

## Parallels of Clinical and Immunological Parameters in Patients With Bronchial Asthma

**Makhkamova O. A**

*PhD, assistant of the Department of Hospital Therapeutic Dentistry of the Tashkent State Medical University*

**Daminova N. R.**

*PhD, associate professor of the Department of Hospital Therapeutic Dentistry of the Tashkent State Medical University*

**Abstract:** Bronchial asthma and rapidly progressing periodontitis occupy an important place among the population, leading to serious socio-medical and economic consequences, and in severe cases even to disability. Currently, nonspecific diseases of the respiratory system in combination with aggressive periodontitis account for 17.7-28.0% of cases. Evaluation of immunological, clinical and respiratory status indicators in the group of patients with rapidly progressive periodontitis in combination with bronchial asthma revealed that in patients the indicators of the physical condition and ventilation capacity of the lungs were reduced, and the emotional state was tense compared to a group of healthy individuals. Bronchial asthma is characterized by rapid progression of concomitant periodontitis, deterioration of the quality of life and breathing, as well as an improvement in the ventilation and perfusion condition.

**Keywords:** bronchial asthma, rapidly progressive periodontitis, immunological, clinical status, exercise tolerance, emotional state, respiratory dysfunction.

### Introduction

In recent years, bronchial asthma (BA) in combination with rapidly progressing periodontitis (RPP) has been recognized as one of the most pressing medical problems among the population, with serious socio-medical and economic consequences, in severe cases leading to disability. Currently, "... a combination of chronic nonspecific diseases of the respiratory system and STD is observed in 14.7-21.0% of cases ..." [4]. According to "... data from the World Health Organization, tooth loss from gum diseases develops 6 times more often than with complications of caries and ranks second in prevalence..." [3,5]. Improving the effectiveness of early diagnosis, prevention, and treatment of STD in asthma is one of the urgent problems facing medical professionals today [1,2].

A number of studies are being conducted worldwide aimed at studying dental problems such as combined periodontal and internal organ lesions. They occupy a prominent place, since this kind of pathology is characterized by a mutually aggravating course of diseases due to the close functional relationship between the affected organs [6,7]. At the same time, in patients with asthma, rapidly progressing periodontitis is a factor that determines the unfavorable course of the disease and a sharp decrease in the quality of life (QOL) of patients. The mechanism of RPP in AD remains unclear and requires further study of the role of the local immune system in the progression of RPP [8]. In this regard, important tasks are to identify pathogenetically related aspects of the imbalance of local microbiocenosis, endothelial dysfunction, with ventilation and perfusion disorders of lung ventilation, psych emotional regulatory factors, the development of BPP in asthma, assessment of quality of life, and the development of basic criteria for predicting exacerbations of early diagnosis of RPP.

In addition, it is known that the effects of immunological imbalance and respiratory dysfunction on the development of rapidly progressive periodontitis in asthma are the main ones. It has been shown that

all available factors can cause additional damage to the periodontal and respiratory system, as well as the consequences of remodeling and reparative processes in the oral mucosa.

## Methods

The group of examined patients includes 52 patients with rapidly progressive periodontitis (RPP) in combination with asthma. The comparison group consisted of 20 patients with rapidly progressing periodontitis without somatic pathology, the control group consisted of 25 practically healthy individuals with intact periodontitis. The age of the examined patients with periodontitis ranged from 37 to 66 years (the average age in the main group was  $54.32 \pm 0.84$  years, in the comparison group -  $46.23 \pm 1.12$  years).

After the initial examination, all patients with periodontitis and asthma were divided into two groups: group 1 consisted of 44 patients with periodontitis on the background of asthma, who underwent only standard dental treatment and therapy for exacerbation of asthma, group 2 included 45 patients with periodontitis on the background of asthma, who received dental treatment, basic therapy BA, resonance therapy resonance therapy (resonance therapy with narrow-spectrum IR emitters locally, 2 times a day for 6 minutes) and propolis tincture (PT) (propolis tincture 25 ml OOO "RADIKS" Uzbekistan gum application for 30 minutes x 2 times a day, 30 minutes after meals) against the background of basic therapy. A dynamic examination was performed on the 10th day after the start of treatment (assessment of dental status), 1 month after the start of therapy (survey, clinical laboratory, immunological examination).

The structure of basic therapy was as follows:

beta-agonists +anticholinergic inhaler were taken by 59% of patients, antileukotrienes - 58% of patients, methylxanthines - 56% of patients, beta-agonists - 41%, glucocorticosteroids - 41%, PT - 26%, resonance therapy with narrow-spectrum IR emitters - 27%, ozone therapy - 24%, Antimicrobials for local treatment of oral diseases - 3%, medications for local anesthesia – 7%, and all patients also received massage, breathing exercises, and psychotherapy.

The general clinical examination of all patients before and after 10 days of complex therapy included the following: assessment of general clinical parameters according to the point system; objective physical examinations, general analysis of blood, urine and sputum;

The clinical examination of all participants was conducted according to generally accepted methods, taking into account recommendations (2016). An objective assessment of the condition of periodontal tissues was carried out using the following indices: hygienic (OHI-S, Green J.C., Vermillion J.R., 1964), periodontal (PI, Russel A., 1956) and papillary-marginal-alveolar (PMA, Parma G., 1960, hygienic index Silness-Loe, bleeding index Muhlemann-Cowell ).

