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АКТУАЛЬНІ ПИТАННЯ МЕДИЧНОЇ НАУКИ ТА ПРАКТИКИ

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FEATURES OF CYTOLOGICAL REORGANIZATION OF GUMS IN GENERALIZED PERIODONTITIS

Abstract. Gingival epithelium, taken from a marginal area of the gums in young adults, with generalized periodontitis has been studied. The disease duration was 3-5 years. The epithelium was removed with a spatula, with subsequent transfer to a glass plate and drying in the open air access for 3-5 minutes. The material was stained according to Himza-Romanovskiy, with further microscopic and morphoiogiciil analysis, taking into account the percentage of different forms of epithelial cells in norma! condition and in an age aspect. It should be noted that these cellular elements belong to the intermediate layer of cells that meets histological sections and ribbed surface layers are characterized by homogenization and vacuolization of the cytoplasm as a manifestation of prolonged irritation bacterial cell aggression. Analysis of cytograms gave the opportunity to consider generalized periodontitis in examined patients, in the absence of adequate therapy, as automotive continuous process. Its components may regress under the influence of effective treatment and re-activate during exacerbation of the inflammatory process under the influence of pathogenic factors such as microbial, hygienic and immune.

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Key words: gingiva, epithelium, cells, nucleus, cytoplasm.

Introduction. As a part **of** the mucous membrane, buccal epithelium takes an active position in relations with irritating factors influencing it from external and interna! environment. It permits to use it in studying of the physiology and reactivity of mucous membranes, and in particular as an indicator of local and general disturbances of homeostasis.

Each anatomical area of gums has a zonal type of keratinization and on histological sections is characterized by basal, ribbed, granular and stratum layers, in which keratinization occurs due to ortokeratoz - phased process, and apoptotic changes in the surface layer of the epithelium [1, 2].

An only exception is the gingival sulcus epithelium that is not keratinized, reducing its barrier function and makes the target organ at the stage of the onset and development of periodontal pathology [4].

Taken into account the prevalence of generalized periodontitis among young people [5] and the prevailing current point of views on the pathogenesis of the disease [6, 7, 8], the question of processes of differentiation of gingival epithelial cells in generalized periodontitis is of particular interest, aiming at diagnosis objectification, determining the severity degree and involvement of the adjacent connective tissue in the process to predict the course of disease, exacerbation rate and relapse.

The aim of our study was to determine the characteristics of cellular structure of cytogram of gums in patients with generalized periodontitis.

Material and Methods. Gingiva! epithelium, taken from a marginal area of the gums in young adults with generalized periodontitis served as the material for the study. The disease duration was 3-5 years. The epithelium was removed with a spatula, with subsequent transfer to a glass plate and drying in the open air access for 3-5 minutes. The material was stained according to Himza-Romanovskiy, with further microscopic and morphological analysis, taking into account the percentage of different forms of epithelial cells in normal condition and in the age aspect.

In order to unificate the epithelium layers and more profound study, in our research we use

cytologicai classification according to which in gingival epithelium the basal, parabasal, intermediate, and superficial cells are distinguished in the area of keratinized gingiva! epithelium, horny scales. Statistical analysis of the findings has been carried out at the Department of Statistical Research of SHEI "Ternopil State Medical University Ministry of Health of Ukraine." Parametric methods have been applied for the indicators, the distribution of which meets the requirements of standardization. To evaluate the nature of the distribution the coefficient of skewness and kurtosis were determined. The test was performed on tests of normal asymmetry test conducted by Shapiro-Wilkie. Probability differences of the results for different groups were determined using Student's t-test. The difference was considered likely in common in the medical and research error probability in $p < 0,05$. The probability of error was evaluated using the Student's tables, given the size of the experimental groups, where the law of distribution statistically significantly different from the expected normal nonparametric (U) Mann-Whitney criterion, nonparametric analogue of a Student's t-test.

Results and Discussion. It is established that a major component of the cellular composition of gingival scraping cytogram in generalized periodontitis are the stratified squamous epithelial cells. They are present in cytograms under normal conditions and during the pathology. It should be noted that the squamous cells are

heterogeneous, reflecting the heterogeneity of cells of gingival epithelial cover, In generalized periodontitis a cytological character of scrap is changed dramatically both in epithelial and connective tissue constituents.

