

<sup>1</sup>N.V. Hasiuk, <sup>2</sup>R.A. Levandovsky, <sup>3</sup>V.O. Borodach, <sup>3</sup>O.V. Klitynska  
SHEI «I. Horbachevsky Ternopil State Medical University», Ukraine  
<sup>1</sup>Bukovynsky State Medical University, Chernivtsi, Ukraine  
<sup>2</sup>Uzhgorod National National University, Uzhhorod, Ukraine

## MORPHOLOGICAL SUBSTANTIATION OF CRITERIA OF PREDICTION OF CLINICAL COURSE OF GENERALIZED PERIODONTITIS

e-mail: gasiuknv@tdmu.edu.ua

In the article the ways to optimize the diagnostic process periodontal patients through an integrated cytology. The results make it possible development of morphological algorithm for evaluation of patients younger patients with generalized periodontitis of varying severity. Application of the proposed algorithm survey, which includes the study of cellular structure periodontal pockets and immunohistochemical profile of cell infiltration of the lamina propria gums in periodontitis, and morphological changes cytospecific epithelium provides an opportunity to supplement the existing arsenal of conventional diagnostic methods in periodontology more accurate and highly specific, and offer a number of morphological criteria prognostic clinical course of nosological unit.

**Key words:** optimization, algorithm, periodontal pocket, cell nucleus, cytoplasm.

Currently, inflammatory and inflammatory-dystrophic diseases of the periodontal tissues are dominant in the overall structure of pathological processes of the oral cavity [3].

Inflammation center of chronic infection in the periodontal tissues are capable of infecting not only tissues of the maxillofacial region, but also to initiate the emergence of diseases associated with systemic inflammation such as rheumatism and collagen diseases. The presence of a large number of epidemiological and clinical research shows the connection between cardiovascular disease and bacterial persistent infections or clinical conditions with periodontitis [1].

Chronic inflammation of the periodontal tissues is accompanied by a sharp increased levels of proinflammatory cytokines IL-1 $\beta$ , TNF- $\alpha$ , activity lactate dehydrogenase, aspartate aminotransferase, superoxide dismutase [2]. C-reactive protein, TNF- $\alpha$ , elevated levels of blood leukocytes can serve as independent risk factors of atherosclerosis, angina pectoris. Their release during exacerbation of the infectious process initiates the cascade biochemical reactions, which is a direct cause of endothelial damage the endocardium and blood vessels [4,5]. According to existing data, such protective reactions of organism, as phagocytosis and the immunogenesis, aimed at neutralizing microbial factor, initiate pathological mechanisms of destruction of periodontal tissues [6,7,9].

When this occurs, immunological response, that providing the relationship of chronic persistent infections in periodontal with cardiovascular and neurovascular diseases – immune cross reaction, autoimmune damage, condition of immune deficiency [10]. The presence of bidirectional communication between clinical features of generalized periodontitis and the condition of the macroorganism, enables the definition of the pathogenetic chain of development of the given nosological unit. Since the body of patients formed antibodies not only to microorganisms and cellular structures periodontal pockets, but actually against pathologically-changed tissues of the periodontium. The increase of these immunological changes and changes in immunological reactions of cellular and humoral types leads in the future to the destruction of clinically unchanged tissues of periodontium [8,11,12]. Requires new approaches to the prevention and treatment of this disease, the hypothesis of the unity of genetic determinism and the tendency to inflammatory diseases, that develop in the periodontal tissues.

**The aim** of our exploration was to optimize diagnostic process periodontal patients by examining the cellular composition, cytospecific and morphological changes of the epithelium and lamina propria of the gingiva that enables to predict the clinical course of generalized periodontitis and the determination of suitable local complex interventions.

**Material and methods.** The material for the exploration served as content periodontal pockets, taken at the 55 males of young age. The main selection criterion, among this contingent were: the absence of bad habits and concomitant somatic pathology. Epithelium were taken with a spatula with the subsequent transfer on a glass slide and drying in open the access of air within 3-5 minutes. The stained material was carried out according to Gsou-Romanovsky, with subsequent microscopic and morphological analysis, with given the percentages of various forms of epithelial cells in norm.

