MONITORING OF STRUCTURAL CHANGES IN THE RESPIRATORY PART OF LUNG IN RATS FOLLOWING THE MODELING OF MILD BURN INJURY

R. V. Yanko, M. O. Zavhorodnii, V. I. Portnichenko

Abstract

The aim of the study was to investigate the dynamic structural changes in the respiratory part of lung in rats following the modeling a mild burn injury.

Material and methods. The study was carried out on 48 male Wistar rats, 3 months old. The rats were divided into 4 groups: Group I — control; Groups II, III and IV — rats in which we modeled burn injury and removed from the experiment on days 3, 9 and 14, respectively. Burn injury was inflicted on anesthetized rats on a shaved area of skin in the scapular area by applying a flat-bottomed glass tube containing boiling water. The burn area was ~1 % of the skin area. For histomorphometric studies, lung tissue samples were taken, from which histological preparations were made according to the standard method. Histomorphometric analysis of tissue samples was performed on digital images of micropreparations.

Results. It was found that burn injury led to structural changes in the respiratory part of the lung, which indicated a decrease in their functional activity, air inflation and gas exchange processes. A decrease of alveolar square, an increase in the thickness of alveolo-capillary membrane, an increase in the relative area of the parenchyma and lung interstitium, a decrease in the relative area of the air spaces were registered. Structural changes were clearly manifested already on the 3rd day after the burn modeling, and their intensity was highest on the 9th day of the experiment.

Conclusion. The effect of a mild burn injury was a phased process leading to structural changes of the respiratory part of the lung. The most intensive lesions in the lung occur on the 9th day after the burn. This should be considered when managing a reduced lung function caused by a skin burn.

Key words: respiratory part of the lung, burn injury, histomorphometry, rats.

Ukr. Pulmonol. J. 2026;34(1):50–54.

Yanko Roman Vasylovich
Bogomoletz Institute of Physiology of NAS of Ukraine
Department of Clinical Physiology of Connective Tissue
Senior research assistant, PhD
4, Bogomolets St., Kiev 01024, Ukraine. Tel.+380 (044) 256-24-77
e-mail: biolag@ukr.net
https://orcid.org/0000-0002-0397-7517