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Clinical-Laboratory Characteristics of Chronic Generalized Periodontitis in Patients with Infiltrative Pulmonary Tuberculosis (TB) with Various Drug Susceptibility.

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RATIONALE

The paper is devoted to the problem of periodontal inflammatory-destructive processes, which are considered to be one of the acute issues in the structure of oral diseases [2, 7]. Nowadays chronic generalized periodontitis is the most essential problem in modern dentistry especially in patients with co-morbidities due to likely mutually aggravating clinical courses of the medical conditions [4, 5, 8]. Currently tuberculosis continues to remain one of the most challenging global issues. Despite the decrease and stabilization of epidemiological TB data the Russian Federation is still among 22 countries carrying the highest TB burden. It should be mentioned that special attention is paid to medical care for patients with multiple-drug resistant tuberculosis (MDR-TB) [3, 6, 9, 10]. However, there are almost no available research data emphasizing peculiarities of chronic generalized periodontitis in patients with MDR-TB, except for the fact that in case of infiltrative TB the evidence of clinical symptoms of mild chronic generalized periodontitis is relevant to the research data obtained in case of focal pulmonary TB investigations [1, 11, 12].

Keywords: periodontitis, tuberculosis, drug susceptibility.

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The aim of study:

To investigate peculiarities of chronic generalized periodontitis in patients primarily diagnosed with infiltrative pulmonary TB of various drug susceptibility before and after the intensive phase of chemotherapy.

MATERIALS AND METHODS

80 patients with chronic generalized periodontitis were included in the study. All patients were divided into three groups. Group I consisted of 29 patients with mild chronic generalized periodontitis, who were primarily diagnosed with infiltrative pulmonary TB susceptible to rifampicin and isoniazid being basic antituberculous preparations. Group II consisted of 26 patients with mild chronic generalized periodontitis, who were primarily diagnosed with infiltrative pulmonary MDR-TB. All patients diagnosed with pulmonary TB were treated in the Voronezh N.S.Pohvisneva Clinical TB Hospital. Group III (comparison) consisted of 25 patients with mild chronic generalized periodontitis, who did not have pulmonary TB. Patients in all groups were comparable in their gender and age. Patients of group I received chemotherapy on the Regimen 1 (rifampicin, isoniazid, pyrazinamide, ethambutol) for 2.5-3 months; patients of group II received chemotherapy on the Regimen IV (capreomycin, levofloxacin, pyrazinamide, cycloserine, prothionamide) for 8 months.

“Mild chronic generalized periodontitis” was diagnosed according to classification adopted by XVI All-Union Dentistry Meeting (1983) and amended by Presidium of the Periodontal Department of the Russian Dental Association (2001). When diagnosing and specifying the severity of a condition the following index findings were used: gingival bleeding index (Muhleman H., Son S., 1971), papillary marginal alveolar (PMA) index (Parma C., 1960), hygienic index (HI) (O’Leary, 1972) considering plaque amount on four teeth surfaces (vestibular, oral, mesial and distal), periodontal index (PI) (Russel A., 1967).

Diagnosis “infiltrative TB” and drug resistance of *Mycobacterium tuberculosis* were specified on the basis of standardized clinical-laboratory and X-ray techniques according to the Order No. 109 of the Ministry of Healthcare of the Russian Federation, 21 March 2003, and Order No. 951 of the Ministry of Healthcare of the Russian Federation, 29 December 2014.

Cellular structure of crevicular fluid and gingival crevicular blood were investigated in all patients. After air drying and fixation smears were stained using Romanovsky-Giemsa stain technique. The number of cell elements per 100 cells and in the field of vision were estimated. Clinical-laboratory characteristics of chronic generalized periodontitis in patients with primarily diagnosed infiltrative pulmonary TB were evaluated in dynamics: at the beginning and 3 months after the intensive phase of chemotherapy. Duration of the intensive phase of chemotherapy resulted from the resistance of *Mycobacterium tuberculosis* to basic antituberculous preparations and was regulated by the Order No. 951 Ministry of Healthcare of the Russian Federation, 29 December 2014.

Statistical data were processed using software programs Statistica 8.0 (StatSoft, Inc.), Biostatistics 4.03 (McGrawHill), Excel 2007 (Microsoft, Corp.), Windows Vista (Microsoft, Corp.). Statistical significance of the compared values was estimated according to the Student’s t-test and was considered to be valid in p less than 0.05.

RESULTS AND DISCUSSION

At the beginning of chemotherapy a clinical picture of chronic generalized periodontitis in patients of groups I and II (complaints, index findings) was slightly more expressed without any significant differences from patients with chronic generalized periodontitis having no TB (Table 1).

Table 1: Index findings supporting periodontitis in the examined patients

Findings	Patients' groups				
	Group I (n=29)		Group II (n=26)		Group III (n=25)
	On admission	After the intensive phase	On admission	After the intensive phase	On admission
gingival bleeding index	1,76±0,12	2,45±0,05*	1,75±0,05	2,44±0,08*	1,72±0,08
Papillary marginal alveolar (PMA) index, %	26,5±0,5	43,9±1,1*	26,7±1,1	42,7±0,05*	26,3±1,31
hygienic index (HI), %	43,5±0,5***	67,7±0,7*	45,7±1,1** ***	66,2±0,8***	41,8±0,8
periodontal index (PI)	0,78±0,06	2,96±0,08***	0,77±0,04	3,02±0,06** ***	0,74±0,04

Note: * - statistical significance of findings before and after treatment is valid, $p < 0.05$; ** - statistical significance of findings of Groups I and II is valid, $p < 0.05$; statistical significance of findings is valid when compared to Group III, $p < 0.05$.

