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Systemic changes in patients with acquired skin hyperpigmentation

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Acquired hyperpigmentation is widespread in the population and significantly affects the quality of life of patients . It is known that one of the clinical signs of skin hyperpigmentation is localised hyperkeratosis in the lesional area, associated with high levels of cell proliferation and melanin saturation of the cells. Cell proliferation and hyperkeratosis are associated with an increased local metabolic rate. It was therefore of interest to investigate the likely characteristics of systemic blood changes in patients with acquired skin hyperpigmentation (ASH).

The level of 2,3-diphosphoglycerate (2,3-DPG) in venous blood erythrocytes of study participants (n=50) was determined by non-enzymatic method in TCA (trichloroacetic acid) filtrate of haemolysed erythrocytes [2, 3], and the concentration of lactate and pyruvate (PBC) by hardware methods (biochemical analyser VitaLine-200, Russia).

The process of formation of hyperpigmentation is pathogenetically associated with impaired microcirculation, which leads to changes in oxygen transport. In this aspect, the functional state of erythrocytes in skin hyperpigmentation and in the control group was studied. Taking into account the role of the circulatory system in oxygenation homeostasis, we evaluated metabolic regulation of oxygen transport function of erythrocytes on the basis of determination of such indicators as lactate, PBC, 2,3-DPH. An indirect indicator reflecting the utilisation of molecular oxygen is the degree of oxidation of substrates and products of the common pathway of catabolism, in particular PBC and lactic acid. According to the results of the study it was found that in erythrocytes of women of the clinical group with skin hyperpigmentation the concentration of PBC was reduced by 86% ($p=0.03$) compared to the control group, which indicates a reduced rate of glycolysis. At the same time, a significant (by 167.4%; $p<0.05$) increase in the lactate level was observed relative to the control group, which, on the one hand, is a reflection of the severity of hypoxia. The decrease in the level of PBC towards the increase of lactate in erythrocytes of patients with hyperpigmentation indicates the presence of tissue hypoxia, which leads to the disturbance of microcirculation in the pathological focus. In the main clinical group there was a significant increase in the level of lactate, which may indicate the presence of tissue hypoxia in the pathogenesis of hyperpigmentation. The increase in lactate concentration can be considered as an adaptive response to the process of hypoxia in the area of hyperpigmentation. The character of preservation of 2,3-DPH at the same level in the clinical group and control is an indicator of the adaptation mechanism associated with an increase in the efficiency of the functions of the oxygen transport and utilisation system, as well Obviously, the increased concentration of lactate against the background of maintaining a constant level of 2,3-DPG indicates that part of oxygen is used not for tissue respiration, but for enhanced melanin synthesis and saturation of neighboring keratinocytes with it.

Biography

Dr. Glushkova Maria Vladimirovna is a dermatovenerologist, oncologist-dermatologist, and dermatocosmetologist at Davinci Medical Center, Rostov-on-Don, and a postgraduate student at RostSMU. She graduated from Irkutsk State Medical University and completed internships in France and at RostSMU. She holds extensive certifications in dermatovenerology, cosmetology, laser medicine, and skin oncology. Dr. Glushkova is a certified specialist in all injection techniques and Fotona laser technologies since 2014. She is actively engaged in research on skin hyperpigmentation, holding a patent and multiple Higher Attestation Commission publications. She regularly presents at national and international congresses and serves as Scientific Director of the Department of Medical Cosmetology at Davinci Clinic.