

DOI: <https://doi.org/10.56936/18290825-1.v19.2025-20>

CHARACTERISTICS OF MORPHOLOGICAL ELEMENTS OF LESIONS OF THE ORAL MUCOSA IN PATIENTS WITH HIV INFECTION

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Received 21.05.2024; Accepted for printing 11.02.2025

ABSTRACT

The human immunodeficiency virus remains a global public health problem, having claimed more than 35 million lives to date. Oral lesions in people infected with HIV are among the first symptoms of the disease, which are characterized by great diversity. WHO suggests using oral mucosal diseases in HIV infection as an important diagnostic criterion. Signs of HIV in the oral cavity are inflammatory-dystrophic changes in the mucous membrane. In essence, HIV suppresses the proliferation of CD4+ T-lymphocytes, thereby significantly reducing the production of these important lymphocytes. The aim of this study was to identify the characters of the most typical morphological changes in the oral mucosa in patients with HIV.

The study included 190 patients (group I HIV n= 90, group II control group n=100) with lesions of the oral mucosa in the age range 29 – 64 years. The control group involved 45 subjects without HIV with lesions of the oral mucosa, their age: 25 to 67. The content of cytokines IL-2, IL-4, IL-10 and γ -IFN in the oral fluid was determined by ELISA. Biopsies taken from the buccal mucosa and gums were subjected to histological examination. Immunohistochemical study of mucous membrane biopsies was carried out using monoclonal mouse antibodies to CD3 + and CD20+.

The morphological signs may be conditionally subdivided into indicators of severity and activity of inflammation. The healing of oral mucosa injuries occurred due to the higher density of newly formed blood vessels and the appearance of collagen fibers. Significant morphological changes developed in the microvasculature have dual influence: it makes worse the tissue trophism and accelerate the healing with differentiation into coarse-fibrous connective tissue. The immunohistochemical findings indicate the decrease in tissue local immune response. An increase in pro-inflammatory IL2 and a decrease in anti-inflammatory IL4 were detected in comparison with the control group.

KEYWORDS: Morphology, oral mucosa, cytokines, immunohistochemistry, HIV.

CITE THIS ARTICLE AS:

Azatyany V.Yu., Yessayan L.K., Poghosyan M.A., Shmavonyan M.V., Sahakyan K.T., Muradyan A.A. (2025). Characteristics of morphological elements of lesions of the oral mucosa in patients with hiv infection. The New Armenian Medical Journal, vol.19(1), 20-30; DOI: <https://doi.org/10.56936/18290825-1.v19.2025-20>

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INTRODUCTION

Human immunodeficiency virus (HIV) remains a global public health problem, having claimed more than 35 million lives to date. In 2023, HIV-related causes will kill approximately 1.5 million people worldwide. At the end of 2023, there were an estimated 37.8 million people living with HIV worldwide, and 2.7 million people acquired HIV-infection in 2021 [WHO, 2022]. In Armenia from 1988 to October 31, 2023 4583 cases of HI-infection were registered [Azatyan VYu et al., 2022; NCID, 2024].

Oral lesions in people infected with HIV are among the first symptoms of the disease, and are characterized by great diversity. A stomatologist may be the first specialist an HIV-infected patient sees [Castillejos-García I et al., 2018]. World Health Organization (WHO) proposes to use oral mucosal diseases in HIV-infection as an important diagnostic criterion [WHO, 2022]. Oral mucosa lesions serve as clinical markers of HIV viremia and immune suppression as HIV-infection progresses [Kolisa Y et al., 2019; Johnson N et al., 2020].

The stomatologist faces great difficulties in diagnosing oral lesions in patients with HIV-infection and AIDS due to their diversity and non-specificity [Jambeiro de Souza A et al., 2018; Weinberg A et al., 2020]. Therefore, diagnosis and treatment of oral lesions in this group of patients should be carried out in close contact with infectious disease specialists, immunologists, oncologists and other specialists [Xia HS et al., 2021].

