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Research Article

The State of Periodontal Tissues in Patients with Rheumatoid Arthritis Who Live in Environmentally Unfavourable Areas

Khrystyna Kovalyshyn*, Mykola Rozhko, Taras Kryvenkyy, Tetiana Dmytryshyn

Abstract
The aim of the work was to compare the condition of periodontal tissues in patients with rheumatoid arthritis who live in ecologically favorable and environmentally unfavorable territories. There was performed a dental examination of 21 patients with rheumatoid arthritis who live in environmentally favorable territories and of 21 patients with rheumatoid arthritis who live in environmentally unfavorable areas. There was given the index evaluation of the condition of periodontal tissues, the level of oral hygiene. It has been determined that the course of generalized periodontitis in patients with rheumatoid arthritis who live in ecologically contaminated territories is more difficult than in a group of patients who live in environmentally favorable territories.

Keywords
periodontitis; generalized periodontitis; rheumatoid arthritis; ecologically unfavorable conditions.

Ivano-Frankivsk National Medical University, Ivano-Frankivsk, Ukraine
***Corresponding author**: endodok89@gvail.com

Problem statement and analysis of the latest research

One of the most common diseases of periodontal tissues is generalized periodontitis (GP) [1]. According to many scientists, a number of exogenous and endogenous factors are involved in its occurrence and development.

It is proved that patients with rheumatoid arthritis (RA) develop preconditions for rapid development and progression of GP [2, 3, 4]. Since this somatic pathology is complicated by an osteoporotic process, this leads to a violation of the processes of resorption and the formation of bone tissue. As a result, osteoporosis develops, which leads to a decrease in the mineral density of the jawbones [5, 6, 7, 8, 9].

It is known the research on the impact of the environmental situation on the peculiarities of the course of GP and RA [10, 11]. It was studied that salts of heavy metals accumulate in organs and tissues of people who live in environmentally polluted territories and provoke the occurrence of inflammation in the periodontal tissue [12].

Taking into account that bone metabolism is closely related to the adverse effects of the environment and the general-somatic state of the organism, it is extremely important to study the development, the course of GP in patients with RA, who live in environmentally unfavorable territories.

The **objective** of our research is the clinical evaluation of the state of periodontal tissues in patients with RA who live on environmentally favorable and ecologically unfavorable areas.

1. Materials and Methods

Dental examination was performed in 42 patients with RA, aged from 29 to 54 years. The diagnosis of RA was determined by the physician-rheumatologist based on clinical, laboratory and radiological data, according to the criteria (ARA, 1987). Duration of RA disease in patients of two groups was more than 3 years. The treatment prescribed by the rheumatologist was to use basic anti-rheumatic drugs and nonsteroidal anti-inflammatory drugs. Among the examined patients women dominated 34 (81%). In order to study the peculiarities of the clinical course of GP in RA patients who live in ecologically contaminated territories, residents of the Kalush district of Ivano-Frankivsk region have been selected, who had the status of "ecological emergency zone" [13, 14]. Group II – patients with RA who live in environmentally favorable territories residents of Ivano-Frankivsk (21 patients). In parallel, 21 patients with GP without concomitant somatic pathology were examined, who formed the control group. All patients were maximally standardized according to the age-gender characteristics.

The dental examination of patients was performed according to generally accepted methods of maintaining an outpatient medical card of a dental patient and an individual examination card, developed by us.

Clinical examination of patients was begun with the collection of anamnesis of the disease and life, complaints and evaluation of the general-somatic condition. During the interview, attention was paid to the duration of the disease, both of GP, and of RA.

During an objective dental examination of patients, the depth of the oral cavity vestibule and the peculiarities of the attachment of frenulum, the tooth row and its integrity, the presence of restorations and orthopedic constructions were studied. Inflammatory-destructive changes in the periodontal tissues were determined using the periodontal index (PI) offered by Russel (1956). To evaluate the inflammatory process in the gum area, the PMA index in the Parma modification (1960) (papillary-marginal-alveolar) was used. The level of oral hygiene was studied using the Simplified Green-Vermillion Index (Oral Hygiene Index-Similified, OHI-S, Green-Vermillion, 1964). In order to determine the degree of bone destruction and the magnitude of gum retraction, the depth of periodontal pockets was measured using a periodontal probe from four sides of the tooth: vestibular, oral, medial and distal direct and indirect methods. Diagnosis of periodontal diseases was performed according to the classification of N.F. Danylevsky (1994).

