THROMBORESISTANT VASCULAR WALL IN PATIENTS WITH CHRONIC GENERALIZED PERIODONTITIS IN COMBINATION WITH A SYNDROME OF ATHEROSCLEROSIS

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ABSTRACT

Introduction. Periodontal disease is a serious public health problem, as they have a high prevalence, reduce the quality of life and chewing, can lead to disability and loss of teeth, have financial implications and are chronic diseases with potentially negative consequences for overall health, for example, contribute to the development of atherosclerotic vascular diseases. Purpose. We aimed to study a role of disturbances of functional activity of thromboresistance of endothelia of a vascular wall at patients of Chronic Generalized Periodontitis (CGP) in a combination by an atherosclerosis syndrome. Material and Methods. We chose 52 patients with CGP. All of them, 24 patients were without comorbidities. Patients treated in Stomatology Department, Clinic of the Tashkent State Dental Institute. Patients with syndrome of atherosclerosis aged 40 to 65 years. There is manifested by an increase in the level of endotheliocytes if desquamated on average 2.3 times in the combined disease group and 20% in patients with CGP group without comorbidities when comparing the performance of healthy individuals. The source of extracellular annexin A5 is apoptotic compositions produced and destroyed cells. Results. Significant increase in the level of annexin A5 in patients with CGP is an average of 1.5 times. The highest values of the level of annexin A5 was observed in patients with CGP combined syndrome of atherosclerosis, where its value exceeded the initial level more than 5 times (P<0.05), indicating a dysfunctional disturbance of the endothelial cells of the vascular wall. Conclusion. Combined form of periodontal disease occurs endothelial dysfunction “run”, in turn, a syndrome of inflammation that must be considered when planning a set of measures of therapeutic interventions.

KEYWORDS: Periodontitis, atherosclerosis, thrombomodulin, annexin A5, chronic generalized periodontitis.

INTRODUCTION

More than a hundred years ago was discovered the relationship between oral infections, removal of teeth and cardiovascular diseases, which led in the mid-twentieth century to the practice of routine prescribing of antibiotics for prevention of endocarditis prior to invasive dental procedures.[1, 2]

Over the past two decades in the spotlight again were infections of the oral cavity as a cause of systemic disease, with particular emphasis on periodontal diseases and their possible association with atherosclerotic vascular disease.[1, 3] Periodontal disease is a serious public health problem, as they have a high prevalence, reduce the quality of life and chewing, can lead to disability and loss of teeth, have financial implications and are chronic diseases with potentially negative consequences for overall health, for example, contribute to the development of atherosclerotic vascular diseases.[4] The atherosclerotic vascular disease can lead to coronary heart disease, the ischemic disease of the blood vessels of the brain or strokes.

Epidemiological studies of the role of periodontal disease as a risk factor for the atherosclerotic vascular disease were considered reputable organizations. ANA, EFP, and AAP, as well as other authors that have concluded that there is clear evidence of the relationship between these two diseases. Because in our knowledge about the relationship between periodontal disease and atherosclerotic vascular disease are significant problems, a more fundamental, invasive studies. In connection with concern on this issue in the field of healthcare, all medical professionals need to know that periodontal disease is a risk factor for the development of atherosclerotic diseases and diagnosis of periodontal disease is of paramount importance.

Objective: to examine the role of violations of the functional activity of thromboresistance vascular endothelium in the present study, which included...
patients with CGP in combined syndrome of atherosclerosis.

MATERIALS AND METHODS

To achieve this goal under our supervision, there were selected 52 patients with CGP. All of them, 24 patients were without comorbidities. The present study included 28 patients with CGP in combined syndrome of atherosclerosis. Patients were on outpatient treatment at the Stomatology Department, Clinic of the Tashkent State Dental Institute. Patients with syndrome of atherosclerosis aged 40 to 65 years consisted mainly of the contingents, suffering from disorders of cerebral circulation, caused by atherosclerosis of cerebral vessels and were under outpatient care. At 78.8% of patients was observed accompanying hypertension. Exclusion criteria were age older than 70 years, myocardial infarction in anamnesis prescription for at least 6 months, insulin dependent diabetes mellitus, and malignant tumors. In this cohort of patients with the syndrome of atherosclerosis was established a chronic cerebral ischemia on the basis of ultrasonic dopplerography of cerebral vessels, estimating the thickness of the KIM.

All patients with the syndrome of atherosclerosis and no comorbidities were chronic generalized periodontitis of moderate severity. When the diagnosis of “chronic generalized periodontitis” was used classification of periodontal diseases, adopted at the XVI Plenum of all-Union society of dentists (1983). The comparison group consisted of 12 patients aged 25-35 years with an intact periodontium without somatic pathology.

In working with the subjects compiled with ethical principles expressed in Declaration of Helsinki of the World Medical Association (1964). For an objective assessment of periodontal tissues, the present study included an examination of patients with CGP was conducted on the following indicators:
- the definition of hygiene index (Green Vermillion, 1969);
- the definition of capillary - marginal alveolar index (Parma C., 1960);
- the definition of periodontal index (Ruzel A., 1956);
- sample functional capillary resistance by V. I. Kulazhenko (1967);
- index of peripheral circulation, was calculated on the basis of the evidence of capillary resistance and time of resorption of the hematoma in the determination of the functional capillary resistance (Dedova L. N. 1981).
- Bleeding gums when probing (Baver G. M., Lamarkii G. I. 1996);
- measuring a depth of periodontal pockets was performed by the direct method; the degree of mobility of teeth (Gavrilov, E. I., 1954).