The pathogenetic commonality of many general somatic processes and inflammatory diseases of the oral cavity is due to the development of mechanisms of cellular damage and modification of tissue structures that are common to the entire body, with the acquisition of autoantigenic properties. The leading role in the occurrence of these changes is played by failures and dysfunctions of cytokine regulation of immunobiological processes [Bostanci N et al., 2018; Maney P et al., 2015]. The development of inflammatory diseases is determined by the state of cytokine regulation [Pan W et al., 2019; Sun X et al., 2021]. Most of both pro- and anti-inflammatory cytokines (such as IL-1, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, TNF α , γ -INF) are present not only in peripheral blood but also in mixed saliva or oral fluid [Sehgal HS et al., 2019; Sheshukova OV et al., 2021]. Compelling evidence has accumulated in favor of

the cytokine concept of pathogenesis of chronic inflammatory diseases oral mucosa [Taylor J, 2014; Groeger S et al., 2019].

Signs of HIV-infection in the oral cavity are inflammatory-dystrophic changes in the oral mucosa: hyperemia, dryness, edema and desquamation of the epithelium. Essentially, HIV-infection inhibits CD4⁺ T lymphocyte proliferation [MacParland SA et al., 2015; Skardasi G et al., 2018; Tavares TS et al., 2021] thus reducing significantly the production of these important lymphocytes. This impairs virus-specific T-cell response by altering cooperation among various components of the immune system [Huang Y et al., 2015; Yang Z et al., 2021]. Moreover, CD3 lymphocytes in HIV-infection patients are less effective in blocking HIV replication as compared to healthy individuals [Kokordelis P et al., 2015; Warnakulasuriya S et al., 2021].

The impaired immune system also leads to the development of oral cavity diseases among HIV-infection patients [Cekici A et al., 2014; Weinberg A. et al., 2020; Yura Y et al., 2022]. The diagnostic methods available to the dentist include immunological [Stadler AF et al., 2016] and morphological studies, forming a group of morphological diagnostic methods [Noguera-Julian M et al., 2017; Sehgal HS et al., 2019; Sun X et al., 2021]. In case of discrepancy between the preliminary clinical diagnosis and the results of histopathological examination (the gold standard of oral mucosa lesions diagnostics) [Mendez M et al., 2016], along with classical histological research methods [Yu CH et al., 2014; Azevedo AS et al., 2016], modern methods of immunohistochemistry should be used [Sanchez-Quevedo MC et al., 2007].

The **aim** of this study was to identify the characters of the most typical morphological changes in the oral mucosa in patients with HIV-infection.

MATERIAL AND METHODS

The study included 190 patients who were divided into groups (group I: patients of the main group with HIV-infection n= 90, group II: individuals of the control group n=100). In addition to the underlying disease, patients with HIV-infection had lesions of the oral mucosa. The age of patients ranged from 29 to 64 years, hospitalized in the period 2021-2023 in the infectious diseases clinic of the "Mikaelyan Institute of Surgery", Yerevan

State Medical University (Yerevan, Armenia). The control group included 100 individuals without HIV-infection with oral mucosa lesions who applied to the Stomatology Scientific and Educational Clinical Center No. 1 of Yerevan State Medical University during the same period. Their ages ranged from 25 to 67 years. The viral nature of HIV-infection was verified by detecting HIV virus RNA in the blood serum of examined individuals using the reaction WESTERN- BLOT.

A clinical examination was done to assess the oral cavity status. This included an external examination of the: lips, corners of the mouth, an assessment of various parts of the oral mucous membrane (color, relief, presence of hemorrhages and telangiectasia), well as the condition of tongue (color, coating and foci of epithelial desquamation).

Study of cytokines in oral fluid: Cytokines of the oral fluid were tested among 24 patients with HIV-infection and 30 patients without HIV-infection, who agreed to pass this test. The test material was unstimulated mixed saliva – oral fluid, obtained without stimulation and collected with a sterile syringe into sterile Eppendorf tubes. Samples were frozen and stored at -20°C . The samples after were thawed at room temperature, centrifuged at 5000 rpm in the cold. Mucin was precipitated using 6 units of Lydase per 1.0 ml of oral fluid by our patented method (*Patent RA No. 3295 A dated at May 16, 2019*). The concentrations of cytokines IL-2, IL-4, IL-10 and γ -INF was determined by the method of solid-phase enzyme-linked immunosorbent assay (ELISA) using the Vector-Best test systems (Vector-Best JSC, Novosibirsk, Russia) and was registered on a Statfax 303 Plus photometer (Awareness Technology, Inc. Palm City, FL 34990, USA)

Morphological study: The material for morphological studies served samples of biopsy tissues excised from mucous membrane in the area of immediate localization of the pathological process in all patients with HIV-infection. According to the standard histological scheme, the pieces of tissue were fixed in 10% neutral formalin, dehydrated and embedded in paraffin. A series of sections of 4 μm thickness were stained with hematoxylin - eosin and picrofuchsin by Van Gieson for a general assessment of the condition of the examined tissues [Prento P, 1999]. Histological micro preparations were studied with a ZEISS Primo Star trin-

ocular microscope (ZEISS Microscopy, Germany) under 100 and 400 times magnification. Microphotographs were taken with a ZEISS Axiocam ERc 5s (Carl ZEISS Microscopy, Germany). All features were examined in accordance with the international standards, WHO recommendations and recognized research methods [WHO, 2005].

