THE ROLE OF DINITROSYL IRON COMPLEXES IN THE REGULATION OF CATALYTIC PROPERTIES OF ALCOHOL DEHYDROGENASE OF THE ANIMALS ORGANS DURIN THE BURN

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It is known that nitric oxide participates in the regulation of many metabolic and physiological processes in the organism [1]. The elucidation of biophysical and biochemical aspects of action of this compound and its donors are still relevant and not investigated problem. The aim of the work was the study of influence of dinitrosyl iron complexes (DNIC) on the activity of the enzyme of transformation of xenobiotics - alcohol dehydrogenase (ADH) in the liver, heart, lungs, kidneys of rats with thermal injury.

Material and methods. Experiments were conducted in rats of line Wistar. The combined thermal trauma (contact burn (20%, 7 sec.) and thermoinsulation injury (20 sec.) at animals was applied under anesthesia. The rats in the control group (n=10) daily were injected intraperitoneally 1 ml of physiological solution. The rats of experimental group (n=10) with the first day were spent infusion therapy with inclusion of an aqueous solution of dinitrosyl iron complexes (1 ml; 0,3 mmol/l). DNIC were received by the method of A.F. Vanina [2]. Rats were scored under anesthesia at 3 and 10 days after injury. Activity of alcohol dehydrogenase was determined in 10% homogenate of tissues (liver, kidney, heart and lungs) using as a substrate alcohol (direct reaction) and acetaldehyde (reverse reaction) [3].

Results and discussion. It is shown that the specific activity of ADH in reverse reaction statistically significant decreases in all organs and all the surveyed day after burn. In the liver the activity is decreased in 1.6 times on the 3 day, in 1.9 times on the 10th day after the injury in comparison with the control group. In the lungs the ADH activity in the reverse reaction is reduced after thermal injury in 6.4 times on the 3 day, in 4.4 times on the 10th day compared with healthy animals. In the heart of specific activity is reduced by 3.1 times in 3 days, in 2,3 times in 10 days after burn compared to control rats. The main reason of development of myocardial degeneration in thermal injury is burn intoxication and oxygen deficiency at disorder of blood circulation. Activity of alcohol dehydrogenase in reverse reaction reduces also in kidneys: in 8.9 times on the 3 day after the burn, in 3.8 times on the 10 day compared with the control group of rats. The decreased of the alcohol dehydrogenase activity in reverse reactions in thermal injury leads to the accumulation highly toxic aldehydes, acetals and ketones in all organs. The introduction of dinitrosyl iron complexes causes a statistically significant increase of the specific activity of ADH in reverse

reaction in the heart in 1,5 times on the 3rd day after burn, in the liver in 1.3 times on the 10 days after trauma and decrease of ADH activity in lung in 1,5 times on the 10 days after the burn, in the kidney in 2.4 times on the 3rd day, in 3 times on the 10th day after burn compared to the untreated animals.

The study of specific activity of alcohol dehydrogenase in direct reaction in burn showed a statistically significant decrease of enzyme activity only in lungs in 3.3 times on the 3rd day, in 3.9 times on the 10 day and liver in 1.8 times on the 3rd day after burn in comparison with healthy animals. On the 10th day after the injury the activity of ADH in direct reaction significantly increased in 1,6 times in liver, in 1.7 times in kidney in comparison with the intact rats. Increasing of ADH activity in direct reaction also contributes to the accumulation of toxic aldehydes. The statistically significant changes in activity of ADH in direct reaction in the heart was not detected. The introduction of deposited forms of nitrogen oxide (DNIC) contributed to the normalization of the specific activity of ADH in direct reaction: increase in lungs in 2 times on the 10 days after burn, reduction in the liver and kidneys on 10 days after the defeat in 2 times respectively.

Conclusion. Thus, thermal trauma causes a decrease of the specific activity of ADH in the studied organs. It is shown that dinitrosyl iron complexes have a positive effect on alcohol dehydrogenase in all organs during the combined thermal injury.

References

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