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INFLUENCE OF MEDICINAL PREPARATIONS ON BEHAVIORAL REACTIONS OF ANIMALS OF THE POST-TRAUMATIC PERIOD

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✓ ***Resume***

This article provides information on the results of pharmacological correction in the post-traumatic period of severe traumatic brain injury in 3-month-old white outbred rats. In a scientific study, traumatic brain injury was performed using the "traffic accident" model in order to study extracranial complications and correct them with widely used drugs.

Key words: traumatic brain injury, kidney, morphological changes in internal organs, white outbred rats.

ВЛИЯНИЕ ЛЕКАРСТВЕННЫХ ПРЕПАРАТОВ НА ПОВЕДЕНЧЕСКИЕ РЕАКЦИИ ЖИВОТНЫХ ПОСТТРАВМАТИЧЕСКОГО ПЕРИОДА

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✓ ***Резюме***

В данной статье представлены результаты фармакологической коррекции в посттравматическом периоде тяжелой черепно-мозговой травмы у 3-месячных белых беспородных крыс. В научном исследовании черепно-мозговая травма была проведена с использованием модели «дорожно-транспортного происшествия» с целью изучения экстракраниальных осложнений и их коррекции с помощью широко используемых лекарств.

Ключевые слова: черепно-мозговая травма, почка, морфологические изменения внутренних органов, белые беспородные крысы.

ЖАРОҲАТЛАНИШДАН КЕЙИНГИ ДАВРДАГИ ҲАЙВОНЛАР ҲАТТИ-ҲАРАКАТ РЕАКЦИЯЛАРИГА ДОРИ ВОСИТАЛАРИНИНГ ТАЪСИРИ

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✓ ***Резюме***

Ушбу мақолада 3 ойлик оқ зотсиз каламушлардаги оғир бош мия жароҳатидан кейинги даврда формокологик коррекциялаш тўғрисидаги маълумот натижалари берилган. Илмий тадқиқот "йўл транспорт ҳодисаси" модели ёрдамида юзага келадиган бош мия жароатидан кейинги экстракраниал асоратларни юзага келиш сабабларини ўрганиш ва кенг қўлланадиган дори воситалари ёрдамида коррекциялашга қаратилган.

Калит сўзлар: бош мия жароҳати, буйрак, ички органлардаги морфологик ўзгаришлар, оқ зотсиз каламушлар.

Relevance

It is known that traumatic brain injury is one of the serious problems of modern medicine, which plays a major role in the development of morbidity and mortality in economicall developed countries [1,3,4]. Mortality in severe traumatic brain injury reaches 80%, and among those who survived up to 75% of victims remain with severe neurological, including intracranial and extracranial complications, leading to 1-2 groups of disability of the

population. For many years, scientists from all over the world have been drawing attention to this problem, in particular, to pharmacotherapy in the post-traumatic period [2].

Material and methods

For this study, laboratory white outbred rats were used: 20 males and 10 females of three months of age, the average weight of which was 115.6 ± 9.3 g. Work with laboratory animals was carried out in compliance with the basic regulatory and ethical requirements. Laboratory animals were kept in a vivarium in plastic cages with small wood chips at room temperature 21 ± 3 ° C for 12-hour light and dark replacement, air humidity 58% in accordance with the standards for keeping laboratory animals. All animals were divided into 3 groups, that is, the first group consisted of animals not inflicted with head trauma (control, n = 10), the second group consisted of animals that had a traumatic brain injury, without drug correction (experimental, n = 10), and the third the group consisted of (experienced, n = 10) - animals that had suffered a traumatic brain injury and were corrected with drugs. Until today, many methods have been used to inflict injury, such as "free fall of the load", "inertial", "hydrodynamic". For our experiment, the “road traffic accident” model was used. In the experiment, the entire group of rats was subjected to craniocerebral trauma under the influence of light ether anesthesia. The experimental animals were fixed on a special home-made vehicle, and in order to avoid a fracture of the jaw, the head of the animal was fixed on a soft pillow and at the end was injured. The glued rats on the vehicle were accelerated at a speed of 6.7 km per hour and hit a wooden obstacle with their frontal part of the head and were injured in the cranial part of the head. After injury, all animals received serious, serious injuries. Of these, 2 animals died during this experiment, 18 received serious, severe injuries. After injury, the animals were transferred to a special plastic cage and observed until the post-traumatic state was restored. During this period, some rats experienced asphyxiation, seizures, and bleeding. Approximately 25 minutes after the injury, the surviving animals were placed in their cage to return to a permanent, normal lifestyle. Test analyzes were carried out before and after traumatic brain injury to study the behavioral responses of animals before and after drug correction. To study the behavioral reactions of animals after traumatic brain injury using methods such as "Open Field", "Morris Water Maze" [5].

Open field. This test, called the "Open Field" method, is a brightly lit rectangular area of white 80 × 90 cm in size. It is limited on all sides by a height of 35 cm. After inflicting a traumatic brain injury on days 1, 7 and 14, 28, the animals were placed in the center arenas and the behavior of rats under new conditions was studied for 5 min. Approximately 45 minutes prior to this experiment, the rats were transferred to a quiet, dimly lit room, and during the same time period, any permissible manipulations, such as feeding and picking up, were minimized.

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1- Figure: *Morris Water Maze Test.*
2-Figure: *Test "Open field".*

"Morris Water Maze", this test is mainly designed to study the spatial memory of animals. The Morris Water Maze is a pool of rubber, 160 cm in diameter and 70 cm high. The labyrinth was filled with water at a temperature of 21 ± 2 ° C. The pool was filled with water up to 40 cm high, which is 1 cm higher than the platform located in the north western sector. Every day for 5 consecutive days, the rat was given 3 attempts, 1 min each, to find the platform. The platform was hidden under water. Animals were thrown randomly from 3 sectors (except for the northwest). For 5 days, the rats were daily accustomed to the experimental environment, and on the 6th day they inflicted a head injury. The spatial memory of animals was assessed on the 1st, 7th, 14th, 21st, 28th days after the application of traumatic brain injury, as well as after the use of drugs. The first group - control animals with craniocerebral trauma, as well as the 2nd - experimental group - are animals with craniocerebral trauma, but not treated with drugs, and the 3rd - experimental group - are animals with craniocerebral trauma that received drug treatment. Only 10 experimental animals, which were subjected to traumatic brain injury, were administered within 10 days drugs neuroxon - 0.001-0.002 g, magnesium sulfate - 0.04-0.05 ml of solution, piracetam - 0.01-0.02 ml of the solution and the animals were transferred to a special plastic cage, observed until the post-traumatic state was restored.

Results and discussion

The Morris water maze is especially used to assess cognitive impairment in experimental rats. This method is often used to assess the memory of animals after inflicted traumatic brain injury [5]. In this study, it was shown that on the 1st, 7th, 14th, 28th day after the injury in rats, the spatial memory mainly decreases, diagnosed by such indicators as the duration of stay on the platform and the time to reach the platform sector. In this experiment, the percentage of time spent in the sector was significantly less compared to the same indicator in control animals, but the time required to reach the sector-platform was increased.

To assess the emotional and exploratory behavior of animals after traumatic brain injury, the "Open field" test was used. It was found that the number of visits to open field areas was significantly reduced in animals that received a traumatic brain injury, starting 1 day after injury, compared with the same indicators in control animals. In the experiment, the duration of the general running of the animal in the open field was determined during the study period (5 min). It was found that after injury on the 1st, 7th, 14th, 28th day, the total duration of running is significantly reduced in rats with a craniocerebral injury, compared with the same indicator in rats of the control group. In rats with a craniocerebral trauma, the average movement speed is reduced.

So, the data obtained proves that in the second and third groups, after traumatic brain injury in animals, indicators indicating exploratory activity decrease, and the level of depression and anxiety increases. Course administration of drugs to the third experimental groups such as neuroxon, magnesium sulfate solution, piracetam solution allows you to correct these disorders and restore the changed processes to the level characteristic of the first groups of control animals. In the second experimental groups of animals that did not receive treatment with the drugs indicated above, the behavioral reactions on the 1st, 7th, 14th, 21st, 28th days indicated a worsening of their condition compared to the third groups, which can indicate the onset of development by the 1st day of secondary intracranial and extracranial complications, which are a consequence of traumatic brain injury.

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3- Figure: *The horizontal arrangement of the experimental object before the infliction of traumatic brain injury.* ***4-Figure:*** *Used medications.*

Conclusion

The obtained data, during the experiment, allow us to conclude that after the administration of drugs such as neuroxon, magnesium sulfate solution, piracetam solution after traumatic brain injury in rats, it is possible to correct these disorders and restore the altered processes to the level characteristic of the first groups of control animals.

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