Immunohistochemical study: Immunohistochemical study was carried out with reagents produced by Zytomed (Germany), i.e. a manual polymer detection system and positive control. Immunohistochemical study of mucous membrane biopsies was carried out using monoclonal mouse antibodies to CD3 + (clone SP7 for the determination of T-lymphocytes), CD20 + (clone L26 for the determination of B-lymphocytes). The listed immunohistochemical markers were chosen after the control researches, which allowed to reveal the most informative indicators to evaluate the activity of T- and B-lymphocytes. It has helped to evaluate more precisely character of oral mucosa inflammation.

Statistical analysis: Descriptive analysis (Mean $\pm$ SD for continuous and frequencies/proportion for categorical variables) were calculated for all variables of interest. Differences between two groups were evaluated using “chi-square” or “Fisher’s exact” tests for categorical variables and “Wilcoxon signed rank test” for continuous variables. Spearman correlation was performed for determination of relationships between continuous variables. P-value was considered significant at <0.05 and <0.001 for highly significant results. Analyses were conducted using Excel 2013 and R software software and program Vassar Stats to calculate Odds Ratio and 95% Confidence Intervals (CI).

RESULTS

The study included 90 patients with HIV-infection, 81 men (90.0%) and 9 women (10.0%). The control group involved 100 subjects without HIV-infection with lesions of oral mucosa: 62 men (62.0%) and 38 women (38.0%). The average age in HIV-infection patients group was 45.2 ± 8.34 , and in the control group 37.99 ± 16.66 . Patient complaints and data from the clinical examination of the oral cavity were taken into account when examining the dental status, including: external examination of the lips and corners of the mouth, assessment of the state of various parts of the oral mucous (Table 1).

TABLE 1.

Clinical examination data of the oral mucosa in patients with HIV-infection and in the control groups

Sign	Control group n=100		HIV-infection n=90		p-value*
	n	%	nr	%	
Erosion on the lips					
Absent	99	99	46	51.1	<0.001
Present	1	1	44	48.9	
Cracks in the corners of the mouth					
Absent	99	99	24	26.7	<0.001
Present	1	1	66	73.3	
Disorders in the mucous membrane relief					
Absent	97	97	22	24.4	<0.001
Present	3	3	68	75.6	
Hemorrhages on the buccal mucosa and the hard palate					
Absent	100	100	83	92.2	<0.00471
Present	0	0	7	7.8	
Telangiectasia on the buccal mucosa					
Absent	100	100	84	93.3	<0.0103
Present	0	0	6	6.7	
Coated tongue					
Absent	100	100	0	0	<0.001
Present	0	0	90	100	
Foci of epithelial desquamation on the surface of the tongue					
Absent	100	100	41	45.6	<0.001
Present	0	0	49	54.4	

NOTES: * p-value test result from the comparison between HIV-infection and control group

The objective examination of the lips in HIV-infection patients revealed 44 cases (48.9%) erosion and 66 cases (73.3%) cracks in the corners of the mouth. There were only 1 (1.0%) patients/cases of erosions and cracks in mouth corners in the control group. Disorders in the mucous membrane relief in the HIV-infection patients were detected in 75.6%, in the control group – in 3.0%. Some manifestations inherent in HIV-infection were absent in the control group. Namely, hemorrhages on the buc-

cal mucosa and on hard palate were observed in 7 (7.8%) of the examined patients. A similar picture was observed in terms of telangiectasias on the buccal mucosa, absent in the control group, while in the HIV-infection group it was detected in 6.7% patients. The examination of the tongue of patients in HIV-infection group also revealed symptoms that were absent in the control group. The presence of coated tongue was detected in 100.0% and foci of tongue surface epithelial desquamation in 54.4% examined HIV-infection patients.

