

ABSTRACT

Background: Oxidative damage is one of the most frequent types of cell components damage leading to oxidation of lipids, proteins and the molecule of DNA. As a consequence, there is a higher occurrence of several pathologies such as atherosclerosis, neurodegenerative diseases, cancer; or diabetes. In our study, influence of whole body anesthesia during minor surgery on the level of DNA damage was examined using comet assay technique.

Methods: The basic principle of this method is fixing the cells (lymphocytes) in agarose, their lysis for the removal of membranes, incubation with the specific enzymes and electrophoresis of the released cell nuclei. During the electrophoresis, free low-molecular weight and negatively charged fragments of DNA move towards anode which causes the formation of the typical comet cell shape. Finally, the gels are stained by ethidium bromide (DNA intercalating dye) and visualized.

Results: We have observed single strand breakages (SSBs) and, with the use of modified assay using specific enzymes for detection of specific lesions, also oxidized purines and pyrimidines. The extent of DNA damage as determined by the intensity of the tail of the comet was quantified using LUCIA Comet Assay (Laboratory Imaging, Czech Republic) software for image analysis. The results were used for the comparison of DNA damage before and after the anesthesia of the patients. Statistical evaluation was performed in SigmaStat 3.5 (Systat Software, USA).

Conclusions: Results showed a statistically significant increase of DNA damage caused by anesthesia during minor surgery. These findings imply further investigations, namely evaluation of the changes in the capacity of the affected lymphocytes to repair DNA damage.

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Key words: comet assay, anesthesia, DNA damage, repair