Clinical and laboratory examination all patients were performed according to standard methods, which included the general analysis of blood and urine.

If desquamated content of endotheliocytes in blood plasma was determined by the method of J. Hladovec (1972). The percentage factor of Willebrand investigated by the method of V. G. Mikhailov (1986). The amount of active forms of thrombocytes were determined using morpho-functional method proposed by Shitikova A. S. (1988). The contents of thrombomodulin in patients with CGP combined syndrome of atherosclerosis was determined by ELISA using the test system “Diagnostic” firm Bio Chem Mak (Russia). The level of endothelin - 1 was determined in plasma by enzyme immunoassay with sets of reagents Endothelin -1 Elisa System manufactured by Amersham Biotech Pharmacia. The content of soluble marker of apoptosis – Annexin – A5 in plasma was determined by enzyme immunoassay, the test system of the company Bio Chem Mak (Russia). In this study, we used equipment of the firm and “HUMAN”.

Static processing was carried out using the static package programs “Statistics”. The significance of differences between groups was assessed by student's criterion (t). The differences were considered statistically significant at P<0.05.

RESULTS AND DISCUSSION

Analysis of results in this study are presented in table 1. It showed that in patients with CGP combined syndrome of atherosclerosis, violations of capillary blood flow due to systemic atherogenic process and dysfunction of endothelial cells of blood vessels. There is manifested by increase in the level of endotheliocytes if desquamated on average 2.3 times in the combined disease group and 20% in patients with CGP group without comorbidities when comparing the performance of healthy individuals.

The content of the adhesive glycoprotein von Willebrand factor the surveyed individuals combined pathology has exceeded the original level by 41% (P<0.05), whereas the present study included patients with CGP, it was equal to 96.8 ± 6.74%, which is 15% higher than the comparison group, indicating thereby the influence of endogenous factors on the endothelial cells of the vascular wall.

Thrombomodulin is a membrane receptor of endothelial and increase of this indicator indicates a high activity prosthetic caused by thrombin. As can be seen from the presented results of the study (table 1), in patients with CGP in a combined syndrome of atherosclerosis showed a significant increase in the level of thrombomodulin on average by 41% (P<0.05) when compared with a group of healthy persons.

The analysis of the content of endothelin-1 in plasma showed an increase of its concentration in patients with CGP about 35% when compared with the group of healthy persons. The highest values of endothelin -1 in blood plasma was observed in the present study included patients with concomitant atherosclerosis, where its performance exceeded the values of the comparison
group in 3.3 times, and indicators of patients with CGP to 2.4 times (P<0.05).

Platelets strongly adsorbed to the site, devoid of endothelial lining on the background of dysfunction of the endothelial cells, which leads to an increase of active forms of blood platelets. The observed dynamics of the amount of active forms of thrombocytes in patients with CGP had a tendency to increase in average by 48%. The syndrome of atherosclerosis in this group of patients was accompanied by a significant rise in amount.

In recent years, much attention is paid to the study of biological activity of proteins belonging to the family of annexins. Annexin 5 and, like other annexins, does not stand out from normal cells. The source of extracellular annexin A5 is apoptotic compositions produced and destroyed cells. Analysis showed that a significant increase in the level of annexin A5 in patients with CGP an average of 1.5 times. The highest values of the level of annexin A5 was observed in patients with CGP in a combined syndrome of atherosclerosis, where its value exceeded the initial level more than 5 times (P<0.05), indicating a dysfunctional disturbance of the endothelial cells of the vascular wall.

Table 1: Biochemical parameters of thromboresistance the vascular wall in patients with CGP in combination of the syndrome of atherosclerosis.

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Comparison Group (healthy) n=12</th>
<th>Patients with CGP in average degree Without an atherosclerosis syndrome n=24</th>
<th>An atherosclerosis Syndrome n=28</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desquamated endothelial plasma 1×10⁴/l blood</td>
<td>2,74±0,19</td>
<td>3,03±0,18</td>
<td>* 6,41±0,42</td>
</tr>
<tr>
<td>The factor of Villebrand %</td>
<td>84,3±5,56</td>
<td>96,8±6,74</td>
<td>* 118,9±6,27</td>
</tr>
<tr>
<td>The maintenance of thrombomodulinum ng/ml</td>
<td>4,64±0,21</td>
<td>4,98±0,13</td>
<td>* 6,53±0,14</td>
</tr>
<tr>
<td>Endothelium - 1 plasma of blood p mol/l</td>
<td>1,61±0,13</td>
<td>* 2,18±0,16</td>
<td>* 5,34±0,32</td>
</tr>
<tr>
<td>The sum of active forms of thrombocytes %</td>
<td>12,4±0,79</td>
<td>* 18,4±0,91</td>
<td>* 26,4±0,81</td>
</tr>
<tr>
<td>Annexin A 5 ng/ml</td>
<td>0,85±0,09</td>
<td>* 1,24±0,12</td>
<td>* 4,59±0,27</td>
</tr>
</tbody>
</table>

The note: * - reliability of distinctions P<0.05.

CONCLUSION

Thus, we are observing a corrective relationship between increase level if desquamated endothelial cells, von Willebrand factor, thrombomodulin, endothelin – 1 reactive platelets and apoptotic compositions produced factor – annexin A5 in patients with CGP combined syndrome of atherosclerosis. Therefore, in the combined form of periodontal disease occurs endothelial dysfunction “run”, in turn, a syndrome of inflammation that must be considered when planning a set of measures of therapeutic interventions.

CONSENT: It is not applicable.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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COMPETING INTERESTS: Authors have declared that no competing interests exist.

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