Pro-inflammatory and Anti-inflammatory Cytokines: Within the scope of the research we studied the content of pro-inflammatory cytokines - IL2, γ -INF and anti-inflammatory cytokines - IL4 and IL10 in the oral fluid (Table 2).

The comparison of the results of oral fluid cytokines in HIV-infection and in the control group shows that the amount of pro-inflammatory IL2 increases with a high significant difference 24.57 ± 21.58 (8.7 times, $p < 0.001$). The level of anti-inflammatory IL4 decreases with the same significant difference ($p < 0.001$) 0.21 ± 0.48 (68.05 times). The amount of IL10 also significantly increases 3.29 ± 6.55 (3.5 times, $p < 0.05$). The increase of γ -INF in HIV-infection patients is statistically insignificant in comparison with the control group ($p > 0.561$).

Pathohistological and immunohistochemical study: Pathological processes in the oral cavity were mainly localized in buccal mucosa (by 55.0% of patients) and in gums (by 45.0% of patients). Five groups of major pathomorphological changes were identified in the mucous membrane in HIV-infection, such as: inflammatory infiltration (lymphoplasmocytic or plasmocytic infiltration with admixture of neutrophils), circulatory disorders, mucosal ulceration with fibrinous film, mucosal fibrosis and dystrophic changes in squamous epithelium. The inflammatory reaction was observed in all morphologically examined patients with HIV-infection and detected in the form of lymphoplasmocytic infiltration in 91.3%. The inflammation predominantly had proliferative properties and was localized mostly in the upper parts of the mucous membrane. Lymphoid infiltration was also

TABLE 2.
Oral fluid cytokines levels in the control group and in patients with HIV-infection (mean $\pm$ SD)

Cytokines	Control group (n=30)	HIV-infection (n=24)	Odds Ratio	95% CI	p value*
IL2	2.83 ± 5.67	24.57 ± 21.58	-21.75	[-31.06; -12.44]	<0.001
IL10	0.94 ± 1.33	3.29 ± 6.55	-2.35	[-5.15; 0.45]	<0.05
IL4	14.29 ± 26.11	0.21 ± 0.48	14.08	[4.33; 23.84]	<0.001
γ -INF	0.72 ± 3.04	0.34 ± 1.4	0.38	[-0.88; 1.64]	0.561

NOTES: * p-value test result from the comparison between control and HIV-infection groups

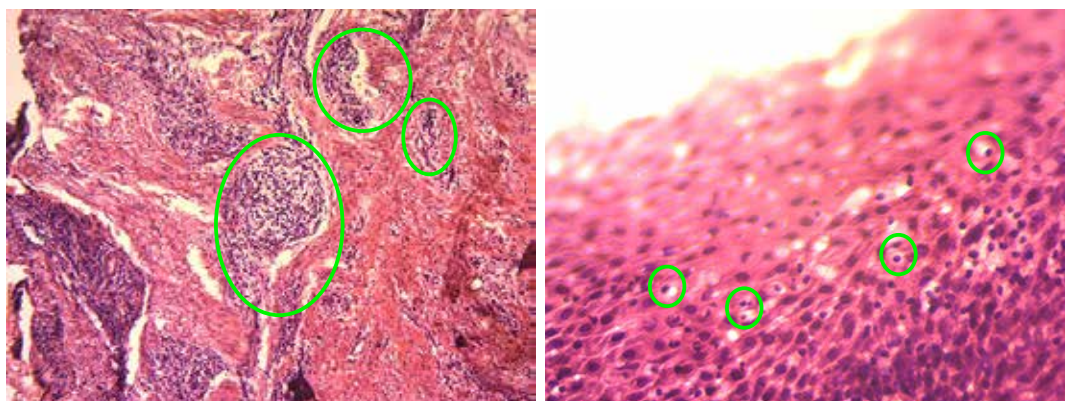


FIGURE 1. Lymphoplasmocytic infiltration in the oral mucosa of the patient with HIV-infection. Rounds – inflammatory cell infiltrate, rounds – sclerosing connective tissue of the oral mucosa (stained with hematoxylin - eosin, x100) (a); Migration of the cells of the inflammatory infiltrate into the thickness of the epithelial layer of the oral mucosa of the patient with HIV-infection (rounds; stained with hematoxylin - eosin, x 400) (b).

