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CYTOKINE PROFILE OF ORAL FLUID IN PATIENTS WITH CHRONIC PERIODONTITIS ASSOCIATED WITH ISCHEMIC HEART DISEASE

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Abstract: This article examines the cytokine profile of oral fluid in patients with chronic periodontitis associated with coronary heart disease. Levels of proinflammatory (TNF-α, IL-2) and anti-inflammatory (IL-10) cytokines, as well as lactoferrin, were analyzed. Increased concentrations of proinflammatory mediators and decreased IL-10 levels were found, indicating a significant imbalance in local immunity and chronic inflammation. These findings highlight the pathogenetic role of cytokine imbalances in the comorbidity of chronic periodontitis and coronary heart disease and can be used to support combination therapy.
Key words: chronic periodontitis, coronary heart disease, cytokines, oral fluid, TNF-α, IL-2, IL-10, lactoferrin, inflammation.

Introduction. Periodontal diseases remain one of the most pressing and socially significant issues in modern dentistry due to their high prevalence, chronic, progressive course, and close relationship with somatic pathology. In recent years, particular attention has been paid to the interaction between chronic periodontitis and cardiovascular diseases, particularly coronary heart disease (CHD), which share common pathogenetic mechanisms, including systemic inflammation, endothelial dysfunction, and immune disorders (1, 2, 5, 11).
Chronic periodontitis is considered not only a localized inflammatory disease but also a source of persistent bacterial and cytokine load, contributing to the progression of the atherosclerotic process and the aggravation of coronary heart disease. In turn, coronary heart disease, accompanied by microcirculatory disorders, tissue hypoxia, and altered immune response, exacerbates inflammatory and destructive processes in periodontal tissues (3, 6, 12).
One of the key mechanisms linking chronic periodontitis and coronary heart disease is an imbalance in the cytokine profile. Excessive production of proinflammatory cytokines, such as tumor necrosis factor-α (TNF-α) and interleukin-2 (IL-2), as well as decreased levels of anti-inflammatory mediators, particularly interleukin-10 (IL-10), lead to the maintenance of chronic inflammation, activation of lipid peroxidation, and a decrease in the body's antioxidant defenses. These changes contribute to both the destruction of periodontal tissue and the progression of cardiovascular disease (7, 8, 10, 13).
Thus, the study of the cytokine profile of oral fluid in patients with chronic periodontitis against the background of coronary heart disease is a relevant and promising area that allows for a deeper understanding of the mechanisms of local and systemic inflammation and the substantiation of new approaches to complex pathogenetic therapy.
The aim of the study was to examine the dynamics of cytokine profile parameters in oral fluid in patients with chronic periodontitis associated with coronary heart disease.
Research materials and methods. Clinical studies were conducted at the Department of Hospital Therapeutic Dentistry at the Tver State Institute of Dentistry (TSSI) from 2020 to 2022. A total of 112 patients aged 25 to 60 years with moderate to severe chronic generalized

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periodontitis associated with coronary artery disease were examined. The average age of the subjects was 46.7 ± 1.45 years.

To assess the state of local immunity of the oral cavity and the activity of the inflammatory process, the levels of proinflammatory cytokines - interleukin-2 (IL-2), tumor necrosis factor-α (TNF-α), as well as the anti-inflammatory cytokine - interleukin-10 (IL-10) in oral fluid were studied.

Unstimulated oral fluid was collected in the morning on an empty stomach by spitting into a sterile 5 ml tube. Patients were given prior instructions not to eat, brush their teeth, use mouthwash, smoke, or apply lip products.

The obtained samples were frozen at a temperature of -18 °C, stored in an upright position and defrosted once immediately before laboratory testing.

Quantitative determination of TNF-α, IL-2 and IL-10 in oral fluid was performed by enzyme-linked immunosorbent assay (ELISA) using mono- and polyclonal antibodies to the corresponding human cytokines.

Statistical processing of the results was carried out using Microsoft Office Excel (version 15.0).

Results and discussion. It is known that immune disturbances in chronic periodontitis and cardiovascular diseases are underpinned by defects in cytokine regulation, which determine the nature and severity of the inflammatory response. Proinflammatory cytokines, such as TNF-α and IL-2, play a leading role in the activation of immune cells, increased vascular permeability, and destruction of periodontal connective tissue.