Diagnostic testing was performed in accordance with the Standards of diagnosis and the treatment of dental patients (an Order of MOH of Ukraine "On approval protocols providing medical care

in the field of "orthopaedic dentistry", "therapeutic dentistry", "surgical stomatology", "orthodontics", "pediatric therapeutic dentistry", "pediatric surgical dentistry" from 28.12.2002 №507 and the order of MH of Ukraine "On approval standards of health care provision and indicators of medical care quality" from 28.12.2002 № 507). The criteria for diagnosis in individuals of the surveyed contingent were: the young age patients (21 to 35 years old, according to age distribution WHO); anamnestic data of the patients (disease duration from 1 year to 3 years and frequency of exacerbations per year); data of the objective examination (generalized and progressive in nature the destruction of bone tissue). Diagnosis was made according to the classification of diseases periodontal M.F. Danilevsky (1994).

Parametric methods of statistical processing of the obtained data was used for indicators, the distribution of which meet the requirements of normality. To assess the nature of the distribution determines the skewness and the kurtosis. Check normality was conducted on the test of skewness Shapiro-ULKA. Reliability differences of the results obtained for different groups were determined using t- criterion by Student. Differences were considered as reliable at generally accepted in the biomedical research probability of error ( $p < 0,05$ ).

The probability error was estimated by Student's table considering the size experimental groups. In cases, where the distribution is statistically differed significantly from normal were calculated using a nonparametric criterion by (U) Mann-Whitney as a nonparametric analogue criterion by Student.

**Results and Discussion.** Cellular composition of periodontal pockets in chronic of generalized periodontitis, represented epithelial and gematogenom cells. Among the epithelial cells, noteworthy appearance in zithromax basal cells, which normally do not exist, their number is  $(14,20 \pm 0,23)$ . They have a prismatic shape, an oval nucleus, nucleolus displaced to the periphery and are characterized by sharp basophilia cytoplasm. Nuclear-cytoplasmatic ratio is high, namely  $(0,49 \pm 0,002)$ , offset to the side the nucleus, which gives the ability to identify this cell as the basal first the degree of differentiation. The appearance of basal cells gives the opportunity to assert that deep lesions of the epithelium of the inflammatory process and characterizes the severity of periodontitis in individuals of the surveyed population. In cells, there are signs cytopathology. A characteristic feature of cytogram individuals surveyed contingent is the lack of parabasal cells, as a consequence of cells in the second degree differentiation. Typical of these cytogram is the presence of intermediate cells in the amount of  $(34,90 \pm 0,28)$ . They have a polygonal shape, an optically light cytoplasm, oval eccentric vesicular nucleus. Nuclear-cytoplasmatic the ratio decreases toward the nucleus, which gives the opportunity to classify data cells to the third level of differentiation. Superficial epithelial cells in periodontal pockets cyrography visualized in two types, the membership of which was determined by condition of nucleos.

The first type of superficial cells in the number  $(20,10 \pm 0,26)$  represented by epithelial cells larger than intermediate, clearly contravene nucleos normal size, placed in the center of the cell. Nuclear-cytoplasmatic the ratio shifts towards cytoplasm and is  $(0,240 \pm 0,001)$ , which gives the ability to relate these cells to the fourth level of differentiation.

The second type of superficial cells represented surface epithelial cells in quantity  $(30,50 \pm 0,29)$  the dimensions of which are similar to the first, the nucleus picnographic is characterized by clear contours, often there are unstained vacuoles, cariolysis and fragmentation with subsequent eliminate from cytoplasm. ACS shifted towards the cytoplasm and is  $(0,100 \pm 0,001)$  that gives the opportunity to relate these cells to the fourth level of differentiation.

Exploration of scrapings-swabs periodontal pockets, under the terms of exacerbation of generalized periodontitis, indicate that the epithelial cells composition remains constant, but pay special attention to the change quantitative the ratio of epithelial cells. The number of cells with nuclear-cytoplasmatic ratio  $(0,490 \pm 0,002)$ , which meets to the basal epithelial cells significantly increased is  $(23,80 \pm 0,31)$ . Parabasal epithelial cells similar scrapings-swabs GP of chronic available. The number of intermediate cells, nuclear-citoplasmatic ratio is  $0.35 \pm 0,001$  significantly decreased and is  $(32,80 \pm 0,21)$ . While the quantitative composition of the cellular fractions the surface layer with a central located nucleus with nuclear cytoplasmatic ratio  $(0,240 \pm 0,001)$  significantly increases and is  $(37,70 \pm 0,23)$ , while the number of surface epithelial cells with picnomic nucleus and nuclear cytoplasmatic ratio  $(0,100 \pm 0,001)$  were significantly decreased and is (of  $6,70 \pm 0,16$ ).

