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In recent years, one of the most frequent and serious complications in traumatology and surgery is sepsis; sepsis often leads to septic shock or eventual multiple organ failure, which is a common cause of death in the intensive care patients. In pathogenesis, an imbalance between the production of reactive oxygen and nitrogen species and the capacity of an antioxidation system are the major factors in causing sepsis and septic shock.

The core of my work was to establish a quantitative end-product of metabolism of the reactive form of nitrogen, i.e. the overall concentration of nitrite and nitrate and concentration of nitrotyrosine in blood, and also set the level of activity for antioxidation enzyme catalasa within the erythrocytes of three groups of patients. This involved a group of septic diagnosed patients ($n = 13$) who had blood samples taken three times in the first twenty-four hours, then after seven days of treatment and, finally, after recovery. Further, two control groups were included: a group of healthy people ($n = 13$), and a group of nonseptic, critically ill patients ($n = 5$).

The overall concentration of nitrite and nitrate was established using the Griess reaction with a following spectrophotometrical detection. The concentration of nitrotyrosine in the blood plasma was measured using the ELISA method, and the activity of catalase was measured spectrophotometrically. The seriousness of the septic state was evaluated on the basis of serum CRP concentration.

The results of the measurements revealed that the total concentration of nitrite and nitrate in blood serum increases during the course of sepsis; the highest level was reached during the second blood sampling from the septic patients, i.e. seven days after the emergence of sepsis. These measurements were significantly higher than the measurements of patients after the third blood tests, i.e. after recovery ($p = 0.0133$) and the control group of healthy people ($p = 0.005$). Likewise, the concentration of nitrotyrosine in plasma was increasingly higher in the first and second blood samples of the septic patients in comparison with the group of healthy people ($p < 0.0001$). The activity of catalase negatively correlated with the serum CRP concentration and positively correlated with the concentration of iron in the serum.

The work confirmed the importance of observing oxidation stress markers in clinical practice.