

ნორმოცენოზის პირობებში ენტერობაქტერიების დომინირებით პირობით-პათოგენური მიკროფლორის გავრცელების მანველებელი არ აღემატებოდა 3 ლგ GE/ნიმუში. მიკოპლაზმების არ არსებობის დროს პირობით-პათოგენური მიკროორგანიზმების რაოდენობა იყო არაუმეტეს 10^{4,5}-სა. I და II ხარისხის დისბაქტერიოზით პაციენტებში პირობით-პათოგენური მიკროფლორის ინდექსი შეადგენდა, შესაბამისად, 3-დან 1-მდე და უფრო ნაკლებს 1 ლგ GE/ნიმუში. გამოვლენილია ბაქტერიული მასის მნიშვნელოვანი შემცირება, *Lactobacillus* spp. რაოდენობის შემცირება (უპირატესად II ხარისხის დისბაქტერიოზის დროს), ამავდროულად გამოვლინდა მიკოპლაზმები და სოკო კანდიდას მაქსიმალურად მუდმივი რაოდენობა.

ნური მიკროფლორის ინდექსი შეადგენდა, შესაბამისად, 3-დან 1-მდე და უფრო ნაკლებს 1 ლგ GE/ნიმუში. გამოვლენილია ბაქტერიული მასის მნიშვნელოვანი შემცირება, *Lactobacillus* spp. რაოდენობის შემცირება (უპირატესად II ხარისხის დისბაქტერიოზის დროს), ამავდროულად გამოვლინდა მიკოპლაზმები და სოკო კანდიდას მაქსიმალურად მუდმივი რაოდენობა.

MORPHOLOGICAL CHANGES IN PERIODONTAL TISSUE DURING PERIODONTITIS

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Periodontitis is a dental polymicrobial, chronic inflammatory condition, which begins with a simple inflammation of the gums and characterized by the loss of alveolar bone, supporting structures of teeth and periodontal complex, forming abnormal periodontal pockets and finally by loss of teeth [5,7,15,16,23,28].

An important factor in the development and progression of periodontitis is the symbiotic-antagonistic relationship between oral bacteria and the host [11,28].

The oral bacteria have the ability to retain plaque and create biofilms on the cervical surfaces of the teeth. The colonization and continued presence of bacteria in the subgingival area leads to the progression of the gingivitis, formation of the pocket and bone loss [19,26].

According to electron microscopic studies, the presence of fusiform, coccobacilli as well as spirochetes was demonstrated in the gingival oral epithelium, adjacent connective tissue and capillaries. The above-mentioned periodontopathic bacteria have the ability to colonize between gingival and subgingival tissue and damage the gingival epithelial and blood-dendritic cells [4,19,23].

As a result of the influence of the microorganisms on the periodontal attachment, the progression of the disease divides into the following steps: 1) colonization near the gum line, - 2) integration and survival in the biofilm milieu, - 3) migration below the gum and, - 4) suppression of the host mucosal defense [10].

There are up to 700 species of microorganisms in the oral cavity, including periodontopathogens [8,13,28], which cause the development of periodontitis [28]. According to certain authors, there are bacteria of red complexion that are most associated with the development of severe periodontitis, namely: *Porphyromonas gingivalis*, *Tannerella forsythia*, *Aggregatibacter actinomycetemcomitans* and *Treponema denticola* [3,11,15,28].

Women and men have an equal periodontal pathogen colonization. However, the women have a higher risk of periodontitis onsets and the most prevalent causative agent is *P. Gingivalis*, whilst the most prevalent causative agents of the periodontitis in men are *P. Gingivalis*, *P. Intermedia*, *T. Forsythensis* and *T. Denticola*. However, most frequently *T. Forsythensis* is observed [28].

Aggressive periodontitis usually affects people under the age of 30 and is characterized by the rapid development of destructive changes. The family cases are rare. Morphologically it is characterized by the plasmacytic inflammatory infiltration, the domination of neutrophils in the connective tissue and the presence of the fibrin-coated plaque [28].

There are many etiological factors causing periodontal disease, one of which is poor oral hygiene. Poor oral hygiene increases chances of the development of periodontal disease by two to five times [17].

According to epidemiological studies periodontitis is highly prevalent globally [25]. The data of studies held at Harvard School of Dental Medicine show that overall periodontitis prevalence is 55.5% ($\pm 1.4\%$), from which 20.7% ($\pm 1.2\%$) is moderate and, 2.8% ($\pm 0.5\%$) is severe [5,14]. Approximately half of the adult USA population has periodontitis [16].