found around unevenly congested small blood vessels, at the epithelium border with the underlying tissue (Fig.1a), in some cases with the migration of inflammatory infiltrate cells into the thickness of the epithelial layer (Fig. 1b). Circulatory disorders were revealed in 100% of the examined patients in the form of edema, hemorrhages of various sizes due to destruction of the blood vessel walls, stasis in capillaries, marginal standing of blood cells corpuscles in venules and capillaries, hyperemia and angiomatosis. Obliteration of the vascular lumina, fibrinoid necrosis and fibrinoid swelling of the vessel walls were observed. Hyperplastic, metaplastic and dystrophic changes in squamous epithelium in form of acanthosis, parakeratosis and thickening were revealed in 99.7% of the examined HIV-infection patients. Fragments of necrotic bone tissue, most likely due to sequestration of the jawbone, were found in few patients 7.9% with HIV-infection. Damage of the epithelial cells was revealed as cytoplasmic vacuoles up to balloon dystrophy, death and desquamation of the epithelium with formation of microerosions. The comparative analyses of these five pathomorphological changes showed that mucous membrane fibrosis was reliably detected in 97.8% of HIV-infection patients with a high significant difference ($p < 0.001$). Changes caused by the development mucous membrane sclerosis were determined in 100% of cases.

Immunohistochemical research of biopsies mucous oral membrane taken of from patients with HIV-infection us to evaluate the quantative com-

position of infiltrate to T-lymphocytes (CD3+) and B-lymphocytes (CD20+). Diffuse lymphocytes in its plate mucous oral membrane are represented mainly with T-cells, though T-lymphocytes were singly localized in the thick epithelial stratum. B-lymphocytes were diffuse in scanty quantity. Single plasmocytes were also scattered in the infiltrate mainly were in the surface part of the mucous membrane under the epithelium (Fig. 2a and 2b).

Thus, in the patients with HIV-infection we saw single diffuse CD20+ - positive lymphocytes, which is evident of local weakly expressed humoral immune response.

DISCUSSION

For the first time, a comprehensive clinical, immunological, pathomorphological and immunohistochemical study of the oral mucosa was conducted in patients with HIV-infection and control group individuals who did not have HIV-infection but had lesions of the oral mucosa.

There is practically no pathology that would not affect the state of the oral mucosa. At the same time, the similarity of clinical manifestations in the oral cavity of diseases of different etiology and pathogenesis contributes to difficulties in making a final diagnosis [Takai S *et al.*, 2015]. Lesions of the oral mucosa and periodontium aggravate the course of diseases and serve as an important addition to the characterization of the general clinical picture of hepatitis and HIV infection [Andrusiów S *et al.*, 2020]. The experience of a dentist working in infectious disease

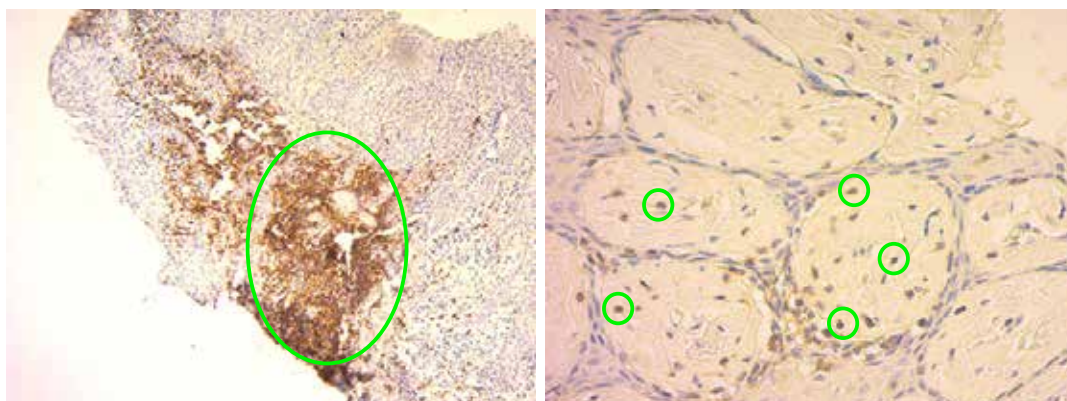


FIGURE 2. Diffuse positive reaction to CD3 + in the cells of the inflammatory infiltrate (rounds) in the oral mucosa of the patients with HIV-infection (x 100) (a). Focal positive reaction to CD20+ in scattered single cells of the inflammatory infiltrate (rounds) of the oral mucosa of the patient with HIV-infection (x 400) (b).

departments has shown that the effectiveness of diagnosis and treatment of oral mucosa lesions depends on the earliest possible examination of the admitted patient [Bagewadi SB et al., 2015].