The clinical study analyzed: periodontal symptoms of varying intensity - pain, inflammation of periodontal tissue, bleeding, purulent discharge from the dento-gingival - periodontal pockets and changes in their structure (IC), bad breath (BP), redness of periodontal tissue, pathological mobility of teeth and their displacement. 6-minute walking test (6 MWD); quality of life testing using a modified Seattle questionnaire; assessment of the function of external respiration (FVD) using spiograph, pneumotachograph with registration of the flow-volume loop and computer calculation of indicators for assessing vital capacity (FVC), forced expiratory volume in 1 second (FEV1) and the Tiffno index (FEV1/FVC) "Medicor" (Hungary). To study the reversibility of obstructive ventilation disorders, an inhaled pharmacological test with beta-agonists was used in the initial study; blood oxygen saturation (SaO<sub>2</sub>) was assessed by pulse oximetry using an OXY device (Germany); The psychoemotional status of patients was determined according to psychological testing data using the Spielberger-Khanin scale.

A sufficient amount of research provided an opportunity for a representative analysis of the material from various perspectives. Statistical processing of the research results was carried out using modern computing systems such as IBM using a package of standard programs.

## Results and Discussions

Cellular factors of local protection of the oral cavity have been identified: epithelial cells and leukocytes, which are located in saliva and gingival fluid. 95-97% of these cells are neutrophils, 1-2% are lymphocytes and 2-3% are monocytes. It was found that an increase in the number of epithelial-like cells is a marker of the destruction of the dentosalveolar junction and increased microbial contamination of cells. The number of polymorphonuclear leukocytes correlates with the number of epithelial cells, neutrophils and lymphocytes, respectively,  $r=0.30$ ;  $r=0.36$  and  $r=0.31$  ( $p<0.05$ ), that is, they are parallel to the severity of the inflammatory process in the periodontal tissue.

### Immunological parameters of patients with asthma combined with BPP of varying severity ( $M \pm m, \%$ ).

ABUSE rates	HP n=30	BA+RPP n=22
Ig A g/L	$0,9 \pm 0,10$	$0,4 \pm 0,15^*$
IgM g/L	$0,4 \pm 0,03$	$0,2 \pm 0,11^*$
IgG g/L	$16,1 \pm 0,31$	$23,3 \pm 0,30^*$
Antigen-binding lymphocyte g/L	$3,6 \pm 0,22$	$8,8 \pm 0,31^*$
Leukocytes thousand/ml	$6,1 \pm 1,31$	$4,3 \pm 1,11^*$
T-lymphocyte	$53,9 \pm 1,4$	$27,3 \pm 1,3^*$
CD4+	$18,1 \pm 0,62$	$7,8 \pm 0,21^*$
CD8+	$9,8 \pm 0,21$	$6,1 \pm 0,12^*$
CD16+	$28,5 \pm 1,82$	$56,3 \pm 0,34^*$
	$17,3 \pm 0,5$	$9,3 \pm 0,34^*$

Note: \*-  $p<0.05$  the confidence between the indicators of HP

A characteristic feature of microbial damage to periodontal tissue is cellular infiltration, represented by plasma cells, lymphocytes, eosinophils and neutrophils. This is indirectly interpreted about the activity and severity of inflammation by the predominance of certain cellular elements. Thus, it was analyzed that out of 10, in 5 cases, there was a high degree of activity of the inflammatory process, where neutrophil granulocytes of the gingival mucosa were subjected to degranulation. These degranulation of neutrophilic granulocytes of the periodontal mucosa has been observed in patients with asthma combined with BPP who have been receiving inhaled medications for a long time in the SGCs+iGCS regimen, which is a sign of a sharp decrease in the antimicrobial function of the gingival mucosa. Due to the chronic process, a sharp decrease in the antimicrobial function of neutrophil granulocytes and pronounced leukocyte and lymphocyte infiltration were detected mainly in the PC zones.

The analysis of the data coincides with the opinion of the researchers that polymorphonuclear leukocytes play a protective role due to their bactericidal function, which is reduced with RPP. They also trigger the release of multiple tissue-destroying agents: free radicals and proteases, activate platelets, which, interacting with the vascular endothelium and underlying tissues, cause their destruction, and platelet conglomerates can block microvessels.

## Conclusions

Cellular factors of local protection of the oral cavity are epithelial cells and leukocytes, which are found in saliva and gingival fluid, from them. 95-97% of the cells are neutrophils, 1-2% are lymphocytes and 2-3% are monocytes. An increase in the number of epithelial-like cells is a marker of the destruction of the dentogastric junction and increased microbial contamination of cells. At the same time, the number of polymorphonuclear leukocytes correlates with the number of epithelial cells, neutrophils and lymphocytes, parallel to the severity of the inflammatory process in periodontal tissue.

If 41% of patients with BA+RPP have severe, and 9% have an aggressive form of rapidly progressive periodontitis, then in patients with BA the indicators are statistically significantly lower and amount to

8% and 1%, respectively. It was also revealed that in patients with varying severity of periodontal damage, compared with mild periodontitis, intact periodontitis exceeds by 15.5%.

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