Alcohol poisoning is constantly registered in many countries of the World, being one of the main causes of hospitalization with acute chemical poisoning. Acute alcohol intoxication (AAI) is a clinically harmful condition that commonly follows the ingestion of a large amount of alcohol. The most common complication of AAI is the development of renal failure. Along with it AAI can induce acute alcoholic hepatitis and negative cardiovascular and gastrointestinal effects. It is believed that alcohol and its metabolites have direct and indirect effects on the properties and functions of the blood cells, as well as the alcohol-intoxicated subjects have a high risk of hypoxemia. It is considered that oxidative stress is one of the possible mechanisms for the development of complications. However, the markers of the oxidative stress of blood cells, in particular neutrophils, in acute alcohol intoxication have been little studied, as well as mechanical and biochemical disorders in erythrocytes. Mainly medical research was focused on the mechanisms of chronic alcohol abuse or in-vitro studies of ethanol-induced effects. The purpose of our work was to study the oxidative stress markers of neutrophils and erythrocytes in patients with acute alcohol intoxication.

**Materials and methods.** Blood neutrophils and erythrocytes were isolated from 55 patients with acute alcohol intoxication and 25 healthy individuals (control group), ranging in age from 20 to 50 years. In all studied groups, men prevailed. The diagnosis verification was based on the medical history and the results of an objective examination based on "The toxic effect of alcohol (adults and children)" protocol. Prior to the study, informed consent was obtained from all patients and healthy individuals for participation in the study; also the study was approved by the Ethics Committee. As oxidative stress markers, the activity of catalase and myeloperoxidase (MPO) [1], as well as the content of reactive carbonyl derivatives (CD) of proteins [2] and advanced oxidation protein products (AOPP) [3] were studied in neutrophils. As the oxidative stress markers of erythrocytes, the content of reactive CD of proteins and membrane-bound hemoglobin (MBHb) [4] were studied. All data were obtained by spectrophotometry. Statistical analysis was carried out using the independent samples t Test.

**Results.** In neutrophils we detected a decreased level of CD of proteins compared with control group (p=0.005) as well as tendency to increase MPO activity and AOPP level. Also statistically significant increase in catalase activity relative to control group (p=0.044) was observed in patients with acute alcohol intoxication. In the study of oxidative stress markers of erythrocytes, there was a tendency to decrease the level of MBHb of AAI patients. At the same time the concentration of reactive CD of proteins in erythrocytes of AAI patients significantly increased in comparison to the control group (p=0.005). Our results revealed various trends in the change of oxidative stress markers of neutrophils and erythrocytes of AAI patients. We surmised that cytoskeletal proteins and hemoglobin could be the most likely substrates for reactive carbonyl protein products formation in erythrocytes. Oxidative infringements of cytoskeletal proteins, accumulation of reactive CD, undoubtedly affect the ability of erythrocytes to control their volume. Previously, we showed a change in the activity of membrane–bounded protein - CI- / HCO3- -exchanger with increased volume of erythrocytes in patients with acute alcohol intoxication. We assumed that increased volume of erythrocytes could be a compensatory mechanism for ion transport regulation. Thus, an increase in the CD level of erythrocyte proteins, in our opinion, reflects the structural damage of erythrocyte membranes, and the tendency to a decrease in the level of MBHb reflects the hypoenergetic state of the cells. Together, these changes contribute to reducing the gas transport function and contribute to the development of hypoxia and the progression of AAI complications. Decreased level of CD of proteins in neutrophils can be result of increased catalase activity and compensatory mechanism. At the same time, we observed an increase in the AOPP level - another type of oxidized proteins, due to the increased activity of MPO enzyme. It is possible, that the activity of catalase and MPO, as well as content of the reactive CD of proteins depend on the severity of intoxication, this assumption must be confirmed by further investigation. All these infringements were caused by the indirect effect of acetaldehyde and ethanol and direct effect of acetaldehyde on protein modification in blood cells.

In our opinion studying of alterations in neutrophil and erythrocyte morphological properties, their functional activity and biochemical parameters, will give us the opportunity to understand and appreciate their impact on AAI complications’ development.

**References:**


**Keywords:** neutrophils, oxidative stress, erythrocytes, alcohol intoxication.