According to the analysis of the studies conducted by sex, age and countries from 1990 to 2017, 796 million people had severe periodontitis on a global scale [12].

Studies show that the prevalence of severe periodontitis varies throughout the world. The highest prevalence rates were reported in Africa (4.2%, 95% CI 2.0-7.1) and South America (4.0%, 95% CI 0.9-9.1) compared to Europe (0.1%, 95% CI 0.1-0.2). However, the lowest prevalence was found in Asia (1.2%, 95% CI 0.5-2.2) and North America (0.8%, 95% CI 0.4-1.4) [5]. In Georgia unhealthy periodontal tissues were found in 66.9 % of men and 57.5 % of women [2].

Periodontal pathogens are harmful not only to the oral cavity but also affect the development of the fetus and our body as a whole. There is also a link between periodontitis and general somatic diseases (Kvaratskhelia et al., 2020). Laboratory studies have established the presence of periodontopathogens in saliva, subgingival plaque and placenta [27].

Based on one of the systematic reviews, there is a connection between periodontitis and cancer [9]. In particular, patients diagnosed with periodontitis have a higher risk of developing mouth cancer, also lungs, and pancreatic cancer [22]. Women with periodontitis are two to three times more likely to develop breast cancer [24].

Due to above mentioned, histomorphological examination in patients with periodontitis is becoming more important, that is not well introduced in dental practice. The results of such studies may play an additional role in detecting the precancerous lesions oral cavity cancer and planning preventive measures for oral cancers [19].

The aim of our study was a morphological study of periodontal tissues in patients with severe generalized periodontitis in Georgia in order to detect signs of the possible precancerous lesions.

Material and methods. 59 patients with the severe periodontitis were studied. The patients were selected for the 3069 per-

sons examined in the dental clinic in town Senaki during the prophylactic oral examination in period of February 6 - December 12, 2020.

After having obtained a written consent, patients periodontal status was assessed by oral examination of a clinical trial method based on the WHO recommendation.

Periodontal status was assessed by the following indicators: 1) Plaque index - the presence of visible plaque on any surface of the tooth, 2) stone index, 3) the depth of periodontal pockets, 4) tooth mobility.

The presence of plaque and stones on the teeth was assessed by dental mirror examination; the depth of the periodontal pockets was measured by means of a periodontal probe in the areas of 16, 21, 24, 36, 41, 44 teeth.

The 59 patients selected for the study had severe generalized periodontitis, poor oral hygiene, grade III-IV teeth shaking, and abnormal pockets of 5 mm in depth and above.

After signing the informed concern form all patients underwent tooth extraction. The procedure was carried out by different means (Chef, Yang, Parchment, etc.). The extracted teeth along with the surrounding granulation tissue and the inner substance taken from the tooth cavity as a result of the curettage process

were placed in 10% formalin For 24 h and decalcified in 10% nitric acid solution for 24-48 days. The obtained species – were embedded in paraffin. 4-5 μ m thick slices stained with hematoxylin and eosin _were studied microscopically (microscope Leica DM-1000 LED with digital camera Leica MC 170 HD).

Results and discussion. In all cases, the well-defined leukocyte-lymphohistiocytic infiltration and both intra (Fig. 1a) and subepithelial (Fig. 1b) edema were revealed. In particular, cell enlargement, filling of the cytoplasm with clear fluid, and nuclei movement toward the periphery were observed. In some cases, the above-mentioned changes were accompanied by the formation of micro-abscesses. Hyperplasia of the multilayered squamous epithelium with an increase in the number and the size of cells was observed in the majority of cases (Fig. 1c). In some of these cases, the foci of necrosis with the complete disintegration of cell components, disruption of the cytoplasmic membranes, cariolysis and eosinophilia, have been revealed (Fig. 1d).

Fibroblast and connective tissue proliferation was detected in predominantly young patients (Fig. 1e). Vascular sclerosis with endothelial cell proliferation has also been reported (Fig. 1f). It should also be emphasized that mild (Fig. 1j) and moderate (Fig. 1h) dysplasia of the epithelium occurred in 30% of cases.

