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SIGNIFICANCE OF SALIVARY BIOMARKERS IN THE DIAGNOSIS OF PERIODONTAL DISEASES

Usmonov Baxtiyorjon Arobidin ugli
ASMI, Head of Department of Therepeutical Dentistry

Mingboyeva Noxlaroyim Xolmurod kizi
Resident of Department of Therepeutical Dentistry

Abstract
Oral fluid is a unique biological medium. Determination of parameters in oral fluid has a number of advantages over traditional blood testing methods: non-invasiveness, atraumaticity for the patient, absence of stress inherent in venipuncture; easier storage and transportation conditions due to the liquid state (unlike whole blood, which is subject to coagulation processes); the ability to obtain the required amount of biological material; the absence of the need for qualified personnel and special equipment when obtaining oral fluid, which allows its practical use in express laboratories of various directions. Despite the attention paid to the diagnostic value of oral fluid, the problems of studying its parameters are mainly due to the lack of systematized data on the role of specific biomolecules in the diagnosis of diseases in clinical practice. The lack of highly sensitive diagnostic systems also affects. However, interest in the study of oral fluid has not subsided at present, and a number of works are devoted to non-invasive research methods.

Keywords: Periodontal diseases, salivary biomarkers, coronavirus pathology, iterleukins.

Introduction

Despite the attention paid to the diagnostic value of oral fluid, the problems of studying its parameters are mainly due to the lack of systematic information about the role of specific biomolecules in the diagnosis of diseases in clinical practice. The lack of highly sensitive diagnostic systems also affects. However, interest in studying oral fluid has not faded and a number of works are devoted to non-invasive research methods (Nikolenko V.N., 2013; Mal M. 2016; Malon R.S., Sadir S., 2014).

The adopted term "salviomics" (salivaomics) emphasizes the rapid development of knowledge about the various components of oral fluid, namely its proteome, transcriptome, metabolome and microbiome (Kaczor-Urbanowicz K.E., Martin Carreras-Presas C., K., 2017). Every year, the world's leading manufacturers of diagnostic test

systems create new kits for the detection of various markers, primarily by immunoenzymatic analysis. Also, methods such as traditional spectrophotometric, spectrofluorometric methods, electrochemical luminescence, gas chromatography, immunochromatography, mass spectrometry and crystalloscopy are used to determine the metabolic parameters of oral fluid (Shabalin V.N., 2015; Hartman M.L., Groppo F., Ohnishi M., 2013). Analysis of databases created in order to expand the view of clinical experts on the information about the components of oral fluid can help to search for new markers of diseases.

Based on the above, studying the role of salivary biomarkers in the diagnosis and treatment of periodontal diseases is an urgent problem.

Research material and methods:

The study uses a prospective longitudinal design to collect data on periodontal parameters (pocket depth, degree of clinical attachment, bleeding on probing) and salivary biochemical markers at baseline and after treatment. Salivary biomarkers studied in this project include interleukin-1 beta (IL-1β), tumor necrosis factor alpha (TNF-α), matrix metalloproteinase-8 (MMP-8), osteocalcin, and alkaline phosphatase. These biomarkers have previously been identified as potential markers for periodontal disease, inflammation, bone turnover, and tissue repair. Additional biomarkers may be included based on literature review and experimental results.

Participants are collected from the clinic and divided into three groups. The sample size was calculated based on power analysis to ensure statistical significance.

The study included 60 patients who applied to the clinical base of the Department of Therapeutic Stomatology of Andijan State Medical Institute, 20 of which were healthy patients without periodontal diseases. The material for the analysis and conclusions was the results of examination of 60 patients with coronovirus infection (KI) aged 30 to 55 years and duration of the disease from 1 to 2 years. According to the used treatment methods, all patients were divided into 2 groups:

Group 1 underwent traditional treatment procedures.

Group 2 - additional treatment procedures with physiotherapy were carried out against the background of traditional treatment.

Clinical, biochemical, microbiological and immunological research methods were used in the study. Data will be analyzed using descriptive and differential statistics, including t-tests and mixed effects models, to compare changes in periodontal parameters and biochemical profiles between the 3 groups.

