

Indicators Of Free Radical Oxidation Of Oral Fluid In Patients With Lichen Plus Of The Mucosus Cavity Of The Mouth

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Abstract

The appearance of an imbalance between free radical oxidation and the antioxidant system is one of the key links in the development of lichen planus on the oral mucosa. The indicators for assessing this imbalance, the degree of balance shift between pro- and antioxidants in the oral fluid are sensitive and objective indicators of the severity of the pathological process on the oral mucosa, which justifies the inclusion of antioxidants in the complex therapy of lichen planus of the oral mucosa.

Keywords : oral mucosa, lichen planus, oral fluid, lipid peroxidation, antioxidant system, diene and triene conjugates, malondialdehyde, catalase, superoxide dismutase.

Introduction. Lichen planus - characterized by a chronic polymorbid course, has a torpidity to treatment, polymorphism of clinical manifestations. It should be noted that lichen planus of the oral mucosa often has severe clinical forms, while one form can transform into another, and the probability of malignancy is 8-9% [2,4,8].

Many studies have proven that the development of LP of the oral mucosa is associated with the development of oxidative stress, which becomes the cause of the development of immune deficiency and chronicity of the pathological process [1,3,5].

However, despite numerous studies in this direction, questions about the state of free radical oxidation processes still remain unclear. In patients with various clinical forms of lichen planus of the oral cavity, the importance of clinical studies of the state of these mechanisms at the local "oral fluid" level has not been fully established [3,6].

In connection with the above, **the purpose of this study** was to study the processes of free radical oxidation of the oral fluid in patients with various clinical forms of lichen planus of the oral mucosa.

Materials and methods. 107 patients with lichen planus of the oral mucosa in the acute stage were examined, including: with a typical form - 27 patients; exudative-hyperemic - 34 patients; erosive-ulcerative and bullous forms, respectively, 32 and 14 patients. The control group consisted of 20 people of comparable sex and age without diseases of the skin and oral mucosa. The compared groups were randomized by sex and age, which ensured the representativeness of the data obtained.

The level of lipid peroxidation (LPO) processes was assessed by the content of primary products of lipid oxidation - diene conjugates (DC); secondary products - triene conjugates (TC); malondialdehyde (MDA) and end products - Schiff bases (SS). The content of DC, TC and OR was calculated as the ratio of optical densities of lipid extracts, respectively, E232/E220; E278/E220 and E400/E220 and were expressed in conventional units (arb. units), isopropanol fraction was taken into account. The concentration of MDA was estimated by the spectrophotometric method in the test with thiobarbituric acid (Konyukhova V.S. 1989).

The state of the processes of the antioxidant system (AOS) was judged by the activity of antioxidant enzymes: catalase (CT) (Korolyuk M.A. et al. 1988); superoxide dismutase (SOD) (Nishikimi N. _ et al 1972); glutathione peroxidase (GP) (B. Paglia, W. Valentine 1967); as well as the activity of succinate dehydrogenase (SuDH) (Storozhuk P.G. and Storozhuk A.P. 2003).

Statistical processing was carried out on a personal computer using the program " Microsoft Excel ", the average values-M were calculated; standard error of the mean - m ; the significance of differences was judged on the basis of Student's t-test.

Results and discussions. From the analysis of the data obtained, it was found that the chronic inflammatory process on the oral mucosa is characterized by a pronounced activation of lipid peroxidation processes with activation or depletion of the endogenous antioxidant potential. When comparing the activity of the studied processes, higher values of the studied parameters were recorded in the oral fluid, which reflects the activity of the local process on the mucous membranes, as well as a higher activity of metabolic processes in the oral cavity.

At the same time, an increase in the concentrations of the studied LPO processes is recorded in the oral fluid, progressively increasing with an increase in the severity of the pathological process.

Thus, in the oral fluid with a typical form of LP, the concentration of DC was increased by 37.73% (P<0.01); exudative-hyperemic - by 83.36% (P<0.001); erosive and ulcerative – by 119.09% (P<0.001) and bullous – by 112.73% (P<0.001); the corresponding dynamics of TC and MDA were 23.81% (P<0.01) and 46.95% (P<0.01); 78.54% (P<0.01) – 83.33% (P<0.01); 151.25% (P<0.001) and 109.62% (P<0.01) and 175.61% (P<0.001) – 111.50% (P<0.001); and OR, respectively, by 84.0% (P<0.01); 124.0% (P<0.01); 224.0% (P<0.01) and 232.0% (P<0.01) (Figure 1).