Analysis of laboratory data performed at the beginning of treatment in patients with chronic generalized periodontitis co-morbid with infiltrative pulmonary TB demonstrated that significant differences were observed in a cytogram of gingival crevicular blood of these patients ($p < 0.05$) in comparison to patients with chronic generalized periodontitis having no TB (Table 2). Prevalence of neutrophilic leucocytes (leucocytosis) over granulocytes was observed in patients of groups I, II and III due to exacerbation of chronic generalized periodontitis.

Table 2: Cytogram of gingival crevicular blood of the examined patients

Number of cell elements, per 100 cells	Patients' groups				
	Group I (n=29)		Group II (n=26)		Group III (n=25)
	On admission	After the intensive phase	On admission	After the intensive phase	On admission
Neutrophils	85,7±2,4***	89,9±0,9*	86,1±1,7***	91,1±1,7*	81,0±4,9
Monocytes	5,5±0,2***	7,7±1,1*	5,7±1,1***	8,1±1,3*	3,0±0,3
Lymphocytes	1,8±0,05***	2,5±0,05*	1,7±0,07***	2,7±0,08*	0,22±0,01

Note: * - statistical significance of findings before and after treatment is valid, $p < 0.05$; ** - statistical significance of findings of Groups I and II is valid, $p < 0.05$; statistical significance of findings is valid when compared to Group III, $p < 0.05$.

A significant increase number of monocytes, lymphocytes and neutrophils in gingival crevicular blood cytograms in patients of groups I and II supported the presence of periodontal inflammatory process developing into chronic one after the intensive phase of treatment ($p < 0.05$).

When investigating crevicular fluid cytograms, *Candida albicans*, epithelial cells and macrophages were reported to appear in gingival pockets in patients of groups I and II significantly more often than in patients of group III (Table 3).

Table 3: Findings of crevicular fluid cytogram in the examined patients

Findings	Patients' groups				
	Group I (n=29)		Group II (n=26)		Group III (n=25)
	On admission	After the intensive phase	On admission	After the intensive phase	On admission
Epithelial cells	64,2±0,2***	70,2±0,5\$	63,9±0,1## ***	71,3±0,7\$	61,0±0,1
Candida albicans	More than 10 cell colonies in the field of vision	More than 15 cell colonies in the field of vision	More than 15 cell colonies in the field of vision	More than 20 cell colonies in the field of vision	From 2 to 7 cell colonies in the field of vision
Macrophages	4,1±0,1***	5,2±0,7	3,9±0,3##***	5,1±0,5	2,1±0,2

Note: \$- statistical significance of findings before and after treatment is valid, $p < 0,05$; ##- statistical significance of findings of groups I and II is valid, $p < 0,05$; ***- statistical significance of findings compared to group III is valid, $p < 0,05$.

On admission the number of macrophages in patients of group II (3.9 ± 0.3) was significantly lower than in patients of group I (4.1 ± 0.1). The number of epithelial cells in patients of group I constituted 64.2 ± 0.2 , the amount of *Candida albicans* was more than 10 cell colonies in the field of vision; in patients of group II – 63.9 ± 0.1 and more than 15 colonies in the field of vision, respectively. In the comparison group the number of epithelial cells amounted to 61.0 ± 0.1 , *Candida albicans* – from 2 to 7 cell colonies in the field of vision, macrophages – 2.1 ± 0.2 . Epithelial cells were registered in cytograms of all patients, however, in the crevicular fluid of patients of groups I and II these cells were binuclear with enlarged nuclei compared to patients of group II; this fact proved their proliferation. Coccal flora prevailed in crevicular fluid of all patients.

After completion of the intensive phase of chemotherapy clinical signs of periodontitis were significantly aggravated in patients of groups I and II in spite of the control of individual oral hygiene: gingival bleeding index, papillary marginal alveolar (PMA) and periodontal indexes increased, hygienic index raised. Periodontal index values in patients of group II were significantly higher after the completion of the intensive phase of chemotherapy in comparison with patients of group I (Table 1). Significant changes of cytogram, i.e. the increase level of neutrophils, monocytes and lymphocytes, were registered when examining gingival crevicular blood in patients of groups I and II (Table 2). Examination of crevicular fluid in these groups of patients after the completion of the intensive phase of chemotherapy demonstrated significant increase amount of epithelial cells, macrophages and *Candida albicans* fungal colonies. In patients of group I the number of epithelial cells constituted 70.2 ± 0.5 , macrophages – 5.2 ± 0.7 , *Candida albicans* – more than 15 cell colonies in the field of vision; in patients of group II – 71.3 ± 0.7 , 5.1 ± 0.5 and more than 20 cell colonies in the field of vision, respectively.

The course of mild chronic generalized periodontitis on the background of infiltrative pulmonary TB was characterized by more often exacerbation of the condition in comparison to group of patients with chronic generalized periodontitis having no co-morbidity.

CONCLUSION

In contrast to patients having no TB, all patients with infiltrative pulmonary TB manifested more apparent clinical-laboratory changes of mild chronic generalized periodontitis after the completion of the intensive phase of chemotherapy; this fact was supported by the presence of such significant diagnostic criteria representing the intensity of inflammatory-destructive process as a crevicular fluid structure and a cytogram of gingival crevicular blood.

The prolonged intake of antituberculous preparations provided increased amount of *Candida albicans* colonies, epithelial cells and macrophages in periodontal pockets.

The course of chronic generalized periodontitis in either patients with infiltrative pulmonary TB with various drug-susceptibility or in patients having no TB does not fully depend on oral hygienic procedures. The problem of patient-specific approach in complex treatment of patients with infiltrative pulmonary TB with various drug-susceptibility is stated to be the target of further research of the authors.

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