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Poster Presentation

Evaluating The Toxicity of L-glutamic Acid on Brain via Histological and Locomotion Measures in Mice

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Abstract

Following severe head injury, there is elevated extracellular glutamate in brain. "About 30% of severely head injured patients develop cerebral ischemia". Increased levels of glutamate (glutamate toxicity) have been considered as an important factor in post- traumatic outcomes. Some articles have reported the effectiveness of antagonists of glutamate for treating head injury. In this study we tried to evaluate the toxicity of glutamate on brain via histological and locomotion measures in mice, to see to what extent glutamate can induce histological and locomotion impairment. In this study, 96 mice were studied which divided into three groups in terms of age: infant, immature and mature. Then in each age group, mice were divided into four groups which three of them received 0.5, 1 or 2 mg/kg of L-glutamic acid and the control group received distilled water. 30 minutes after the injection, the motor activity impairments were evaluated with the classical EAE scoring scale. Then, mice were tested by a grid walk test, and a narrow beam test, to assess specific aspects of locomotion impairments. For histological effect of glutamate on brain, histological slides were prepared from different parts. L-glutamic acid in three doses 0.5, 1 and 2 mg/kg and three age groups increased the mean of scores in classical EAE scoring scale and the mean of footfall errors in grid walk test, significantly ($P<0.001$), and decreased the mean of scores in narrow beam test, significantly ($P<0.001$) compared to the control group. Histological showed significant necrosis in the cortex, hippocampus, olfactory bulb, and in lesser extent in the striatum. Glutamate can cause locomotor and histological impairments, so using antagonists of glutamate may be able to be as a one of treatments in head injury in future.

Keywords: Head Injury, Glutamate, Histological Impairment, Locomotor Impairment.

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