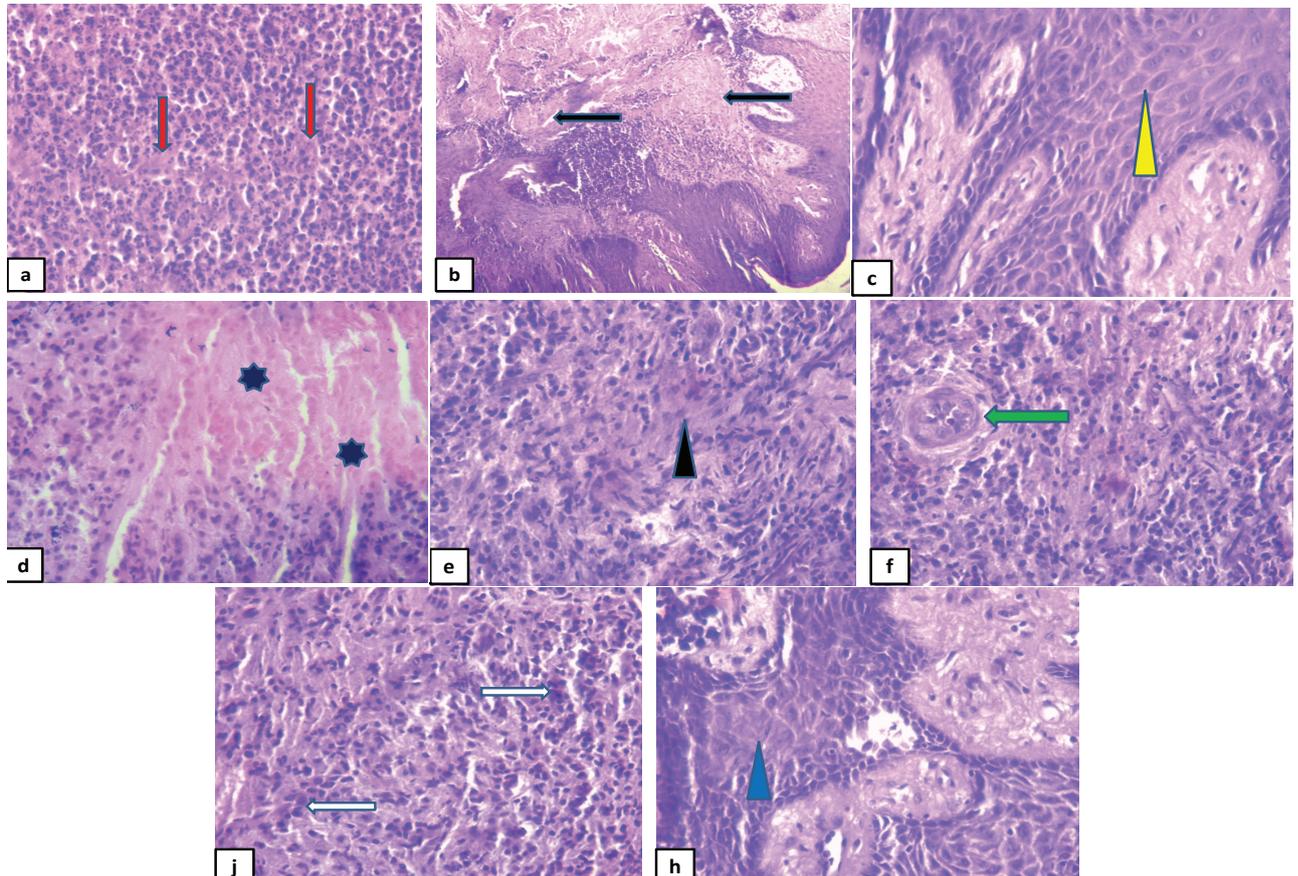


Fig. 1a - 2 teeth with an adjacent granulation tissue. 47 years-old woman; oedema; red arrows - the centre of leukocyte-histiocytic infiltration; b - 13 teeth with and adjacent granulation tissue. 49 year-old man; oedema; black arrows - the centre of leukocyte-lymphohistiocytic infiltration; c - 14 teeth with an adjacent granulation tissue. 50 years-old man; yellow arrowhead - area of multi-layered flat epithelium hyperplasia; d - 13 teeth with an adjacent granulation tissue. 66 years -old man; stars - foci of necrosis; e - 35 teeth with an adjacent granulation tissue. 26 years-old woman; black arrowhead - the centre of reproduction of a connective tissue; f - 21 teeth with surrounding granulation tissue. 48 years-old man; green arrow - the foci of vascular sclerosis with proliferation of endothelial cells; j - 11 teeth with surrounding granulation tissue. 57 years-old man; white arrows – an area of light dysplasia of the epithelium; h - 22 teeth with adjacent granulation tissue. 35 years-old man; blue arrowhead - the epithelium of moderate epithelial dysplasia

Conclusion. This study shows that severe generalized periodontitis is characterized by various morphological changes. Purulent-destructive inflammation should be considered as a morphological manifestation of aggressive periodontitis. In severe cases, foci of necrosis may also develop. Mild to moderate epithelial dysplasia, found in one third of all cases, may be considered an optional precancerous condition and should be considered when choosing a treatment.