The statistical processing of the obtained results was performed by the method of variational statistics using the computer software package of medical and statistical calculations STATISTICA.

2. Results and Discussion

In the examined patients in all groups, the main symptoms of GP were: symptomatic gingivitis, resorption of bone tissue, periodontal pockets. The severity of these signs depended on the degree of development of the disease.

To estimate the prevalence of GP according to the stages of development and the nature of the course of GP within each research group, the percentage distribution of patients was studied (Fig. 1). We found that among the examined groups, the highest percentage of patients with the III degree of development of GP – 3 (14.28%) was diagnosed in group I, which indicates a significant progression of inflammatory-destructive changes in periodontal tissues. On the other hand, there were less than 2 (9.52%) patients in group II with the III degree of GP, and only – 1 (4.7%) patients in group III.

GP of I degree of development was most often diagnosed in patients of group III – 11 (52.38%), and the least patients with the I degree were in I group – 4 (19.04%). In the group II the GP of the I degree was detected in 7 (33.3%) patients.

GP of II degree was detected in 14 (66.6%) patients in group I, which is 14.28% more than in group II of patients and 35.7% than in group III of patients. Persons with an initial severity of GP were not identified in the examined patients.

Consequently, concomitant somatic pathology and adverse environmental factors lead to an in-

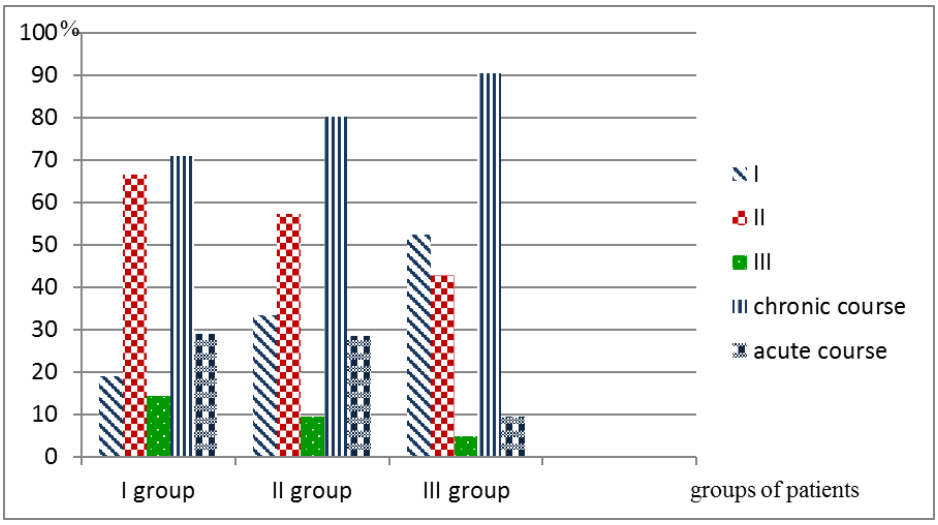

Figure 1. Forms and course of GP in the examined groups.

