

WAYS TO IMPROVE THE TREATMENT OF PERIODONTAL DISEASES IN WORKERS EXPOSED TO STYRENE POLYMERS

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ABSTRACT

Periodontal diseases are inflammatory conditions that affect the periodontium, the dental support apparatus that includes gingival tissue, alveolar bone, cement, and periodontal ligament. Primary pathological signs include clinical attachment loss, radiologically assessed loss of the alveolar bone, the presence of periodontal pockets and bleeding. Gingivitis is a common and mild form of PO; it is a reactive condition that is reversible with proper oral hygiene. In turn, periodontitis is an advanced form of PO when gingivitis is not treated properly, which leads to a chronic, destructive and irreversible inflammatory condition.

Key words: Periodontal diseases, ligament, chronic generalized periodontitis, chronic gingivitis.

INTRODUCTION

Relevance: in the process of intensive industrial development, the study of the role of harmful and health-related factors of the production environment is timely and very important. After all, unfavorable working conditions contribute to the formation of various pathological processes in the human body (Amirov N.H., 2016). The long-term influence of a complex of production factors simultaneously with the deterioration of the health of workers, as a rule, can lead to pathological changes in the mucous membrane of the oral cavity, periodontal diseases, hard tissues of teeth (Galiullin A.N., 2014).

The Andijan Rubber Products Factory has a number of workshops with harmful working conditions. Workers in the workshops are exposed to a complex of harmful substances (styrene, styrene butadiene, sulfur dioxide, carbon monoxide, amino compounds, talc, rubber dust, benzene, etc.), unfavorable microclimate and noise exceeding permissible levels. Risk factors of production

can negatively affect the state of resistance of the body with a violation of the local immunity of the oral cavity, which causes pathological changes in the mucous membrane, damage to the hard tissues of the teeth and periodontal.

Due to the lack of sufficient information on the above problem, the study of dental morbidity in workers in the manufacture of rubber products is of particular relevance.

The purpose of the study: to improve the methods of prevention and treatment of chronic generalized periodontitis in workers exposed to styrene polymers. (production of rubber products).

Materials and methods of research. We selected 85 workers who come into contact with styrene polymers and have chronic generalized periodontitis of mild, moderate and severe severity. Of these, 35 workers received the traditional (control group), 50 – the comprehensive advanced treatment we have proposed.

Results and discussion

The employees of all the surveyed groups were represented by males. The prevalence of the bad habit among workers of all groups was approximately the same ($p > 0.05$). Statistically significant differences were revealed between the indicators of the first group and the rest of the groups in terms of the depth of periodontal pockets, the level of loss of epithelial attachment and the number of teeth.

The average values of the periodontal pocket depth index differed significantly between all three groups of subjects ($p = 0.001$). The prevalence of inflammatory periodontal tissue diseases in workers of the 1st and 2nd groups was very high and amounted to 100%. In the 1st group of patients, severe chronic periodontitis occurred in 25% of cases, moderate in 45%, mild degrees — 25% and chronic gingivitis — in 5% of cases. In group 2, severe chronic periodontitis was observed in only 8.3% of patients, moderate - in 19.4% and mild — in 41.6% of the examined, chronic gingivitis occurred in 30.7% of patients.

The results of the study of cytogenetic parameters (protrusion, micronuclei), proliferation indicators (cells with two nuclei) and indicators of the early stage of nuclear destruction (vacuolization of the nucleus, condensation of chromatin), indicators of the completion of nuclear destruction (karyopycnosis, karyorexis) are presented.

A statistically significant difference in the frequency of occurrence of cells with micronuclei and protrusions of the nucleus was found in individuals in group 1 compared with groups 2 and 3 ($p = 0.001$).

The frequency of cells with two nuclei in the 1st ($p = 0.002$) and 2nd ($p = 0.006$) groups was at the same level and significantly exceeded the value of the

indicator of the 3rd group. Statistical analysis of the frequency of occurrence of vacuolization of the nucleus revealed a difference in indicators between the 1st and 3rd groups. The value of this parameter of the early stage of nuclear destruction in the group of interned workers was more than 2 times higher than that of the group of people with healthy periodontitis ($p = 0.009$).

