Modern Aspects of Platelet Hemostasis In Inflammatory Parodontal Diseases

Davlatova D. D¹, Usmanova Sh.R ², Usmanov R.D³

¹,²,³Urgench Branch Of Tashkent Medical Academy Tashkent State Dental Institute.

*Corresponding author’s: Davlatova D. D

Abstract

The reasons for the chronization of periodontal tissue inflammation are still poorly understood, which determines the low effectiveness of preventive and therapeutic measures. The accumulated data allow us to consider the multifactorial nature of chronic generalized periodontitis as the most probable. The transition from health to disease occurs gradually and is accompanied by the depletion of the functional reserve and a decrease in the ability to adapt. Some research data are consistent with the modern understanding of the role of nervous, immune, hormonal, barrier mechanisms in the occurrence of CGP. The effectiveness of the dentist's work largely depends on the skills of integrative perception of the patient's health, a comprehensive assessment of the main parameters of homeostasis, background reactivity of the body. Highly effective diagnostic decisions should be made only on the basis of data from a wide range of diagnostic methods.

Keywords: Modern, Platelet

1. Introduction

Currently, dental practice has a wide range of methods and tools for the diagnosis and treatment of periodontal diseases, however, their use does not always lead to the expected result. Numerous studies have proven that endothelial dysfunction in periodontal tissues often leads to the formation of chronic inflammation and the development of persistent microcirculatory disorders. In the immunopathogenesis of CGP, a significant role is assigned to processes accompanied by an autoimmune reaction against periodontal antigens. The presence of common immunopathological processes in the pathogenesis of CGP and inflammatory diseases can be considered as another probable mechanism of the relationship between the formation of inflammatory-dystrophic changes in periodontal disease in patients with CGP. On the other hand, generalized degenerative-inflammatory lesions of the parotid tissues are an unsolved problem of practical dentistry. Local therapeutic measures in the oral cavity, as a rule, give a temporary effect and do not interfere with the progressive course of the disease, which convinces of the need to evaluate its pathogenesis from the standpoint of systemically acting mechanisms. The high prevalence of inflammatory periodontal diseases, the lack of methods of diagnosis and treatment of this pathology motivate the urgency of studying the problems of dental diseases [1.3.5.7.9.11.13.15.17].

The urgency of the problem also determines the need for further studies of the mechanisms of atherogenesis, including in periodontal diseases. All of the above mechanisms are obligate pathogenetic links in periodontal pathology. Chronic generalized periodontitis is the cause of tooth loss, including at a young age, and leads to changes in the chewing apparatus, violation of facial aesthetics, speech function, negative impact on the function of the digestive and other body systems. A close relationship of periodontal pathology with general diseases of the body has been established, which is confirmed by the high frequency (74%) of pathology of other organs and systems in patients with periodontitis. The functional and morphological relationship of the vessel walls and platelets is so close that it is combined into a single system, designated as vascular-platelet or primary hemostasis. Its violations are the cause of almost 80% of cases of bleeding and 95% of thrombosis. Platelet activation is an important stage in the development and progression of endothelial dysfunction.
Currently, it has been established that absolutely all cellular elements of the blood take part in thrombogenesis, but for platelets, the procoagulant function is the main one. The functioning of platelet hemostasis depends on the number of platelets in the bloodstream and their activity. The blood of healthy people contains 170-350x10^9 / l platelets. A decrease in their number below 80x10^9 / l contributes to bleeding, and an increase above 800x10^9 / l poses a threat of thrombosis. However, the qualitative composition of platelets circulating in the blood, the presence of inhibitors of their function in the blood, and the severity of disorders in the plasma hemostasis system are important. Objective: To study the features of endothelial dysfunction in patients with CGP with arterial hypertension.

