Probability Of Encephalopathy Developing In Rats With Hemic Hypoxia

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Introduction

Тhe possibility of the encephalopathy developing with a background of chronic administration of aqueous solution of sodium nitrite has been poorly investigated.

The study was designed to determine the nitrite-induced changes of the endothelium functional state and cognitive functions of the brain in adult rats.

The experiment was performed on 24 male WAG rats weighing 180-230 g, which were divided into 4 groups. Groups 1 and 2 received 0.1% and 0.2% aqueous solution of sodium nitrite respectively instead of drinking water (in free access) for 6 weeks. Rats of group 3 were injected 50 mg / kg of body mass same solution intraperitoneally during 2 weeks. Group 4 was control. The endothelial growth factor (VEGF-A, pg / ml) was determined by the immuno-enzymatic method, the von Willebrand factor (vWF, %) was identified by photometric method, the 2, 3 diphosphoglycerate (2, 3-DFG, μmol / ml) was measured by spectrophotometric method. Cognitive functions were evaluated using passive avoidance test and extrapolational disposal test.

The level of VEGF-A was found increased in rats of the group 1 by 1.8 times (52.5 ± 0.5), group 2 - by 4,4 times (131,3 ± 1,8), group 3 – by 21 times (622,1 ± 6,6) compared to control group (29,7 ± 0,7). Quantitative analysis of von Willebrand factor and 2, 3 diphosphoglycerate showed the highest levels in the third group. Rats of the group 3 did not pass extrapolational disposal test and passive avoidance test. It proved that the cognitive functions of brains in the group 3 were noticeably reduced. In contrast, the control group rats completed both tests successfully. There were no significant changes in rats of groups 1,2.

The data demonstrates that the long-term administration of aqueous solution of sodium nitrite leads to development of endothelial dysfunction and cognitive impairment of the brain in rats.