A stable increase in the concentration of DC, as a product of an early response, indicates a constantly persistent increased activity of LPO processes provoked by a pathological process, as well as a stable “feeding” of the humoral environments of the body with fresh products of this type of metabolism.

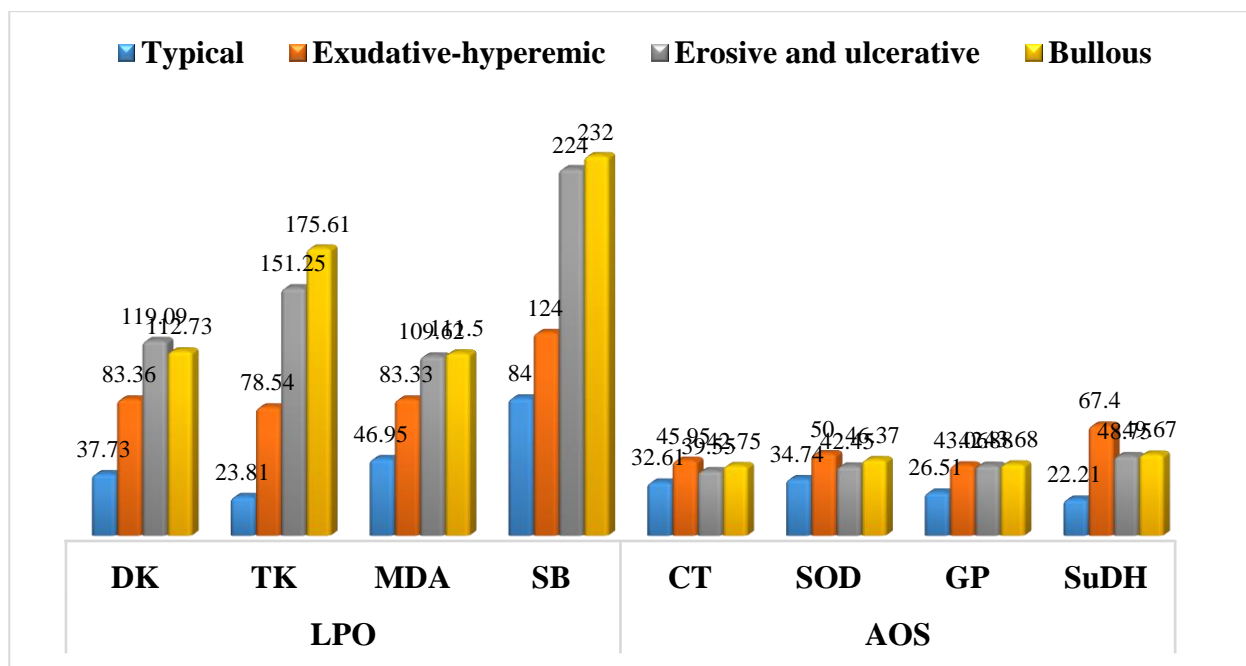


Fig.1. Indicators of the intensity of LPO processes and the activity of the AOS system in the oral fluid of patients with LP OOM (M ± m)

Changes in other indicators of lipid peroxidation - the levels of TC and MDA (intermediate products of lipid peroxidation), the concentration of OR (late reaction products), reflect the activity of the process to a lesser extent, characterizing to a greater extent the involvement of lipid components of various morphological structures and, first of all, cellular structures in lipid peroxidation. membranes.

When studying the endogenous antioxidant potential, the asynchrony of the activity of AOS enzymes was stated, a clear increase in the activity of enzymes in biological media in typical and exudative-hyperemic forms is replaced by their suppression in patients with erosive-ulcerative and bullous forms.