2. Materials And Methods

65 people of both sexes aged 20 to 40 years (average age 35 years) were examined. All the study participants live in Uzbekistan. In women, the phase of the menstrual cycle was taken into account (studies were conducted in the first phase of the cycle). The choice of this age group was determined by the fact that the chronic course of periodontal diseases manifest in adulthood. In addition, by this time the dentition system and the entire complex of periodontal tissues have been fully formed. The condition of periodontal tissues was assessed according to clinical methods, in which patients' complaints, anamnesis of the main disease, the presence of occupational hazards, concomitant diseases were clarified. During an objective examination, the dental formula was fixed, the CPI index was calculated, the bite condition, the attachment of the bridles, the condition of the gums (color, swelling, bleeding), the presence of soft and hard dental deposits, hyperesthesia of the hard tissues of the teeth were determined, pathological mobility of the teeth was determined taking into account 4 degrees.

To study the state of the bone tissue of the alveolar processes, an X-ray examination was performed. The hygienic condition of the oral cavity was determined by the OHI-S index (Green, Vermillion, 1960), periodontal tissue inflammation - papillary-marginal-alveolar turkey - PMA (RagmanS., 1960), IR - degree of bleeding according to H.Mullemann and S.Son (1971), PI - degree of destruction of noA.Russel(1956), the depth of periodontal pockets was measured (WHO, 1990). The clinical condition of periodontal tissues was assessed using the Schiller-Pisarev test [2.4.6.8.10.12.14.16]. To solve the tasks, 65 people of both sexes aged from 20 to 45 years (average age - 35 years) were examined. All participants are divided into 2 groups

| Group 1 - (H) - norm. - 15 people with clinically healthy gums, preserved dentition and orthognathic bite, without pronounced acute and chronic somatic pathology. Periodontal was considered healthy in the absence of subjective complaints, index indices were normal, changes in the structure of bone tissue were not detected on radiographs. The group was a blood donor for control studies - (K). Group 2 - (CP) - 65 people diagnosed with chronic generalized periodontitis of moderate severity, remission. Patients of this group complained of bleeding gums, increased sensitivity of teeth to chemical and temperature stimuli, bad breath, mobility of teeth. During clinical examination, the depth of pathological dentoalveolar pockets varied up to 6mm. Deposits of supra- and subgingival tartar and plaque were noted. The indices corresponded to the average degree of periodontitis. Radiologically, with periodontitis, there is a decrease in the height of the alveolar process due to resorption of the bone tissue of the interalveolar septa.

The diagnosis was made using the International Classification of Diseases ICD-10. Chronic periodontitis. Code: K05.3 The average value of index indicators indicates significant disorders in periodontal tissues: OHI-So evaluates the hygienic condition of the oral cavity as unsatisfactory, CPU characterizes the high prevalence of caries, PMA characterizes the average degree of inflammation, significantly exceeds the norm, which indicates the destruction of periodontal tissues, IR - is high enough. Table Indicators of index evaluation of the oral cavity and periodontal condition in healthy people and chronic generalized periodontitis.

### Table 1

<table>
<thead>
<tr>
<th>Clinical indexes</th>
<th>Standard (n=15)</th>
<th>Parodontitis (n=65)</th>
</tr>
</thead>
<tbody>
<tr>
<td>OHI-S (Green-Wermillion)</td>
<td>1,1±0,55</td>
<td>2,0±2,75</td>
</tr>
<tr>
<td>KPU</td>
<td>0</td>
<td>8,0±1,5</td>
</tr>
<tr>
<td>PMA (Parma) %</td>
<td>0</td>
<td>46,18±4,2</td>
</tr>
<tr>
<td>PI no Russel</td>
<td>0</td>
<td>6,1±0,3</td>
</tr>
</tbody>
</table>
Based on these data, diagnoses were made: chronic generalized periodontitis of moderate severity. In order to objectify the assessment of the condition of periodontal tissues in patients with chronic periodontitis of moderate severity, generally accepted index indicators were used, which included the PMA -papillary-marginal-alveolar index; API- index of the approximal surfaces; SBI- index of bleeding of the dentoalveolar furrow; PI - periodontal index (table 2.).