In group 1, a positive correlation was established between work experience and the number of teeth ($g = 0.569$; $p = 0.001$), as well as the level of loss of epithelial attachment ($g = 0.410$; $p = 0.010$). At the same time, it was not possible to establish a link between work experience and the frequency of cells with nuclear abnormalities. In group 2, a positive correlation was established between the length of service and the frequency of cells with various anomalies: micronuclei ($g = 0.436$; $p = 0.008$), cells with two nuclei ($g = 0.424$; $p = 0.010$), condensed chromatin ($g = 0.559$; $p = 0.002$), vacuolization of the nucleus ($g = 0.414$; $p = 0.012$) and cells with karyopycnosis ($g = 0.427$; $p = 0.009$).

In the structure of dental diseases, periodontal diseases — gingivitis and periodontitis - occupy one of the leading places in terms of prevalence in the adult population. These chronic diseases are characterized by the presence of a bacterial infection leading to gingival inflammation, followed by destruction of epithelial attachment and loss of bone tissue, which is the main cause of tooth loss in the adult population [11]. The inflammatory process in periodontal tissues causes a proliferative response, which in turn contributes to the occurrence of genetic damage, increasing the likelihood of errors in DNA replication [12]. Lipopolysaccharides and bacterial toxins are triggers of the immune response and stimulate an increase in the accumulation of reactive oxygen species in various periodontal cells, which leads to damage by lipid peroxidation, protein denaturation and DNA damage [13-15].

This paper presents the results of studying the relationship between cytogenetic damage to the cells of the buccal epithelium and the pathogenesis of inflammatory periodontal diseases against the background of exposure to a complex of harmful substances such as polymetallic ore dust and fluoro-agents. A high prevalence of severe periodontitis and an increased level of cytogenetic markers were revealed in the trained workers of the main production (mining and crushing of ore) of the mining and processing plant.

It has been established that in the first years of work, deviations from the norm are observed in workers - the frequency of cells with nuclear anomalies increases, and with increasing length of service, the total number of buccal epithelial cells with chromosomal aberrations increases. This suggests that the

complex of harmful substances characteristic of this production has cumulative genotoxic and cytotoxic activity.

The results of studies of cytogenetic damage in workers with respiratory diseases using a micronucleus test are comparable with previously published data from other researchers [16]. However, in these studies, the effects of the chemical factor were not taken into account. A positive relationship between the frequency of micronuclei in buccal epithelial cells and the severity of chronic periodontitis was established in their study by Bloching et al. [17]. In patients with severe chronic periodontitis, the frequency of micronuclear epithelial cells was $2.16 \pm 0.85\%$, in patients with moderate disease — $1.91 \pm 1.04\%$, and $1.50 \pm 1.06\%$ in healthy individuals. In their study, they found that in patients with chronic periodontitis, the frequency of gum cells with micronuclei and double-core cells ($0,45 \pm 0,16\%$, $1,55 \pm 0,25\%$) above the indicators of the control group ($0,66 \pm 0,12\%$, $1,31 \pm 0,15\%$), but the results obtained were not statistically significant [19]. Avula et al. When studying the frequency of nuclear abnormalities in lymphocytes, no differences were found between groups of patients with generalized and chronic periodontitis and healthy individuals [20]. Based on the results of published studies, it can be assumed that gum cells are less susceptible to cytogenetic damage in inflammatory diseases than buccal epithelial cells. The prevalence of DNA damage can also be influenced by various factors, including lifestyle and bad habits [21]. So, Nersesyan et al. In their study, they found a statistically significant inverse correlation between nuclear abnormalities in buccal epithelial cells and smoking duration [22].

Conclusion

The results of the study showed that the inflammatory process caused by gingivitis and periodontitis is associated with a higher frequency of chromosome damage. Patients with periodontitis have a higher level of cytogenetic markers, which indicates the genotoxic and cytotoxic effects of exposure to aerosol of copper sulfide ores, nitrogen oxides and acrolein present in the air of the work area.

Production factors have a significant impact on the development and course of inflammatory periodontal diseases in workers of the mining and processing complex. The conducted studies using a micronuclear test indicate the negative effect of a complex of harmful substances on the development and course of inflammatory periodontal diseases.

This test may be recommended for the examination of workers exposed to harmful chemicals.

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