The above dynamics of changes in the cellular composition of epithelial cells gives the ability to assert, that conditions of prolonged inflammatory process in the periodontium there is the absence of all cells of difereno epithelial cells and change the percentage of cell avant-garde.

Among cells of hematogenous series in cytogram content of periodontal pockets is defined by a large number of neutrophils on different stages of phagocytosis with barcelonean nucleus, with no

bridges between segments. Their number is  $(65,60 \pm 0,18)$ . It should be noted that this type of cells were in cytogram regardless of the current generalized periodontitis, however, their function has changed.

In conditions of chronic neutrophilic granulocytes form the cell clusters. Thus clearly visualized the outline of the plasmolemma, the shape of the cells mainly rounded and stored segmentation of nucleus. The number of macrophages in this is  $(8,60 \pm 0,14)$ , monocytes  $(5,70 \pm 0,17)$ , lymphocytes  $(20,10 \pm 0,18)$  This type of stroke chronic clinical course have correlated with anamnestic data of patients in relation to frequency of exacerbations 3-4 times a year and is a prognostic criterion of «a high probability of relapse».

In some cytogram in large enough quantities, namely  $(36,90 \pm 0,38)$  defined macrophages, which have an elongated shape, an optically dense nucleus, while the number of leukocytes was significantly decreased and is  $(29,60 \pm 0,21)$ , provided the increase in the number of monocytes  $(12,60 \pm 0,21)$  and slight increase in lymphocytes  $(20,90 \pm 0,16)$ . In the cytoplasm of macrophages contains a well-developed lysosomal apparatus, while the other organelles are developed moderately. Their quantitative composition due to the constant need of phagocytosis of necrotic tissue and components of the intercellular substance and microorganisms in the periodontal inflammation center. Additionally, this type of cell takes part in the induction immune response by processing antigens and presenting them to lymphocytes regulate the activity of other cell types, including fibroblasts. Along with functionally active macrophages in cytogram meet and live even cells. The contours of the plasmolemma violated, nucleus is at the stage. In addition cells of the macrophage system visualizes red blood cells that when stained for Gram have the form of twisted-wheel discs that in the process of phylogenesis lost nucleus. Their cytoplasm is poorly stained and characterized by oxyphilia. This type of stroke chronic clinical course correlates with anamnestic data of patients in relation to frequency of exacerbations generalized periodontitis 2-3 times a year, which gives the opportunity to characterize how the predictive criterion of «relatively low probability of exacerbations».

Noteworthy is the predominance in some cytogram of monocytes in the amount of  $(35,40 \pm 0,28)$ , which have a oval shape with boomed-shaped resegmenting nucleus large size, rich in chromatin. The cytoplasm of the cells is relatively large size, contains well-developed lysosomal. The number leukocytes and macrophages significantly decreased and is equal to  $(23,20 \pm 0,31)$  and  $(14,70 \pm 0,22)$  respectively. The advantage of these cells in strokes indicates functional the activity of mesenchyme and describes a slight tendency to exacerbation of chronic process. This type of stroke chronic clinical course correlates with anamnestic data of patients in relation to frequency of exacerbations 0-1 times a year prognostic criterion of «low probability of exacerbations».

All citogramss conditions of chronic periodontitis visualized lymphocytes, which have a large spherical-shaped nucleus, located mainly on the center, which occupies almost the entire cell, contains a large number of diffuse placed heterochromatin. With the aim of cytologic identification we conducted a survey citospecific properties of lymphocytes of periodontal pockets. In the cytoplasm visualized light perinuclear area. The presence in cytogram lymphocytes confirms our results integrated histological and immunohistochemical analysis on the involvement of the immune system and the chronicity of the process and the relationship of the hearth chronic infection of periodontal tissues with a number of systemic inflammatory processes in the body. In conditions of heightened clinical course of generalized periodontitis, the observed changes of qualitative characteristics neutrophilic granulocytes. When this, note that the number lesovna neutrophilic granulocytes significantly increased amounts (of  $12,40 \pm 0,98$ ) compared to scrapings-swabs of chronic, respectively  $(1,60 \pm 0,22)$ . Most of them are degenerative changed barcelonean nucleus, without connections between them, the specific the grit is missing. So, the results of our research scrapings-swabs periodontal pockets provide an opportunity to observe changes in the qualitative and quantitative composition as the epithelial and connective tissue component of the stroke-strokes. In case of generalized periodontitis in the acute stage, compared with a chronic course  $(14,20 \pm 0,23)$  observed significant increase in the number basal epithelial cells  $(23,80 \pm 0,30)$ , which indicates a high intensity of inflammatory-destructive changes in periodontal tissues and activation of proliferative the ability of the basal layer.