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SUMMARY

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Periodontitis is the most common oral disease worldwide and is the leading cause of tooth loss. It is considered to be a major burden in terms of costs of treatment and preventive measures.

According to the systematic reviews, there is a link between periodontitis and cancer. In particular, patients diagnosed with periodontitis have a higher risk of developing oral cancer. In this regard, the histomorphological examination of patients with periodontitis, which has not yet been sufficiently introduced in dental practice, is acquiring more and more importance.

The aim of the work is a morphological study of periodontal

tissues in patients with severe generalized periodontitis in Georgia - to identify signs of possible precancerous lesions.

The data obtained show that the morphological characteristic of severe periodontitis is purulent destructive inflammation. In addition, a third of severe periodontitis is accompanied by mild to moderate epithelial dysplasia, which should be taken into account when choosing a treatment method in terms of oncological alertness.

Keywords: Periodontitis, causative bacteria of periodontitis, periodontopathic bacteria, micromorphology.

РЕЗЮМЕ

МОРФОЛОГИЧЕСКИЕ ИЗМЕНЕНИЯ В ТКАНИ ПАРОДОНТА ПРИ ПАРОДОНТИТЕ

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Пародонтит - наиболее распространенное заболевание полости рта во всем мире, является основной причиной потери зубов. Он считается большим бременем с точки зрения затрат на лечение и профилактические меры.

Согласно результатам одного из систематических обзоров, существует связь между пародонтитом и развитием рака, в частности пациенты с диагнозом пародонтита имеют более высокий риск развития рака ротовой полости. В связи с этим, все большее значение приобретает гистоморфологическое обследование больных пародонтитом, которое по сей день не внедрено в стоматологическую практику.

Целью исследования является морфологическое исследование тканей пародонта у пациентов с тяжелым генерализованным пародонтитом - для выявления признаков возможных предраковых поражений.

Полученные данные показывают, что морфологической характеристикой пародонтита тяжелой степени является гнойное деструктивное воспаление. Кроме того, треть тяжелых пародонтитов сопровождаются дисплазией эпителия легкой и средней степени тяжести, что следует учитывать при выборе метода лечения с точки зрения онкологической настороженности.

რეზიუმე

მორფოლოგიური ცვლილებები პაროდონტის ქსოვილში პაროდონტიტის დროს

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პაროდონტიტი პირის დრუს საკმაოდ გავრცელებული დაავადებაა, როგორც მსოფლიოს მასშტაბით, ასევე საქართველოშიც და წარმოადგენს კბილების დაკარგვის ერთ-ერთ ძირითად მიზეზს და მნიშვნელოვან ტვირთს მკურნალობის და პროფილაქტიკის ხარჯების თვალსაზრისით.

სისტემური მიმოხილვის თანახმად, არსებობს კავ-

შირი პაროდონტიტსა და კბილის განვითარებას შორის. კერძოდ, პაროდონტიტით დაავადებულ პაციენტებს აქვთ პირის დრუს კბილის განვითარების მეტი რისკი. ამ მხრივ, სულ უფრო მეტ მნიშვნელობას იძენს პაროდონტის ქსოვილთა ჰისტომორფოლოგიური გამოკვლევა, რაც ჯერ კიდევ საკმარისად არ არის დანერგილი სტომატოლოგიურ პრაქტიკაში.

კვლევის მიზანს წარმოადგენს პაროდონტის ქსოვილების მორფოლოგიური გამოკვლევა საქართველოში მცხოვრებ პაციენტებში (n=59) მწვავე გენერალიზებული პაროდონტიტით შესაძლო კბოსწინარე დაზიანების ნიშნების გამოვლენისათვის.

მოპოვებული მონაცემების თანახმად, მძიმე პაროდონტიტის ძირითადი მორფოლოგიური მახასიათებელია ჩირქოვანი დესტრუქციული ანთეზა. ამასთანავე, შემთხვევათა ერთ მესამედში აღინიშნება მსუბუქი და საშუალო სიმძიმის ეპითელური დისპლაზია, რაც გასათვალისწინებელია მკურნალობის მეთოდის არჩევისას ონკოლოგიური სიფხიზლის თვალსაზრისით.

