Summary

Psoriasis is the most common inflammatory skin disease characterized by the release of pro-inflammatory cytokines by lymphocytes, keratinocytes, and dendritic cells. Although psoriasis is considered an immune-mediated inflammatory disease, the effects of the disease on the secretory activity of the salivary glands and the quantitative composition of saliva are still unknown.

The aim of our research was to evaluate redox balance parameters, oxidative stress biomarkers, selected inflammatory and nitrosative stress biomarkers in unstimulated and stimulated saliva and in the blood of patients with plaque psoriasis compared to healthy subjects.

The first study involved 40 patients with plaque psoriasis and 40 age- and sex-matched generally healthy subjects, while the second study involved 60 patients with plaque psoriasis and 60 generally healthy people.

The concentration / activity of antioxidant enzymes was examined: Px, CAT and SOD in NWS, SWS and erythrocytes. In plasma, NWS and SWS, we measured the concentration / activity of GSH, TAC, TOS, OSI and markers of oxidative modification of proteins: AGE, AOPP and lipid oxidation products: MDA and LOOH. At NWS and SWS, we also assessed the production rate of ROS. Moreover, the concentration of inflammatory markers TNF-α, Il-2, INF-γ, IL-10 was assessed in NWS, SWS and in the plasma of patients with plaque psoriasis. The parameters of nitrosation stress determined in the saliva and blood of patients with psoriasis were: nitric oxide, S-nitrosothiols, peroxyazotine and nitrotyrosine.

It was shown that the concentration of Px, CAT and SOD was significantly higher in the NWS of patients with plaque psoriasis compared to healthy subjects. In the SWS of patients with psoriasis, significantly higher levels of Px and CAT were observed, and in the erythrocytes of patients with plaque psoriasis, the concentration of GPx and CAT was significantly higher than in the control group. The levels of AOPP, AGE, MDA and LOOH were significantly higher in the NWS, SWS and plasma in the test group compared to the control group. The concentration of total protein and salivary amylase was significantly lower in the NWS and SWS of psoriasis patients compared to the healthy control. In the course of plaque psoriasis, we observed redox imbalances with a predominance of oxidation reactions. The mechanisms involved in protein synthesis / secretion and amylase activity were weakened in both glands of patients with psoriasis; however, they were more inhibited in the parotid gland compared to the submandibular gland.

It has been proven that with the severity and duration of the disease, the secretory function of the parotid and submandibular glands is lost, which manifests itself as a decrease in the secretion of unstimulated and stimulated saliva and a reduction in the activity of salivary amylase and total protein concentration. The concentration of TNF-α, Il-2, IFN-γ was significantly higher, while IL-10 was significantly lower in unstimulated and stimulated saliva of patients with psoriasis compared to controls, and these changes worsened with the duration of the disease. Similarly, the intensity of nitrosation stress in the salivary glands of psoriasis patients depended on the duration of the disease. The ROC analysis showed that the evaluation of the concentration of nitric oxide, nitrotyrosine and IL-2 in unstimulated saliva with high sensitivity and specificity differentiates patients with psoriasis depending on the rate of salivation (normosalivation vs. hyposalivation).

It is worth emphasizing that the concentration of TOS and the value of OSI in NWS and SWS may serve as diagnostic biomarkers of plaque psoriasis.

In conclusion, inflammation, oxidative and nitrosative stresses underlie the dysfunction of the salivary glands in patients with psoriasis.