The number of intermediate cells is slightly decreased in comparison with the identical class of cells in conditions of chronic  $(34,90 \pm 0,28)$  and is  $(32,80 \pm 0,21)$ , evidence of the violation of the flow of processes of differentiation of epithelial cells.

The number of superficial cells with a nucleus without picnotial scrapings-swabs for conditions chronic is  $(20,10 \pm 0,26)$ , epithelial cells with picnotial nucleus is (of  $30,50 \pm 0,28$ ), which indicates the path of keratinization of the epithelium of the pockets by parakeratosis. In conditions of heightened clinical course note a significant increase in the number of superficial epithelial cells with nucleus

without picnographic changes likely reduce picnographic cells with nucleus, what constitutes a violation of keratinization of the epithelium is initiated by an inflammatory response of stroma and the development of disorders of keratinization in the form of dyskeratosis. Significantly different quantitative indicators of the functional state neutrophils in chronic and acute clinical course. So lesovna the number of leukocytes, which, when chronic periodontitis is  $(1,60 \pm 0,22)$  significantly increases with the worsening and is  $(12,40 \pm 0,98)$  that reflects the incompleteness of the phagocytic reaction and provides the clinical picture of the current. Noteworthy intense microbial contaminate scrapings-swabs periodontal pockets, among which identified complex systems bacilli, cocci and Candida, spryly. In terms of progression generalized periodontitis, there is a change in the microbial composition of the conditional pathogenic strains of microorganisms to other more pathogenic and pathogenic organisms with a strong association to periodontal disease. Pathogens can cause tissue damage periodontal for two reasons: bacterial and toxic actions, and as a response of the periodontal tissues to the effects of microbial factors.

In case of generalized periodontitis, it triggers a cascade of cellular reactions polymorphonuclear leukocytes and macrophages, to be destructive exposure to microbial agents. Statistical processing of obtained results relative changes in the connective tissue cellular components scrapings-swabs gives the ability to predict the probability of an exacerbation of periodontal disease in terms of of chronic. Segmentation white blood cells are an integral component however notes the maximum number  $(65,60 \pm 0,18)$  correlates with the frequency exacerbations 3-5 times. Residency of leukocytes and their quantitative changes indicate constant persistence parodontopathogenic of microorganisms, which leads to formation in the periodontal tissues of the complex of highly active compounds, cytokines, which are able to modify the activity of neutrophils and reduce their specific bactericidal properties. Cytokines not only adversely affect on periodontal tissues, but also cause further activation of the cells, their synthesized, suppress tissue repair and resynthesis fibroblasts of the connective tissue. The maximum number of strokes-imprints macrophages  $(36,90 \pm 0,38)$  correlated with the frequency of exacerbations 2-3 times per year. The advantage in the number of monocytes  $(35,40 \pm 0,28)$  is characterized by the presence of correlations with frequency exacerbations 0-1 times a year, while the number of segmented leukocytes and of macrophages significantly decreased and is equal to  $(5,70 \pm 0,17)$  and  $(12,60 \pm 0,21)$ . Quantitative changes of lymphocytes, with different frequency of exacerbations are mild and is  $(20,10 \pm 0,18)$  (frequency of exacerbations 3-5 times per year),  $(20,90 \pm 0,16)$  (frequency exacerbations 2-3 times per year) and  $(26,60 \pm 0,47)$  (frequency of exacerbations 3-5 times a year). The presence of lymphocytes reflects the tensions of the humoral immune circuit system.

### Conclusions

The statistical analysis allows one to identify «neutrophil», «macrophage» and «monocytic» types of strokes-imprints for the conditions of chronic generalized periodontitis. The results of our research give the opportunity to assert that the high diagnostic informative value of the cytological method analysis in periodontics in particular.

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## Реферати

**МОРФОЛОГІЧНЕ ОБҐРУНТУВАННЯ КРИТЕРІЇВ ПРОГНОЗУВАННЯ КЛІНІЧНОГО ПЕРЕБІГУ ГЕНЕРАЛІЗОВАНОГО ПАРОДОНТИТУ**

Гасюк Н.В., Левандовський Р.А., Бородач В.О., Клітинська О.В.

