

## Abstract

The aim of this study was to observe levels of oxidative DNA damage in patients with multiple injuries in correlation with the nutritional support that the patients have received during their hospital stay. Oxidative DNA damage was evaluated in two periods of time, first evaluation was performed during standard nutritional support according to the ESPEN guidelines. Second evaluation was performed after a change in nutrition according to individual parameters of metabolism and utilization of nutritional components based on indirect calorimetric measurements.

This study included 6 patients with multiple injuries hospitalized in the Intensive Care Unit 1 at the Department of Surgery, University Hospital in Hradec Kralove. In this experiment DNA isolated from peripheral lymphocytes was used to evaluate oxidative DNA damage. This DNA was analyzed using the Comet Assay method. The enzymatic version of the Comet Assay was used to determine the oxidative damage of purines and pyrimidines, and the alkaline version was used for detection of single strand breaks. Mann-Whitney test was used for statistic evaluation the difference between both measurements, correlation analysis for relations between Comet Assay results and clinical parameters.

Significant correlations between a total amount of nutrients given parenterally and detected oxidative DNA damage were found, as well as between the individual amount of saccharides, proteins and lipids and oxidatively damaged purines, with lipids showing the most importance. The results indicate that the levels of oxidative DNA damage are significantly higher in patients before a change of nutrition in comparison to the control group. However, the levels of oxidative DNA damage in patients after a change of nutrition are not significantly higher than the control group.

Described results of this pilot study show possible effect of accurate nutritional support on reduction of oxidative DNA damage in polytraumatic patients. Other study is needed for evaluation on large sample of patients.

**Key words:** Comet assay, oxidative DNA damage, polytrauma, nutrition