Diagnostic value of identification of IgG subclasses in the blood serum of patients with acne

Abstract: Acne vulgaris is chronic, often with recurrences disease characterized by impairment of the functional activity of the immuno-hormonal system of the body that causes heavy clinical progressing of disease. At the ground of the dyshormonal state of the body the humoral immunity has become of great importance. The immunoglobulins are the effectors of humoral immunity. The majority of immunoglobulins connected with the surface of B-lymphocytes carry out function of the antigen-recognizing receptor. Among all classes of immunoglobulins 80 % present immunoglobulins of G class [4; 6; 8].

The scientific information on a spectrum of antibodies of this class in the patients with acne is extremely scant and contradictory. Taking into account insufficiently knowledge of this issue and suggesting that singular isotypes of immunoglobulins of IgG class can be one of criteria of assessment of the severity of disease as well as curability of the inflammatory process and prognosis of its possible acceleration we put the task to study the spectrum of immunoglobulins IgG in the patients with acne disease with regards to the stage of severity of disease.

Keywords: acne, diagnostic, IgG subclasses, clinic, bacterial sensibilization.

Acne is chronic, often with recurrences disease characterized by impairment of the functional activity of the immuno-hormonal system of the body that causes heavy clinical progressing of disease [1; 2; 5; 7]. At the ground of the dyshormonal state of the body the humoral immunity has become of great importance. The immunoglobulins are the effectors of humoral immunity. The majority of immunoglobulins connected with the surface of B-lymphocytes carry out function of the antigen-recognizing receptor. Among all classes of immunoglobulins 80 % present immunoglobulins of G class [4; 6; 8].

The scientific information on a spectrum of antibodies of this class in the patients with acne is extremely scant and contradictory. Taking into account insufficiently knowledge of this issue and suggesting that singular isotypes of immunoglobulins of IgG class can be one of criteria of assessment of the severity of disease as well as curability of the inflammatory process and prognosis of its possible acceleration we put the task to study the spectrum of immunoglobulins IgG in the patients with acne disease with regards to the stage of severity of disease.

Material and methods

This study included 34 patients with acne (A) of the age from 17 to 27 years. At all patients there were carried out clinical, microbiological and immunological investigations. The clinical examinations were characterized by determination of the severity degree with use of classification offered by Plewig G. and Kligman A. M. (1994) among 34 patients suffering from acne there have been identified the following forms: comedones (comedos-ouacnecomedonica) in 4 (11.7 %) patients, papulopustular form (acnepapulosapapulopustulosa) — in 21 (61.7 %), phlegmanous form (acnephlegmonosa) — in 7 (20.6 %), and fulminant acne (acnelfulminans) — in 2 (5.8 %), respectively.

Using classification developed by the American Academy of Dermatologists there was diagnosed light stage of disease in 11 patients among 34 patients that accounted for 32.4 %, moderate degree — in 10 (29.4 %), and severe degree — in 13 (38.2 %) patients.

The results of IEA assay of IgG levels in the blood serum in the patients with A showed statistically reliable increased concentration of all parameters of subclasses in comparison with parameters of control group (P < 0.05) (Table 1). In our point of view such sharp increase of immunoglobulins IgG concentration promoted the body tension to infiltrative-inflammatory process.

According to the data of table 1, the level of IgG1 increased 2.3 times than the parameters of the healthy persons and achieved 5.6 ± 0.1 mg/ml (P < 0.05). Such picture was observed in parameters of IgG2 (2.4 times), IgG3 (1.8 times) and IgG4 (225 times), respectively. The high level of subclasses IgG indicated about significant body response to toxic effect of opportunistic microorganisms at the ground of "antigen mimicry" and immunosuppressive state of the patient organism.

Table 1 – The level of immunoglobulins of IgG subclasses in healthy persons (M±m) mg/ml

<table>
<thead>
<tr>
<th>Subclasses</th>
<th>IgG1</th>
<th>IgG2</th>
<th>IgG3</th>
<th>IgG4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy persons, N=15</td>
<td>2.4 ± 0.3</td>
<td>1.4 ± 0.3</td>
<td>0.6 ± 0.1</td>
<td>0.004 ± 0.002</td>
</tr>
<tr>
<td>Patients with acne, N=34</td>
<td>5.6 ± 0.1*</td>
<td>2.9 ± 0.07*</td>
<td>1.07 ± 0.04*</td>
<td>0.9 ± 0.04*</td>
</tr>
</tbody>
</table>

Note: * — index of reliability in relation to parameters of control healthy group (P < 0.05).
Microbiological investigations of the skin in the focuses of the lesions in the patients with acne showed that in 93.2% of cases there was isolated Staphylococcus spp., and in relation to strains in 48.8% of cases the growth of pathogenic strain St.aureus was noted. Mycological cultures examination of the body biosubstrates (oral cavity mucosa, bowel) showed high prevalence of yeast fungi Candida, accounted for 65.9% (in 29 of 44 patients). Thus among body biosubstrates the greatest quantity of culture isolations were noted in the bowel, that was 52.3% (23 patients). The data obtained indicated about mixed-bacterial contamination of the biosubstrates (skin, mucous environments) in the patients with acne which promotes aggravation of clinical course of disease and development of immunopathological syndromes, such as endotoxic shock and reaction of Shvartsman without appreciable participation of T-cells [3; 8].