Table 2: Index indicators of the state of periodontal tissues against the background of chronic periodontitis of moderate severity

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Healthy faces</th>
<th>Patients with CGP</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMA, %</td>
<td>1.14±0.02</td>
<td>24.18±2.08*</td>
</tr>
<tr>
<td>API, %</td>
<td>3.31±0.03</td>
<td>57.81±4.07*</td>
</tr>
<tr>
<td>SBI, %</td>
<td>3.42±0.09</td>
<td>61.23±4.65*</td>
</tr>
<tr>
<td>PI, points</td>
<td>0.07±0.03</td>
<td>4.02±0.20*</td>
</tr>
</tbody>
</table>

Note: *- confidence in relation to the norm when P<0.05.

The conducted studies have shown that all the indices used in patients with chronic periodontitis of moderate severity differed significantly from normal values. It was revealed that at the time of treatment of these patients to the clinic before the start of treatment, the PMA index exceeded the norm by 21.34% (p< 0.05). The hygiene index of the approximal surfaces also significantly exceeded the norm - by 16.98% (p<0.05). The bleeding index of the dentoalveolar furrow significantly exceeded the normal values in this group of patients by 14.56% (p<0.05). The periodontal index was 51.7 times higher than normal! The bleeding index of the dentoalveolar sulcus significantly exceeded the normal values in this group of patients by 15.26% (p<0.05). In the pathogenesis of microcirculation disorders in patients with chronic generalized periodontitis (CGP), an important role belongs to disorders in the vascular-platelet, coagulation links of the hemostasis system, as well as thromboresistance of the vascular wall endothelium. Disorders in the hemostasis system in this category of patients develop by the type of disseminated intravascular coagulation (DIC) of blood. Since there are significant gaps in our knowledge of the pathogenesis of periodontal diseases, more fundamental and invasive research is needed. To solve this problem, we decided to evaluate the thrombogenic potential of blood in CGP [19.21.23.25.26].

Thus, as a result of the conducted studies, it was found that in patients with chronic generalized periodontitis, there is a decrease in thrombosis resistance of the vascular wall, which is manifested by inhibition of anticoagulant and fibrinolytic activity of the endothelium. Changes in vascular endothelial thrombosis depend on the underlying disease, chronic generalized periodontitis. A decrease in the anticoagulant activity of the vascular endothelium in patients with periodontitis is manifested by inhibition of the release of antithrombin III by the vascular wall endothelium. Arginine- and lysine-specific cysteine proteases of Porphyromonas gingivalis are known to cause degradation and inactivation of thrombomodulin in endothelial cells of gum microvessels in patients with periodontitis. At the same time, it is known that thrombomodulin binding thrombin causes changes in the conformation of its active center, resulting in an increased rate of inactivation of its antithrombin III. On the other hand, it was found that a number of inflammatory cytokines, in particular, interleukin 1, as well as tumor necrosis factor, cause a decrease in anticoagulant activity of the vascular wall endothelium. In this regard, it is most likely that in patients with chronic generalized periodontitis, the decrease in anticoagulant activity of the vascular wall endothelium is due both to the direct influence of periodontopathogenic microflora and indirectly to the action of immune mechanisms implemented in a long-existing focus of inflammation [18.20.22.24.26].

4. Conclusion
In patients with CGP, it is accompanied not only by metabolic disorders on the part of periodontal tissues, but also by serious deviations in the physico-chemical parameters of the oral fluid, which is manifested by microcirculatory disorders caused by increased platelet aggregation activity and an imbalance of markers of endothelial dysfunction. Endothelial dysfunction in periodontitis is not
limited only to the microcirculatory bed of periodontal tissues, but is systemic in nature. In patients with CGP, there was a violation of thromboresistance of the vascular wall, where violations of both anticoagulant and fibrinolytic activity of the vascular endothelium predominate

References:
2. Адгезивные молекулы эндотелия сосудистой стенки / А.Н. Иванов, И.А. Норкин, Д.М. Пучинян // Успехи физиологических наук. - 2014.