დონტიტის ძირითადი მორფოლოგიური მახასიათებელია ჩირქოვანი დესტრუქციული ანთეზა. ამასთანავე, შემთხვევათა ერთ მესამედში აღინიშნება მსუბუქი და საშუალო სიმძიმის ეპითელური დისპლაზია, რაც გასათვალისწინებელია მკურნალობის მეთოდის არჩევისას ონკოლოგიური სიფხიზლის თვალსაზრისით.

ASSESSMENT OF LASER AND ANTIOXIDANT THERAPY EFFICACY IN TREATMENT OF CHRONIC GENERALIZED PERIODONTITIS

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An apparent tendency in continuous and steady rise in the incidence of pathological changes in periodontal tissue has been noted in the past few decades, reaching the prevalence of up to 95-100% among the population of Russian Federation [4,7,9]. This trend of growing prevalence of chronic generalized parodontitis as the most severe disorder among diseases of oral cavity and the complexity of its treatment present pressing challenges for all involved professionals [1,2,5,10,11].

Many different treatment modalities and practical recommendations have been developed to help the patients and to reduce the incidence [3,6,8,10], nevertheless this problem still remains not unresolved.

The purpose of this study was to assess the outcomes of conventional treatment and secondary prevention of chronic generalized parodontitis when combined with laser therapy and antioxidative treatment.

Material and methods. The prospective cohort study included 98 patients aged 30-50 years (31 male, 67 female) with history of 3 to 10 years duration of moderate chronic generalized parodontitis disease. All patients were divided into approximately equal three groups in accordance to the age, stage of disease and gender. The data collection has been performed at the time of admission, on the 6th day after the start of treatment, and on the 12th day and 6 months after completion of the course of treatment.

There has been no other disorder treated or a medication administered for treatment of any other disorder during the observation period. Conventional dental and oral cavity hygiene practices were observed.

The 1st Group (Control Group) consisting of 33 patients received the standard anti-inflammatory course of treatment: professional hygiene procedures with subsequent administration of Chlorhexidine and Metrogyl into gingival sulcus, irrigation with Dioxidine or Dimexidum, ointment dressing with Lingezine, Metrogyl Denta, Butadionum, Cholosal; Antimicrobial agents Flagyl, Kliostom, Metrogyl were combined with anti-allergic drugs (Diazolin) and vitamins (A,C,P). Non-steroidal anti-inflammatory drugs (NSAID) also were routinely used, and Indomethacin was a drug of choice in majority of cases.

The 2nd Group consisted of 32 individuals who underwent laser treatment using device "Matrix" with wave length 635 nm and energy level 10 mW. The irradiation of alveolar process started with 2 minutes duration for the first treatment session with daily increments of 30 seconds until reached the maximum duration of exposure up to 5 min. The full treatment course duration was 12 days.

Treatment in the 3rd Group (33 patients) was similar to that of the 2nd Group with addition of antioxidant drug Mexicor during the same course of 12 days conventional therapy and laser application.

Several clinical indices were utilized for assessment of periodontal tissue: PMA (Papillary Marginal Attachment), SBI (Sulcus Bleeding Index), API (Approximal Plaque Index). The resistance of gingival capillaries was measured by scaled vacuum application (V. Kulazhenko). The degree of osteal resorption was determined by assessment of intra alveolar septae of maxillary bones on X-ray.

The lipid peroxide oxidation was determined by levels of secondary products (malonic dialdehyde Fe²⁺+MDA) in patients' blood serum. Phospholipase A2 catalytic activity was determined based on the amount of free fatty acids by potential measurement in the following solution: 10 mmol tris-HCl-buffer (pH 8,0), 150 mmol Triton X-100, 10 mmol CaCl₂ and substratum (1,2 mmol phosphatidylcholine of egg yolk. Spectrophotometry was implemented to determine catalase activity.

The collected data were analyzed by use of basic scientific statistics and Student's t-test.

Results and discussion. In accordance with the API index the hygienic condition of oral cavity in patients with chronic generalized parodontitis has been found as non-satisfactory. The dynamics of PMA index have shown inflammatory changes in oral mucosa.

After completion of the course of treatment the values of PMA were reduced by 22,7-45,0% (p<0,05). The hygiene index (API) by the completion of therapy was reduced by 33,7% (p<0,05). The traditional treatment was also effective in decreasing gingival bleeding, according to the SBI index of 57,1% (p<0,05). The improvement functional condition of periodontal vessels was reflected by an increase in time for development of gingival haematoma by 55,8-107,7% (p<0,05).