

DOSE-DEPENDENT EFFECT OF OZONE DURING PROLONGED USE ON PRO - AND ANTIOXIDANT SYSTEMS OF BLOOD IN THE EXPERIMENT

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Today ozone therapy is a whole direction in modern medicine. The basis of therapeutic action of ozone on the organism is its high redox potential. The use of ozone for the treatment and prevention of diseases based on a wide range of therapeutic effects of different ozone doses on the body. Taking into account this fact, this work is of practical and scientific interest. The aim of this work was to study the possible toxic properties of various ozone concentrations on lipid peroxidation of rat blood during long use.

Material and methods. The experiments were conducted on 50 white Wistar rats weighing 160-180g. The animals were divided into 5 groups of 10 animals each: group 1 - control (healthy rats), group 2 - animals, who daily intraperitoneally injected 1 ml saline solution saturated with oxygen, 3, 4, 5 group - animals who have been treated with ozone. A month later, the animals were scored by decapitate under ether anesthesia. Ozone was obtained from the oxygen produced by the oxygen concentrator, with the help of medical apparatus ozone therapy "MEDOZONS SYSTEMS". The drug was administered to rats 3, 4, 5 groups daily 30 days intraperitoneally in the form of ozonated physiological solution in the amount of 1 ml with different ozone doses in him - 0.6 mcg/l, 2.0 mcg/l and 8 mcg/l at saturating concentrations of ozone in the ozone-oxygen mixture 3000 mcg/l, 10000 mcg/l, 40000 mcg/l respectively. In blood was investigated parameters of free radical oxidation using the method of induced biochemiluminescence, activity of superoxide dismutase, the level of malondialdehyde (MDA). The MDA level was estimated by the method of M. Uchiyama and M. Mihara [3]. Superoxide dismutase activity (SOD) was determined in erythrocytes inhibition of formation of product autooxidation of adrenaline [2]. The protein concentration was detected by the method of Lowry modification [1]. Statistical analysis was performed using the program Statistica 6.

Results and discussion. It is shown that under the influence of the used ozone concentrations activation of total antioxidant activity (TAA) of blood plasma was happened: under the action of ozone at a dose of 3000 mcg/l of the TAA was increased by 79%, in a dose of 10000 mcg/l O₃ – on 30%, at a dose of 40000 mcg/l on 45%, compared with healthy rats. It was identified increase of activity of antioxidant enzymes SOD under the action of ozone at a dose of 3000 mcg/l at 34%, with a dose of 10000 mcg/l only 5%, and the decrease of SOD activity at the dose of ozone 40000 mcg/l on 45%. When this the level of malondialdehyde in plasma and erythrocytes decreased under

the influence of ozonized physiological solution. When using an ozone dose of 3000 mcg/l MDA in plasma decreased by 70%, at a dose of 10000 mcg/l O₃ – on 70%, at a dose of 40000 mcg/l by 22% compared with healthy rats. When using an ozone dose of 3000 mcg/l MDA in erythrocytes decreased by 70%, at a dose of 10000 mcg/l O₃ – on 70%, at a dose of 40000 mcg/l by 22% compared with healthy rats (table).

Table.

Indicators of lipid peroxidation and antioxidant activity in the blood of rats under the influence of different ozone concentrations

| experimental conditions | TAA, conditional units | MDA in plasma, mcmol/l | MDA in erythrocytes, mcmol/l | SOD, conditional units /mg× protein |
|--------------------------|------------------------|------------------------|------------------------------|-------------------------------------|
| control | 0,44±0,03 | 0,96±0,08 | 8,04±0,70 | 242,02±22,01 |
| O ₂ | 0,70±0,06* | 0,80±0,07 | 3,38±0,28* | 382,50±32,21* |
| 0,6 mcg/l O ₃ | 0,79±0,06* | 0,29±0,01* | 2,30±0,21* | 323,70±28,20* |
| 2,0 mcg/l O ₃ | 0,57±0,04* | 0,29±0,00* | 2,58±0,10* | 256,00±23,21 |
| 8,0 mcg/l O ₃ | 0,64±0,06* | 0,75±0,06 | 1,96±0,10* | 132,70±12,11* |

Note: * - the differences are statistically significant as compared with control rats (p<0,05).

Conclusions. 1. Thus, ozone has an effect on lipid peroxidation. In response to the introduction of ozone the level of malondialdehyde decreases on the background of significant increase activity of erythrocytes superoxide dismutase. The total antioxidant activity of plasma increases. 2. The data obtained allow to conclude that optimal metabolic dose of ozone for blood is 3000 mcg/l.

Literature

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