Detailed statistical analysis of cytogram made it possible to determine the percentage change in gingival epithelial cells of examined people with different severity of generalized periodontitis. This ratio is — 2,20±0,10 : 9,30± 0,16 : 41,6±0,36 : 37,0±0,31 : 9,9±0,16.

The qualitative and quantitative cellular composition of cytogram in periodontitis depends on the clinical course and intensity of inflammatory and degenerative processes in periodontal tissues. The received data was significantly different from the stereotypical percentage of epithelial differentiation of stratified squamous gingival epithelium [3], and ratio that was determined by us for examined patients and is, characterized by violation of differentiation - disorder of keratinization, as evidenced by the presence of all components of different epithelial cells. This makes it possible to assert that during generalised periodontitis mechanisms of disruption of epithelial desquamation originates, providing barrier function of gums at generalized periodontitis, are the outcome of a process of differentiation of different forms of epithelial cells initiated by inflammatory infiltrate of the lamina propria. The presence of parabasal ceils in cytograms is explained by activation of compensatory mechanisms of epithelium, taken into account high mitotic activity of gingival epithelium and increased glycogen-containing epithelial cells.

Table 1

Characteristic of percentage change in different classes of cells of stratified squamous gingival epithelium in generalized periodontitis

Indicator	Cells of smears				
	Basal	Parabasal	Intermediate	Superficial	Horny scales
Norm (V.L. Bykov)	0	0	60	8	32
Norm for young person	0	0	59,20±1,15*	7,60±0,34*	33,2±0,65*
Generalized periodontitis	2,20±0,10**	9,30±0,16**	41,60 ±0,36**	37,0±0,31**	9,90±0,16**

Note: * — p <0,05comparedwith the control group;
** — p <0,05 compared with the experimental group.

At the same time, reflecting the severity, course and intensity of generalized periodontitis and intensity of inflammatory and degenerative processes in periodontal tissues, cellular composition of gums in cytograms was divided into four types. The first type is characterized by presence of intermediate and parabasal cells stained by Himza-Romanovskiy, with smaller size compared to intermediate. These epithelial layers correspond to deep ribbed cells in histological sections. In size they are larger, compared to the basal cells and have an elongated shape. The core is large, well-countered, vesicular, with small diffuse located chromatin inclusions and relatively wide rim of basophilic cytoplasm. Lack of hematogenous cells row has been noted. It is obvious that this cellular composition obtained in cytograms shows evidence of proliferation, i.e. reproduction of parabasal cells and characterized prognostic criterion of generalized periodontitis at the initial stage.

The second type of cytogram is characterized by presence of individual representatives of

rod flora with advantage of basophilic intermediate (azur- positive) epithelial cells from cytological smears from the gums. The latter have cubic, rectangular or polygonal form; cytoplasm contains azure-positive granules. The core is round, sometimes oval. It is necessary to admit the trend towards clusters of cells location of this class. Intermediate cells in histological sections correspond to ribbed parts of surface layer. These intermediate cells are normal and mostly without elements of cytopathology. It can be argued that this type of cytograms is specific to chronic generalized periodontitis.

The third type of cytogram is characterized by presence in cytograms of intermediate cells stained by Himza-Romanovskiy. The latter have azure-positive cytoplasm and nucleus is centric located. A cytoplasm is elongated. The cells are usually located in clusters. Change in the microbial composition has been noted, which in this type of cytogram is represented mainly by cocci that adhere on the surface of epithelial cells.

It should be noted that in addition to the abovementioned epithelial cells in the cytogram of the third type of examined people segmented leukocytes have been found, which are split into 3-4 segments core, in addition, there are isolated mononuclear leukocytes or young white blood cells, whose appearance suggests a redistribution pool of myeloid cells in response to the presence of foci of active inflammatory process that initiates the process of differentiation of leukocytes available. Present cytological pattern characterizes an acute generalized periodontitis in examined people.

The fourth type of cytograms is characterized by presence of single basal epithelial cells. During staining by Himza-Romanovskiy, as compared to basal cells of periodontal pockets they have relatively smaller and more rounded shape of cytoplasm. The core is round- shaped and has a narrow rim of cytoplasm. Basal epithelial cells are surrounded by segmented leukocytes.

The predominant cells in the fourth type of cytograms are cells of intermediate layer, cytological organization of which corresponds to the class affiliation and level of differentiation in a large amount a pathogenic microflora and cells of inflammatory response are visualized. Superficial cells are visualized, too.