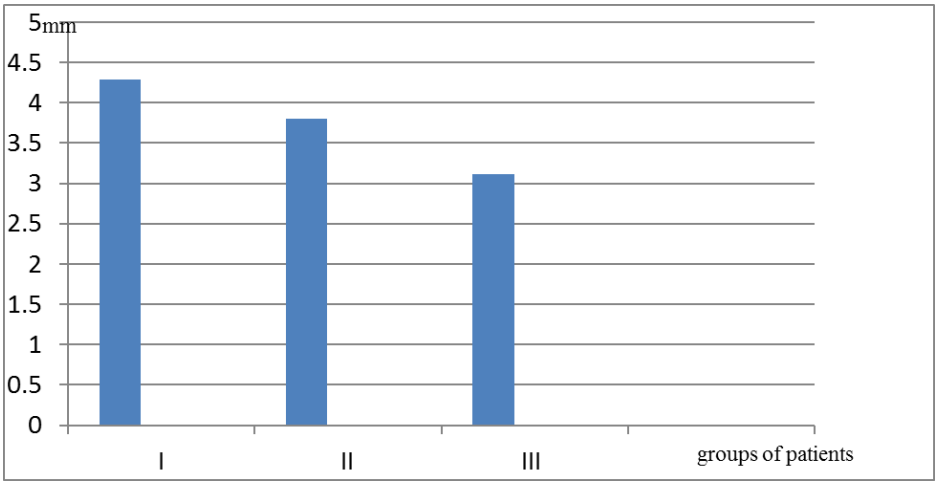

Figure 2. Depth of periodontal pockets in patients of groups I, II and III.

crease in the severity of GP in RA patients who live in ecologically unfavourable territories.

In patients with GP with RA living in environmentally unfavorable territories, the acute course of GP was most common – 6 (28.57%) examined, while in group III only 2 (9.52%). In patients of group II, an acute course was diagnosed in 4 (19.00%) patients.

The highest percentage of patients with chronic course of GP was diagnosed in group III of the examined patients – 19 (90.47%), which is 11.5% and 21.5% more than in patients of groups II and I, respectively.

Analyzing the results of measurement of the depth of periodontal pockets in patients of all groups found the dependence on the degree of disease development (Fig. 2). In patients of group I, the mean value of the depth of periodontal pockets was greater, and was 4.29 ± 0.06 mm ($p<0.05$). In patients of group II, this indicator was 3.8 ± 0.06 mm ($p<0.05$), while in patients of group III the mean value of the depth of periodontal pockets was the lowest and was 3.12 ± 0.02 mm ($p<0.05$).

The results of the index evaluation of periodontal tissues and the hygienic state of the oral cavity in patients with GP (of the 1st, 2nd degree of development) with RA are represented in Table 1.

The average Green-Vermillion index value in

Table 1. Index characterization of periodontal tissue status in the examined patients (M±m).

Patient groups	Hygiene Green-Vermillion index	PMA	PI according to Russel
I (n=21)	3.01±0.08	35.84±0.78	3.68±0.06
II (n=21)	2.59±0.09*	33.84±0.41*	2.89±0.08*
III (n=21)	2.24±0.09^	33.12±0.4^	2.53±0.12^

Notes:
* – probability of difference between groups I and II, $p<0.05$;
^ – probability of the difference between groups I and III, $p<0.05$.

patients of group I was 3.01±0.08 points and corresponded to the level of oral hygiene "bad". In patients of groups II and III these values were lower and were 2.59±0.09 and 2.24±0.09 points, respectively, which corresponded to the "unsatisfactory" level of oral hygiene. Analysis of Green-Vermillion indeces showed, that in case of deepening of pathological process in periodontal tissues, deterioration of oral hygiene was observed.

Inflammatory changes (symptomatic gingivitis of various clinical and morphological forms) were evaluated using the PMA index. In all three groups, the average severity of gingivitis was diagnosed, but in the patients of the main group the degree of gum inflammation was 35.84±0.78 and was higher by 5.6% than in patients of group II and 7.6% than in patients of group III.

The mean of PI according to Russel was the highest in the patients of the main group and was 3.68±0.06, which is 21.46% and 31.25% higher than the indicators of the groups II and III. The growth of this index indicates the activation of destructive processes in the alveolar process of upper jaw and alveolar part of lower jaw.

3. Conclusions

The performed clinical and index evaluation of periodontal tissues in patients of three groups indicates a severe course of generalized periodontitis in patients with rheumatoid arthriti, s who live in ecologically unfavorable territories compared with patients with rheumatoid arthritis who live in ecologically favorable territories, and with patients with generalized periodontitis without concomitant somatic pathology, who live in ecologically favorable territories.

4. Prospects of Further Researches

The obtained results create the preconditions for further study in patients with generalized periodontitis with rheumatoid arthritis, who live in ecologically unfavorable territories of other objective indicators of periodontal status using modern laboratory, radiological diagnostic methods to determine the relationship between the severity of generalized periodontitis and the structural and functional state of bone tissue.

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