for the treatment of generalized invasive bacterial infection. Therefore, in our opinion, there was no significant increase in the level of procalcitonin in these patients.

Due to the fact that opportunistic microorganisms are one of the factors of recurrence of allergic skin diseases, it was interesting for us to assess the state of the skin microbiota in the examined patients.

In the examined patients, increased colonization of staphylococcal flora St. aureus - 66,2±1,3 CFU/cm², St. epidermidis - 54,5±1,02 CFU/cm², St. saprophyticus -47,3±0,8 CFU/cm² And St. Haemoliticus- 34,02±0,2 CFU/cm² (
control group - St. aureus - 1.5±0.3 CFU/cm²; St. epidermidis - 6.6±0.4 CFU/cm²; P<0.05) was noted on the skin of lesions, which statistically significantly differed from the indicators of control healthy individuals (P<0.05).

Correlation analysis of the obtained results of colonization of opportunistic microorganisms Micrococcacea with the level of procalcitonin showed that pathogenic species of St. aureus r=+0.8, St. saprophyticus – r=+0.5, St. Haemoliticus = r=+0.6 had a direct high correlation (P<0.05), opportunistic flora St. epidermidis had a noticeable correlation - r = +0.4.

The results obtained indicate the interdependence of the degree of colonization of opportunistic microorganisms with the level of procalcitonin. In our opinion, with increased colonization of conditionally pathogenic microflora, lipopolysaccharide (toxins) produced by the bacterial film contribute to an increase in extrathyroidal synthesis of PCT by cells of the liver, kidneys, lungs, muscle tissue, adipocytes, macrophages and monocytes, which leads to an increase in its level in blood serum.

The level of procalcitonin was analyzed according to the duration of the underlying disease: in the group of patients with AD with a prescription of up to 1 year, there were 11 patients, from 1 to 5 years - 29, over 5 years - 17 patients. Then, as in the group of patients with allergic dermatitis up to 1 year, it was noted in 5, from 1 to 5 years - in 7 and over 5 years - in 5 patients.

The level of procalcitonin in patients with allergic skin diseases tends to increase in proportion to the duration of the disease. With a disease duration of more than 5 years, there is a 2-fold increase in procalcitonin compared with patients with a prescription of up to 1 year. This phenomenon is possibly associated with the long-term persistence of opportunistic microorganisms in the body of patients. On the basis of which, procalcitonin can be considered as one of the possible markers of high contamination of Micrococcacea biosubstrates, in particular the skin, in the complex diagnosis of diseases, in order to be used to evaluate the therapy.

Figure (1): Indicator of the correlation of procalcitonin with the severity of allergic skin diseases according to the SCORAD index, (r)

As follows from the figure, in the group of patients with atopic dermatitis, the level of procalcitonin had a direct correlation (I degree of severity - r=+0.4; II - degree of severity - r=+0.6; III degree - r=+0.8) with the severity of the disease according to the SCORAD index. (P<0.05). While in the group of patients with AD, the level of procalcitonin had an inverse correlation with the moderate severity of the disease (r=+0.3), and in other cases they had the same inverse, but not significant relationship. (P>0.05).

This phenomenon is possibly due to the fact that the incidence of atopic dermatitis is genetically determined in nature with the immunological reactivity of the body. At the same time, great importance is attached to the barrier function of the skin, where, first of all, the main protein, filaggrin, is involved in the differentiation of epidermal cells, as the main component of the natural moisturizing factor of the skin. A high level of contamination of the skin with microorganisms is
facilitated by the features of the structure and function of the epidermal barrier in chronic dermatoses: an increase in transepidermal water loss, changes in the function of the acid mantle, impaired desquamation, and other factors.

Thus, based on the results obtained, it can be said that the PCT level reflects the severity of the inflammatory process and can be a prognostic criterion for the prognosis of the disease. An increase in the concentration of procalcitonin, taking into account the skin microbiome and the duration of the disease in patients with allergic dermatoses, indicates the development of a chronic superficial invasive form of a bacterial infection on the skin, which can be a pro-inflammatory mediator in determining the infectious process.

CONCLUSIONS

An increase in the concentration of procalcitonin, taking into account the skin microbiome and the duration of the disease in patients with allergic dermatoses, indicates the development of a chronic superficial invasive form of a bacterial infection on the skin, which can be a pro-inflammatory mediator in determining the infectious process.

REFERENCES