

HSR-25

The Chances of Rat Blood Plasma H₂S Concentration after Musculoskeletal System Trauma under the Experimental Hyperhomocysteinaemia Conditions

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Background & Hypothesis:

Trauma and surgery lead to generalised vascular endothelial damage. The metabolism of homocysteine and H₂S also plays a role in the development of endothelial dysfunction.

Methods:

The experiment was performed on 32 male rats (*Rattus norvegicus*), taking into account the principles of bioethics. The induction of hyperhomocysteinaemia was carried out by injection of L-methionine (0.04 g/100 g body weight per day for a month). Formation of the injury was performed using a special device. Animals were randomised into 4 groups: 1) intact animals (control group); 2) animals with injury; 3) animals with hyperhomocysteinaemia; and 4) animals with hyperhomocysteinaemia and injury. Blood plasma was taken at the 3rd day after the formation of the injury. Homocysteine level was measured by Immulite 2000xpi (Siemens). H₂S level was measured with the use of N, N-dimethyl-p-phenylenediamine. For statistical data analysis, STATISTICA 10.0 was used.

Results:

The level of homocysteine in the control group was 7.46 ± 0.33 mkmol/l, 2nd group – 7.47 ± 1.24 mkmol/l; 3rd and 4th groups reached 48.03 ± 0.98 mkmol/l and 46.2 ± 1.27 mkmol/l. This corresponds to an average level of hyperhomocysteinaemia. H₂S level in the plasma of the third group was 72.39 ± 3.8 mkmol/l, which is 30% higher than in the control group (55.6 ± 2.1 mkmol/l); in the 2nd and 4th groups, no statistically significant changes had been found (57.83 ± 5.7 and 59.73 ± 4.9 mkmol/l).

Discussion & Conclusion:

Mechanical injury causes a decrease in the level of H₂S in animals with experimental hyperhomocysteinaemia, which leads to violations of vascular-platelet hemostasis, such as in endothelial dysfunction, increased platelet aggregation. This study was carried on the equipment of CCU "High Technology".