У статті запропоновано шляхи оптимізації діагностичного процесу у пародонтологічних пацієнтів, шляхом застосування інтегрованих цитологічних параметрів. Отримані результати дають можливість розробки морфологічного алгоритму для об'єктивізації пародонтологічного статусу пацієнтів. Застосування запропонованого алгоритму обстеження, яке включає вивчення клітинного складу пародонтальних кишень, а також морфологічні зміни епітелію, дає можливість доповнити існуючий арсенал традиційних діагностичних методів у пародонтології, більш точними та доказовими і пропонують ряд морфологічних прогностичних критеріїв клінічного перебігу даного захворювання.

**Ключові слова:** оптимізація, алгоритм, пародонтальна кишеня, ядро клітини, цитоплазма.

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**МОРФОЛОГИЧЕСКОЕ ОБОСНОВАНИЕ КРИТЕРИЕВ ПРОГНОЗИРОВАНИЯ КЛИНИЧЕСКОГО ТЕЧЕНИЯ ГЕНЕРАЛИЗОВАННОГО ПАРОДОНТИТА**

Гасюк Н.В., Левандовский Р.А., Бородач В.А., Клитинская О.В.

В статье предложены пути оптимизации диагностического процесса у пародонтологических больных путем изучения клеточного состава парадонтальных карманов и применения интегрированных цитологических параметров. Полученные результаты дают возможность разработки морфологического алгоритма обследования, с целью объективизации пародонтологического статуса пациентов. Применение предложенного алгоритма обследования, которое включает изучение клеточного состава парадонтальных карманов, а также морфологические изменения эпителия, дает возможность дополнить существующий арсенал традиционных диагностических методов в пародонтологии, больше точными и доказательными и предлагают ряд морфологических прогностических критериев клинического течения данного заболевания.

**Ключевые слова:** оптимизация, алгоритм, парадонтальный карман, ядро клетки, цитоплазма.

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<sup>1</sup>S.V. Golovko, <sup>1</sup>A.A. Kobirnichenko, <sup>3</sup>O.F. Savvitskiy, <sup>2</sup>I.L. Trovitskiy<sup>1</sup>Clinic of Urology, National Military Medical Clinical Center, DOD of Ukraine, Kyiv<sup>2</sup>Department of Cardio-Vascular Surgery, National Military Medical Clinical Center, DOD of Ukraine, Kyiv<sup>3</sup>Department of Military Surgery, Ukrainian Military Medical Academy**APPLICATION OF SELECTIVE ARTERIAL EMBOLIZATION FOR TREATMENT OF BENIGN PROSTATIC HYPERPLASIA IN PATIENTS WITH HIGH OPERATIVE RISK**

E-mail: sgoluro@gmail.com

The choice of method of treatment of benign prostatic hyperplasia (BPH) in elderly patients with high operative risk is one of the pressing issues of modern urology. Selective arterial embolization (SAE) of the prostate – is a new method of treating lower urinary tract symptoms caused by benign prostatic hyperplasia. The article presents preliminary experience of performing this procedure in a group of 21 patients with high operative risk, describes indications, criteria of patient selection, technique of the procedure, results and prospects of utilizing this method in the clinical practice.

**Key words:** benign prostatic hyperplasia, selective arterial embolization.

*The present paper is an integral part of the research study "Improvement of minimally invasive surgical treatment for diseases of the kidneys and urinary tract in the conditions of short-term stay surgical hospital", state registration No. 0114U002120.*

Benign prostatic hyperplasia (BPH) is one of the most prevalent urological diseases among men. According to data from the Institute of Urology, National Academy of Medical Sciences of Ukraine (Kyiv) prevalence of BPH in Ukraine is 1765.5 cases per 100,000 of the men's population who need urological surveillance and treatment [4]. In autopsy investigations of S.J. Berry and co-authors (1984) microscopic signs of BPH were found in 8% of patients aged under 30, in 10% of patients under 40, in 40% of patients aged 50-60, in 70% of patients aged 60-70 and in 80% of patients older than 80 years [6]. Because this disease has connection to age, patients are at a high risk for chronic concomitant diseases, such as metabolic syndrome, diabetes mellitus, cardiovascular diseases, which complicate treatment of these patients [1]. Although transurethral resection (TUR) of the prostate has been the "golden standard" in surgical treatment of BPH for the last 50 years, this operation has a high rate of complications [0]. Moreover, results of treatment prove to be unsatisfactory in 15% of patients [9].

Selection of the appropriate tactic and methods of treatment of BPH depends on the patient's somatic status, while the possibility of operative treatment is often limited by a high operative-anesthesiological risk. Therefore, minimally invasive methods of treatment with the minimal risk of complications and the lack of need in general anesthesia acquire significance. Its application can reduce