Thus, in the oral fluid of patients with a typical form of LP, the activity of CT was increased by 32.61% (P<0.05); SOD - by 34.74% (P<0.01); HP - by 26.51% (P<0.05); and SuDG – by 22.21% (P<0.05); the corresponding dynamics in the exudative-hyperemic form was 45.95% (P<0.01); 50.0% (P<0.01); 43.06% (P<0.01) and 67.40% (P<0.01); suppression of the activity of AOS enzymes in the erosive-ulcerative form was 39.55% (P<0.01); 42.45% (P<0.01);

42.88% (P<0.01) and 48.75% (P<0.01); and in the bullous form, respectively - 42.75% (P<0.01); 46.37% (P<0.01); 43.68% (P<0.01) and 49.67% (P<0.01) (Figure 1).

The free radical oxidation reaction is initiated by reactive oxygen species, leading to chemical modification and destruction of biomolecules. Under conditions of oxidative stress or increased formation of reactive oxygen species, the functioning of antioxidant defense enzymes is disrupted.

Catalase (CT) is an enzyme of the oxidoreductase class, which is part of the antioxidant system of the cell and performs the function of antiperoxide protection (H_2O_2); glutathione peroxidase (GP) catalyzes the reduction reactions of hydrogen peroxide (H_2O_2) lipid hydroperoxides ($ROOH$); superoxide dismutase (SOD) - catalyzes the recombination reaction of superoxide anions (O_2^-); Succinate dehydrogenase (SuDH) is an enzyme of the oxidoreductase class, localized in the inner membrane of mitochondria - one of the important enzymes of energy metabolism, catalyzes the reversible oxidation of succinic acid (succinate) to fumaric acid in the Krebs tricarboxylic acid cycle. Oxidation of 1 mole of succinic acid leads to the synthesis of 2 moles of adenosine triphosphate (ATP). In this case, electrons from succinate dehydrogenase are transferred to the respiratory chain to coenzyme Q. Decreased activity SuDG reflects a decrease in the endotransport respiratory chain of the cell [1,7].

Quantitative characteristics of the main energy process in mitochondria - the oxidation of succinic acid (SAT) and its signaling action, which characterizes the severity of sympathetic (adrenergic) regulation in the body. Oxidation of NTK by SuDHose is the most powerful process of energy conservation, on which the physiological state of the body depends. The activity of the mitochondrial enzyme SuDG is an important indicator of the relationship between the physiological state and mitochondrial processes [2, 8]. Decreased activity of SuDG in patients with LP OOM of the erosive-ulcerative and bullous form indicates the need to include drugs that restore energy processes in mitochondria in the complex treatment.

Thus, the ongoing changes characterize multidirectional, but interdependent shifts in both links of the prooxidant-antioxidant system, illustrating a pronounced shift in balance. An increase in the concentration of LPO products, reflecting an increase in the intensity of FRO, contributes to a more rapid depletion of bioantioxidant reserves and a decrease in the redox potential of the system.

Moreover, in this case, a kind of "vicious circle" is formed, when each previous stage launches the next one, and the probability of reversibility and normalization of the state gradually decreases to a minimum.

The results unambiguously confirm that generalization and an increase in the severity of LP ORM contribute to the gradual depletion of physiological reserves of bioantioxidants. The relative increase in AOS enzymes in patients with typical and exudative-hyperemic forms suggests an increase in the capacity of protective physiological antioxidant systems for the regulation of LPO processes. In the transition to bullous and erosive-ulcerative forms, a "qualitative leap" occurs, when the reserve capacity of antioxidant systems is not enough to compensate for the increased lipid peroxidation processes, the ratio of incentives changes in favor of pro-oxidant agents and oxidative destruction contributes to the frolicking pathological process on the oral mucosa .

Conclusions. Thus, the imbalance between free radical oxidation and AOS is one of the key links in the development of lichen planus of the oral mucosa.

Data on the assessment of AOS and LPO processes, the degree of balance shift between pro- and antioxidants in biological substrates (oral fluid) are sensitive and objective indicators of the severity of the pathological process in the oral mucosa, which justifies the need for the use of antioxidants in the complex therapy of lichen planus of the oral mucosa in form of local treatment.

A promising way should be to increase the energy potential of the cell, which will preserve the energy-synthesizing function of mitochondria under conditions of progressive hypoxia.

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