In the course of the conducted studies, it was established that in patients with chronic periodontitis against the background of ischemic heart disease, there is a significant increase in the levels of TNF-α and IL-2 in the oral fluid against the background of a marked decrease in the concentration of IL-10, which indicates the predominance of pro-inflammatory reactions and the insufficiency of anti-inflammatory mechanisms (Fig. 1).

Before treatment, average proinflammatory cytokine levels in patients with chronic periodontitis associated with coronary heart disease were significantly higher than in the control group. TNF-α levels were 1.35 times higher, and IL-2 levels were 1.61 times higher, indicating a highly active chronic inflammatory process in periodontal tissues.

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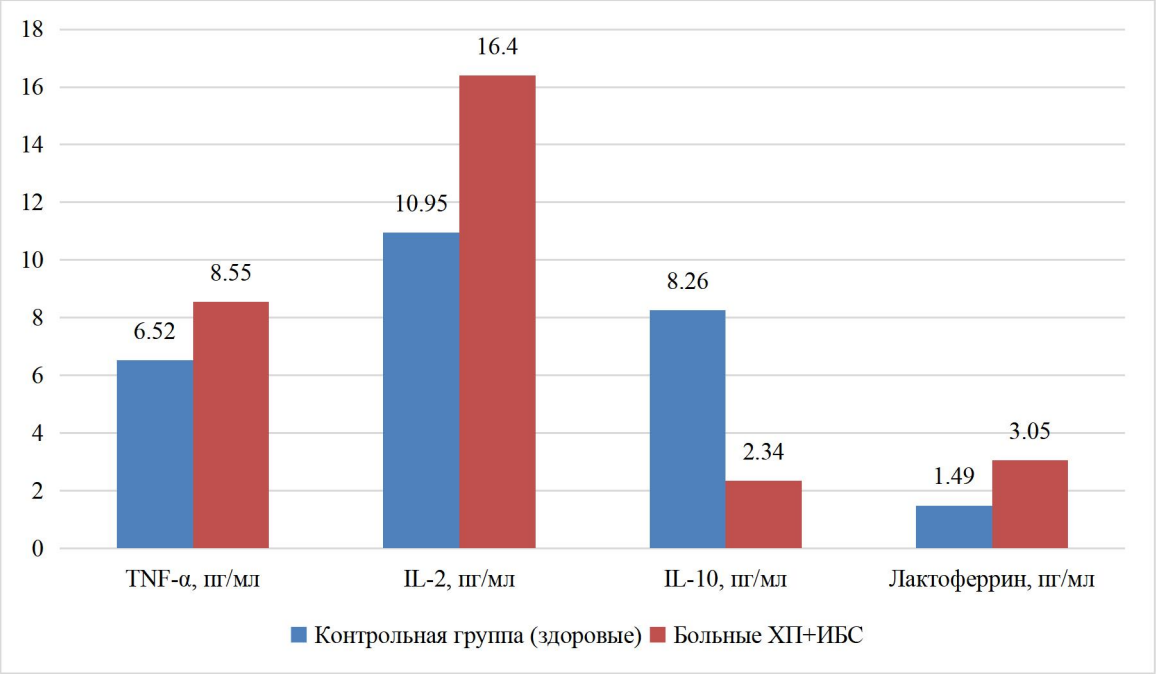

Fig. 1. Dynamics of cytokine profile parameters of oral fluid in patients with chronic periodontitis against the background of coronary heart disease

A 3.5-fold decrease in IL-10 concentration compared to control indicates a deficiency in anti-inflammatory regulation and contributes to the maintenance of prolonged inflammation. Given the role of IL-10 in inhibiting the production of TNF-α, IL-1β, and IL-12, its deficiency can be considered a key factor in the progression of periodontitis and the exacerbation of systemic inflammation in coronary heart disease.

Additionally, a significant increase in the level of lactoferrin in oral fluid was revealed, which reflects the activation of the neutrophilic component of the immune system and can be considered as a marker of the intensity of inflammatory reactions in the periodontium.

Conclusion. Thus, patients with chronic periodontitis associated with coronary heart disease exhibited a significant cytokine imbalance, manifested by increased concentrations of the proinflammatory cytokines TNF-α and IL-2, lactoferrin, and decreased levels of the anti-inflammatory IL-10 in oral fluid. These data confirm the important role of cytokine imbalance in the pathogenesis of periodontitis associated with coronary heart disease and substantiate the need for a comprehensive, interdisciplinary approach to the diagnosis and treatment of this patient population, taking into account both their dental and somatic status.

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