The increased level of the contents of subclasses IgG in the blood serum may be as diagnostic and prognostic criterion of the clinical course of disease (table 2).

It is visible from table 2 that in the patients with acne of severe degree characterized by formation more than 25 papular and pustular elements on the skin of the trunk, dense nodular elements of infiltrate character the level of IgG1 increased 2.2 times in comparison with parameters of control healthy group (P < 0.05). Whereas in the patients of mild degree the level characterized by presence of comedones and nodules of inflammatory nature in quantity less than 10 IgG1 increased 2.5 times. This tendency was noted in the indicators of subclasses IgG2 — 2.2 times, IgG3 — 2 times and IgG4 — 225 times, respectively (P < 0.05). It should be noted that in the patients with acne with moderate degree all subclasses were consequently increased in reliable parameters (P < 0.05) (tab. 2). Thus, in the patients with acne of mild degree the contamination of the bowel by Candida sort accounted for 14746.8 ± 958.9 KOE/g, that was 29.4 times higher in comparison with parameters of the healthy persons (P < 0.05). Whereas in the patients with moderate and severe stage of disease the contamination of the bowel increased in 71.9 times and 81.04 times, respectively. The study of the IgG level to Candida in the patients with acne revealed its increased contents in the blood serum in statistical reliable parameters in comparison with control group of the healthy persons (P < 0.05) (table 2).

The data obtained testify to the increased sensitivity of the body to fungi of Candida sort. The high level of a subclass IgG4 indicated about development of bacterial sensibilization that is connected with a high level of the common immunoglobulin E (P < 0.05).

Thus, the study of the spectrum of immunoglobulins of Class IgG in the patients with acne of mild degree reflects the high bacterial loading in the body that can serve as the indicator of disease progressing. So, at increase of concentration IgG1 in 2.5 times and IgG2 in 1.8 times in the patients with acne it is possible to predict heavy development of disease, that requires timely tactics of the complex antibacterial therapy.

Conclusions
Thus, the identification of subclasses of immunoglobulins of IgG class has the important role during clinical monitoring of the patients with acne with mucogen sensibilisation of disease in order to increase the efficiency of the complex therapy performed and to prevent the complicated forms of the acne process.

Table 2. – Characteristic of the immunoglobulins of IgG subclasses in the blood serum in the patients with acne in relation to the severity degree of disease, (M ± m) mg/ml

<table>
<thead>
<tr>
<th>Subclasses</th>
<th>IgG1</th>
<th>IgG2</th>
<th>IgG3</th>
<th>IgG4</th>
<th>IgE</th>
<th>IgG Candida</th>
<th>Quality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy persons, N = 15</td>
<td>2.4 ± 0.3</td>
<td>1.4 ± 0.3</td>
<td>0.6 ± 0.1</td>
<td>0.004 ± 0.002</td>
<td>27.5 ± 6.8</td>
<td>0.2 ± 0.03</td>
<td>502 ± 39.1</td>
</tr>
<tr>
<td>Mild stage of disease, N = 11</td>
<td>6.03 ± 0.1 *</td>
<td>3.1 ± 0.08 *</td>
<td>1.2 ± 0.07 *</td>
<td>0.9 ± 0.05 *</td>
<td>147.3 ± 9.7 *</td>
<td>0.4 ± 0.04 *</td>
<td>14746.8 ± 3958.9 *</td>
</tr>
<tr>
<td>Moderate stage of disease, N = 10</td>
<td>5.6 ± 0.3 *</td>
<td>3.08 ± 0.1 *</td>
<td>0.9 ± 0.07 *</td>
<td>0.7 ± 0.08 *</td>
<td>164.4 ± 12.2 *</td>
<td>0.5 ± 0.08 *</td>
<td>36110 ± 8253.3 *</td>
</tr>
<tr>
<td>Severe stage of disease, N = 13</td>
<td>5.2 ± 0.3 *</td>
<td>2.6 ± 0.1 *</td>
<td>1.09 ± 0.06 *</td>
<td>1.02 ± 0.03 *</td>
<td>142.6 ± 6.4 *</td>
<td>0.3 ± 0.07 *</td>
<td>40684.2 ± 4465.3 *</td>
</tr>
</tbody>
</table>

Note: * — index of reliability in relation to parameters of control healthy group (P < 0.05).

References: