MODELING OF ACUTE TRAUMATIC BRAIN INJURY IN WHITE MONGREL RATS

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https://doi.org/10.5281/zenodo.7439808

The purpose of the research: To create an experimental acute traumatic brain injury on white mongrel rats and to study their behavior using various methods. Here, a craniocerebral injury was modeled, similar to the injury caused by a car accident observed in humans.

Research materials and methods:

In TBI, which is observed in life, most often in falls from a height and in car accidents, brain damage occurs as a result of a collision of the victim's moving head with a barrier. Based on this, we developed a model of horizontal impact of TBI, simulating an injury as a result of a car accident. In people with injuries from car crashes, TBI is often linear and occurs as a result of acceleration or deceleration of rotation. This clinical scenario was reproduced by us in a special device in the experiment as follows. The rat is placed in a cart, and the animal's head is attached to the headrest. It moves along a special rail that is lowered into the rat cart, creating a barrier for the animal's head to collide on this road. By changing the angle of descent of the tracks and the weight of the cart, the severity of TBI that occurs in rats is regulated.

The study was conducted on 20 laboratory white rats weighing 180-200 g of both sexes, 2 months of age. The rats were divided into 2 groups. The first control group consisted of 10 rats that were not injured. The remaining 10 rats of the second experimental group under light inhalation anesthesia with isoflurane were inflicted with mild and moderate injuries using the above method. At the same time, the length of the rail to the barrier was 1.5 meters, the angle of incidence was 30°.

Results and discussion. The proposed method investigated the mobility and cognitive characteristics of white rats to evaluate the results of TBI. "Movement on a bar" method mainly determines the coordination disorders of motor function, which is typical for mild and moderate traumatic brain injury. Rats of the experimental group were treated with mild and moderate TBI. A day after the injury, a study was conducted on rats of both groups to assess their motor disorders using the "movement on a bar" method. The study was conducted on rats of both groups on a narrow bar with a width of 2.0 cm, a length of 150 cm, which is installed in a special wooden box. On one side was a bright light, and on the other side was a dark shelter for rats. The animals ' ability to balance and

move on the bar was evaluated using video recording. The rats were given the "walking on a bar" method to notice that the coordinate of movement had changed. The rats of the experimental group had a disturbed balance when walking on the board compared to the control group.

Conclusions: Despite the many methods of modeling TBI, none of them can fully reflect all aspects of TBI in humans. Each model has its own advantages and disadvantages. In our proposed model, the moving body of a rat hits its head on an obstacle and receives many natural brain injuries inherent in humans, TBI is caused due to the horizontal impact effect of traumatic force. This model helps us study the combined traumatic brain injury that is often seen in humans.

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