Summary:

1. Changes in the levels of salivary biomarkers affect the deterioration of periodontal health: KPO indices increased from 4.2 ± 1.1 to 6.5 ± 1.5 ($p < 0.05$), OHI-S increased from

1.2 ± 0.3 to 4.84 ± 0.12 (p < 0.5), SBI index from 0.10 ± 0.005 to 5.70±0.22 (p<0.05), and PCh index increased from 0.9±0.2 to 4.84±0.09 (p<0.05).

2. The average loss of alveolar bone tissue was 2.3 ± 0.5 mm, which is twice that of the control group. 73% of patients have signs of resorption of cortical and trabecular bone tissue, and 60% have periodontal pockets with a depth of more than 5 mm, which confirms the presence of periodontitis. Osteoporosis and periapical changes were observed in 15% of cases, suggesting a complex interaction between infection and bone health.

3. A significant increase in pro-inflammatory cytokines was observed with increasing severity of chronic periodontitis: TNF-α in oral fluid increased by 105.79% (mild), 247.38% (moderate) and 441.02% (severe) (p < 0.01); IL-1b-198.96%, 347.58% and 425.15% (p<0.01); IL-6 increased by 203.60%, 302.45% and 375.85% (p < 0.01). IL-10 concentration decreased by 41.30% (moderately severe) and 60.70% (severely) (p < 0.01), which showed a balance against pro-inflammatory cytokines.

4. Decreased oral resistance in patients with coronavirus pathology can increase the severity of periodontal diseases. An increase in the activity of secretory immunoglobulin A (sIg A) in saliva +36.7% (P< 0.01) is associated with a decrease in lysozyme by 39.7% and phagocytic activity of neutrophils by 45.86%. These changes weaken oral defenses, weaken defense mechanisms against infections.

5. The study showed that the number of high-frequency bacteria was significantly increased in patients with coronavirus infection: 95% compared to 30% in the control group, and Fusobacteria in 70% compared to 90%. The number of Peptostreptococcus SP is lower: 60% compared to 65%. Actinobacillus prevailed among aerobes and facultative species, their number was on average 5.08 ± 0.25 LG Koe / ml, E coli - 4.61 ± 3.0 LG Koe / ml and Candida - 3.92 ± 0.17 LG Koe / ml. Porphyromonas, Bacteroides, Actinobacillus and gram-negative bacteria dominated in saliva and periodontal pockets, which indicated an imbalance of bacterial balance in the oral cavity.

6. Taking into account salivary biomarkers in the complex treatment of periodontitis in patients with coronavirus infection helped to increase the overall effectiveness of treatment by 22.61% and reduce its duration by 7.15 days, which helps patients recover faster and improve oral health.

References

1. Yusupalikhodjaeva S. H., Bekjanova O. E. Pathogenetic aspects of treatment of periodontitis associated with candida infection in patients with diabetes mellitus //European science review. – 2016. – №. 1. – С. 134-135.
2. Yusupalikhodjaeva S. H., Bekjanova O. E. Background diseases at patients with candidiasis of oral cavity mucosa //European Science Review. – 2018. – №. 3-4. – С. 215-219.
3. Адамян Л. В. и др. Организация оказания медицинской помощи беременным, роженицам, родильницам и новорожденным при новой коронавирусной

инфекции COVID-19. – 2020 //Методические рекомендации Версия 1 (24.04.2020), С.61.
4. Барбараш О.Л., Каретникова В.Н., Кашталап В.В. и др. Новая коронавирусная болезнь (COVID-19) и сердечно-сосудистые заболевания // Комплексные пробл. сердечно-сосуд. заболеваний. – 2020. – Т. 9, №2. – С 17-28
5. Бубнова М.Г., Аронов Д.М. COVID-19 и сердечно-сосудистые заболевания: от эпидемиологии до реабилитации // Пульмонология. – 2020. – Т. 30, №5. – С. 688-699.
6. Беженарь В.Ф.и др. Спорные вопросы акушерской тактики при ведении беременности и родоразрешении пациенток с новой коронавирусной инфекцией COVID-19 //Акушерство и гинекология. – 2020. – Т. 5. – С. 13-21.
7. Бельская Л.В. Возможности применения слюны для д иа гностики онкологических заболеваний. Клиническая лабораторная диагностика. 2019; 64 (6):333-336
8. Бекжанова О. Е., Юсупалиходжаева С. Х. Микробиоценоз полости рта при инвазивной кандидозной инфекции слизистой оболочки полости рта и пародонта //Актуальные проблемы стоматологии детского возраста и ортодонтии. – 2017. – С. 13-16.