Analyzing the frequency of occurrence of symptoms of oral mucosa lesions, it was found that in HIV-infection, the leading positions with a high degree of reliability are occupied by two leading pathognomonic symptoms (disorders in the mucous membrane relief, coated tongue) with fluctuations from 75.6% to 100.0% of cases. On the contrary, cracks in the corners of the mouth and especially erosions on the lips are more characteristic of HIV-infection, which cannot be said about the presence of hemorrhages on the buccal muca and the hard palate, which were observed in 7.8% of cases.

There are few studies in the available literature that have studied and systematized the symptoms of oral mucosa damage in HIV-infection, especially the early manifestations of the disease. The reliability of the frequency of occurrence of one or another symptom of the lesion has not been studied either. Some authors even point to the contradictory nature of the data indicating the connection between oral mucosa lesions and HIV-infection. In our opinion, these conclusions are related to the incorrect conduct of the research. It should be noted that the literature contains reviews on this problem, which describe in detail the epidemiological data and pathophysiological mechanisms of extra-hepatic lesions in HIV-infection [El Howati A et al., 2018; Meer S, 2019]. However, there are few original studies in this area. We will try to discuss

and compare those individual works that were found in the available literature.

Stomatological aspects of HIV-infection are diverse and not fully understood. HIV-associated stomatological diseases may be the first symptoms of infection, are characterized by high frequency, clinical polymorphism and manifestation of the course, significantly aggravate the course of the underlying disease and reduce the patient's quality of life. Jambeiro de Souza A et al. (2018) studied the prevalence and structure of periodontal diseases in HIV-infected patients, but the authors did not aim to study individual symptoms of the lesion and limited themselves to an index assessment [Jambeiro de Souza A et al., 2018].

Pakfetrat A. et al. (2015) examined 110 HIV-positive patients to study the prevalence of oral lesions. The authors identified severe periodontitis in 27.3% of patients [Pakfetrat A et al., 2015]. As indicated above, in our work, periodontitis and oral mucosa damage are detected more often in HIV-infection. In addition, we studied individual symptoms of oral mucosa lesions, which (almost all) had a high frequency of occurrence. Candidly lesions of the oral cavity were found in 42.7% of cases (*Pseudomembranous Candidiasis* - 23.6%; *Erythematous Candidiasis* - 19.1%) [Zeng BS et al., 2021]. Our results are somewhat at odds with the data of the above-mentioned authors. Acute candidiasis is indicated by the presence of plaque on the surface of the tongue, which was detected in 100% of our patients with HIV-infection. The discrepancies also concern angular cheilitis, which they identified in 9.1% of cases; according to our

results, cracks in the corners of the mouth occurred in 73.3% of patients.

The basis of the inflammatory process of any etiology is the launch of the cytokine cascade, which includes, on the one hand, proinflammatory cytokines, and on the other, anti-inflammatory mediators. The balance between the two opposing groups largely determines the nature of the course and outcome of the disease [Zatoloca PA et al., 2013; Ketlinsky SS et al., 2018]. The main problem is the lack of available laboratory diagnostic methods that would sufficiently clearly reflect the shift in the cytokine balance towards inflammatory or anti-inflammatory/immunosuppressive reactions.

In connection with the above, we consider it appropriate to discuss some methodological aspects of our work in studying cytokines. The latter can come from the blood serum as a result of their transudation, but the content of cytokines in saliva does not correlate with their level in the blood, which indirectly indicates the predominance of their local synthesis [Ketlinsky SS et al., 2018; Zhang H et al., 2021]. Taking into account the recommendations of the literature, we studied the content of both pro-inflammatory - interleukin 2 (IL-2), γ -interferon (γ -INF), and anti-inflammatory cytokines - interleukin 4 (IL-4) and interleukin 10 (IL-10) specifically in the oral fluid, which is more accessible and non-invasive.

There are a sufficient number of works in the literature devoted to the study of the content and ratio of pro- and anti-inflammatory cytokines in oral fluid in various pathologies [Grimm S et al., 2020; Esmailzadeh A et al., 2021]. However, it should be noted that the available data are highly contradictory. This also applies to the data from control groups, which creates certain difficulties in terms of a clear understanding of normal cytokine levels in oral fluid. There are a few studies in the literature devoted to studying this issue in HIV-infection, but there are no studies on the simultaneous study of proinflammatory (IL-2, γ -INF) and anti-inflammatory cytokines (IL-10, IL-4) in the same group of patients.