A powerful microbial composition initiates further necrobiotic processes in epitheliocytes and in a segmented leukocytes. At the same time, due to phagocytosis, the destruction of the cytoplasm of segmented leukocytes ocurr, called “incomplete phagocytosis”.

Coccal microflora adheres not only to the surface of epithelial cells, but also to the surface of the segmented leukocytes. In addition, along with hematogenous cells predominantly coccoid flora and single thread of pseudomycelia of Candida fungi are visualized in cytograms.

Thus, cytograms of the fourth type reflect the enhance of phagocytic reaction of segmented leukocytes, and formation of «pus cells» occurs as a result of incomplete phagocytosis. During phagocytosis leukocytes undergo specific channel in the form of restructuring of its nuclear, while in epitheliocytes of gums n necrobiotic process occurrs primarily in the cytoplasm and in the nucleus.

The abovementioned type of cytogram corresponds to the clinical picture of generalized periodontitis with abscess formation.

One of cytological signs of periodontal pathology in young people is the emergence of a epithelial cells with signs of irritation in cytograms. It should be noted that these cellular elements belong to the intermediate layer of cells that on histological sections corresponds to ribbed surface layers and are characterized by homogenization and vacuolization of the cytoplasm as a manifestation of prolonged bacterial irritation. The mechanism of vacuolization of the cytoplasm of epithelial cells in generalized periodontitis is complicated and reflects disorders of water and electrolyte and protein metabolism, leading to changes in colloid-osmotic pressure in the cell. Violation of cell membrane permeability, accompanied by their collapse is crucial. This leads to lysosomal membranes labilization with activation of their hydrolytic enzymes that break intramolecular connection with

water. In fact, these changes are the manifestation of early cell focal necrosis [5].

At the same time an increase in the volume of epithelial cells, the cytoplasm is full of vacuoles, containing a clear liquid has been noted. The core is moved to the periphery of the cell, sometimes vacuoles or core shrinks appear. Disintegration of ultra-structural elements of cells occurs further and it overflows with water. These changes are an intermediate stage of cellular metabolism disorders caused by inflammation and preceding cell cyto-transformation into balloons filled with fluid Such changes characterize a balloon cell degeneration.

Analyzing cytogram, one can reach the following conclusion, which unlike previous smear from gingival epithelial have a greater degree of destruction that accompanied by cariopiknosis and kariorexis of nucleus and cytoplasm homogenization. Homy scales in cytograms are found in lower amounts in comparison to their quantitative composition in cytograms of people with health periodontium. They are mainly eosinophilic, with polygonal shape, characterized by a lack of clarity contours.

CONCLUSION

Thus, the character of changes in the gums in generalized periodontitis, is subject to rather wide limits, which depends on the clinical course and exogenous factors. Analysis of cytograms gave the opportunity to consider generalized periodontitis in examined patients, in the absence of adequate therapy, as automotive continuous process, its components (inflammatory, infiltrative and destructive) may regress under the influence of effective treatment and re-activate during exacerbation of the inflammatory process under the influence of pathogenic factors such as microbial, hygienic and immune.

Perspectives. We are planning to determine the pathogenic mechanisms of generalized periodontitis through the polymorphism of nuclear transcription factor NFkb1, which controls the expression of immune response genes, apoptosis and cell cycle.

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Г.А. Єрошенко, Н.В.Гасюк, О.Д. Лисаченко **ОСОБЛИВОСТІ ЦИТОЛОГІЧНОЇ ПЕРЕБУДОВИ ЯСЕН ПРИ ГЕНЕРАЛІЗОВАНОМУ ПАРОДОНТИТІ**

В статті представлені результати комплексного цитологічного дослідження особливостей диференціювання епітелію ясен за умов ураження генералізованим пародонтитом.

Матеріалом для дослідження слугував ясеневий епітелій, взятий з маргінального ділянки ясен у хворих на генералізований пародонтит молодого віку. Тривалість захворювання не перевищувала 3-5 років. Епітелій забирали за допомогою шпателя, з подальшим

перенесенням на предметне скло та висушуванням при відкритому доступі повітря протягом 3-5 хвилин. Матеріал забарвлювали за Гімзою-Романовським з наступним мікроскопічним морфологічним аналізом, з урахуванням відсоткового співвідношення різних форм епітеліальних клітин в нормі та у віковому аспекті.

Особливістю цитограм ясен хворих на генералізований пародонтит є поява епітеліальних клітин з ознаками подразнення. Однією із цитологічних ознак патології пародонта у осіб молодого віку відноситься поява в цитограмах епітеліальних клітин з ознаками подразнення. Слід зазначити, що вказані клітинні елементи відносять до клітин проміжного шару, що на гістологічних зрізах відповідає поверхневим шарам шипуватого та характеризуються гомогенізацією та вакуолізацією цитоплазми як прояв тривалого подразнення клітини бактеріальною агресією. Аналіз цитограм, дав можливість розгляду генералізованого пародонтиту у осіб обстеженого контингенту, за умов відсутності адекватної терапії, як безперервний саморушійний процес. Його складові (запально-інфільтративна і деструктивна) можуть регресувати під впливом ефективного лікування і знову активуватися при загостренні запального процесу під впливом патогенних чинників, а саме мікробного, гігієнічного та імунного).

Ключові слова: ясна, епітеліоцити, клітини, ядро, цитоплазма.

Г.А. Ерошенко, Н.В.Гасюк, О.Д. Лисаченко **ОСОБЕННОСТИ ЦИТОЛОГИЧЕСКОЙ ПЕРЕСТРОЙКИ ДЕСЕН ПРИ ГЕНЕРАЛИЗОВАННОМ ПАРОДОНТИТЕ**

В статье представлены результаты комплексного цитологического исследования особенностей дифференцировки эпителия десны в условиях поражения генерализованным пародонтитом. Материалом для исследования служил десневой эпителий, взятый из маргинального участка десен у больных генерализованным пародонтитом молодого возраста. Длительность заболевания не превышала 3-5 лет. Эпителий забирали с помощью шпателя, с последующим переносом на предметное стекло и высушиванием при открытом доступе воздуха в течение 3-5 минут. Материал окрашивали по Гимзе-Романовскому с последующим микроскопическим морфологическим анализом, с учетом процентного соотношения различных форм эпителиальных клеток в норме и в возрастном аспекте. Особенностью цитограмм десен больных генерализованным пародонти том было появление эпителиальных клеток с признаками раздражения. К одним из цитологических признаков патологии пародонта у лиц молодого возраста относится появление в цитограммах эпителиальных клеток с признаками раздражения. Следует отметить, что указанные клеточные элементы относятся к клеткам промежуточного слоя и на гистологических срезах соответствует поверхностным слоям шиповатого и характеризуются гомогенизацией и вакуолизация цитоплазмы как проявление длительного раздражения клетки бактериальной агрессией. Анализ цитограмм дал возможность рассмотрения генерализованного пародонтита у лиц обследованного контингента при отсутствии адекватной терапии, как непрерывный самодвижущийся процесс. Его составляющие (воспалительно- инфильтративная и деструктивная) могут регрессировать под влиянием эффективного лечения и снова активироваться при обострении воспалительного процесса под влиянием патогенных факторов, а именно микробного, гигиенического и иммунного).

Ключевые слова: десна, эпителиоциты, клетки, ядро, цитоплазма.

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FEATURES OГ CYTOLOGICAL REORGANIZATION OF GUMS IN GENERALIZED PERIODONTITIS

Findings of the comprehensive cytologic screening of features of gingival epithelium differentiation, affected by generalized periodontitis, are presented in the paper.

Gingival epithelium, taken from a marginal area of the gums in young adults, with generalized periodontitis has been studied. The disease duration was 3-5 years. The epithelium was removed with a spatula, with subsequent transfer to a glass plate and drying in the open air access for 3-5 minutes. The material was stained according to Hinrda-Romanovskiy, with further microscopic and morphological analysis, taking into account the percentage of different forms of epithelial cells in normal condition and in an age aspect.

One of the cytological signs of periodontal pathology in young people is the emergence of epithelial cells with signs of irritation. It should be noted that these cellular elements belong to the intermediate layer of cells that meets histological sections and ribbed surface layers are characterized by homogenization and vacuolization of the cytoplasm as a manifestation of prolonged irritation bacterial cell aggression. Analysis of cytograms gave the opportunity to consider generalized periodontitis in examined patients, in the absence of adequate therapy, as automotive continuous process. Its components may regress under the influence of effective treatment and re-activate during exacerbation of the inflammatory process under the influence of pathogenic factors such as microbial, hygienic and immune.

Key words: gingiva, epithelium, cells, nucleus, cytoplasm.