Given the high variability of the normal cytokine levels in oral fluid, we found it interesting to analyze the available literature data regarding the cytokines identified in our work. According to various authors, the content of IL-4 in the stomach

fluid of practically healthy people ranges from 2.3 (1; 8.5) to 15.2 ± 1.5 pg/ml, IL-10 – from 4.83 ± 0.40 to 22.59 pg/ml (11.04-43.74), IL-2 – from 0.1 ± 0.02 pg/ml to 10.0 (8.5; 28.5), γ -INF from 18.35 ± 0.47 to 23.8 ± 1.5 pg/ml [Chibichyan EK et al., 2017; Shafeev IR et al., 2016]. Our data on IL-4 and IL-2 levels in the control group coincide with literature data, but there are discrepancies in IL-10 and γ -INF levels, which once again proves the high variability of normal cytokine levels in oral fluid.

Based on the above, it can be assumed that the level of cytokines in oral fluid and their ratio depend on various factors: the duration, prevalence and severity of the process, the rate of progression and development of complications of the disease, as well as the individual characteristics of the body. In this regard, we are more inclined to agree with the opinion of the following authors, who believe that the diagnostic significance of assessing the level of cytokines lies in the statement of the very fact of its increase or decrease in a given patient with a specific disease, and, in order to assess the severity and predict the course of the disease, it is advisable to determine the concentration of both pro- and anti-inflammatory cytokines in the dynamics of the development of pathology [Pan W et al., 2019; Surlin P et al., 2020]. It is certainly advisable to evaluate the dynamics of cytokine profile indicators in order to determine the effectiveness of the treatment and reduce the risk of therapeutic failure.

The results of our research has shown circulatory disorders and inflammation in the oral mucosa which were revealed in 100% of the examined patients. In cases of HIV-infection, significant morphological changes have developed in microvascular channel had dual influence. On the one hand, impaired blood circulation affects the tissue trophism, on the other hand, the high density of blood vessels in the regenerating granulation tissue ensured acceleration of metabolic processes, which promoted healing and differentiation into coarse-fibrous connective tissue. Azatyan V. et al. (2021) performed a morphological study of oral mucosal biopsies in patients with HBV, HCV, HIV-infection and also revealed general morphological changes in the oral mucosa [Azatyan V et al., 2021].

An immunohistochemical study revealed a significant decrease in CD3+ and CD20+ lymphocytes

in patients with HIV-infection, which indicates a decrease in local immune responses. Available studies have been dedicated to the study of minor salivary glands in patients with HCV+HIV-infection suffering from Sjögren's syndrome with the use of monoclonal antibodies CD3, CD8, CD20, HLA-DR [Coll J et al., 1997].

The problem of HIV-infection remains extremely relevant due to its widespread prevalence. The global coverage of territories and the high epidemic potential of this group of diseases maintain their social and economic significance. Pathologies caused by HIV are most often found in young, working-age individuals and lead to disability and fairly high mortality. Thus, the study of the state of the oral mucosa in HIV-infection, the features of the cytokine profile of the oral fluid, morphological and immunohistochemical lesions of the mucous membrane is very relevant, which is why our work was carried out.

One of the limitations of the study was that de-

spite the fact that the HIV-infection group had 90 participants and the control group – 100, only 24 of them from the HIV-infection group and 30 patients from the control group agreed to pass the test of cytokines of the oral fluid.

CONCLUSION

Thus, HIV-infection contributes to the damage of the oral mucosa. Pathomorphological examination revealed circulatory disorders and inflammation of the oral mucosa. Immunohistochemical study revealed a decrease in CD20 + lymphocytes in biopsies of patients with HIV-infection, which also indicates a decrease in local humoral immune responses. An increase in pro-inflammatory IL2 and a decrease in anti-inflammatory IL4 were detected in comparison with the control group. Further studies are needed to better understand IL-s levels in patients with HIV-infection and their relationship with oral mucosal lesions.

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The Journal is founded by
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Our journal is registered in the databases of Scopus,
EBSCO and Thomson Reuters (in the registration process)



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Copy editor: Tatevik R. Movsisyan

LLC Print in "Monoprint" LLC

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