

Involvement of Cholinergic and Adrenergic Drugs Mechanisms in Stomach Reactions

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Abstract: The work is devoted to the study of serotonergic structures that enhance gastric motility. Experiments were performed on 2-4 rats in the surgical stage of anesthesia, mechanical ventilation, bilateral vagotomy and bilateral cutting of the lingual pharyngeal nerves. The mechanical activity of the stomach was recorded in response to the administration of serotonin adipinate in intact animals and against the background of the continued action of adreno- and holinoblockers. It was found that the blockade of adreno- and holinoreceptors not only does not prevent, but on the contrary, promotes the manifestation of stomach reactions to serotonin, and the blockade of beta-adrenoreceptors increased the severity of gastric stimulant effects by almost 90%. It was concluded that adrenergic and cholinergic mechanisms prevent the manifestation of stimulatory reactions of serotonin-reactive structures on gastric motility.

Keywords: serotonin-reactive structures, serotonin, stomach, adrenoreceptors, holinoreceptors.

During the preparation, the skin was dissected with a median incision on the neck, the trachea was isolated, which was crossed 1/3 of the length in the area of the 5th half-ring, where an intubation tube was inserted, after which the animals were transferred to a ventilator. The fascia of the neck was separated in a blunt way, preparing the right and left neurovascular bundles, under which ligatures were brought. The vagus and glossopharyngeal nerves were bandaged as close as possible to the lower jaw, then the distal ends of the vagus nerves were crossed with a length of 12-15 mm, fixed on ligatures, which were covered with gauze cloths moistened with saline solution to prevent drying. The right common carotid artery was isolated for 10-15 mm. To prevent retrograde bleeding, the distal part of the artery was also bandaged as close to the lower jaw as possible, and then, retreating lower by 8-10 mm, an atraumatic serfin was applied to the artery. The vessel was transversely crossed 1/3 of the width with eye scissors, and a Teflon catheter with a diameter of 0.3 mm was inserted into the incision in the direction of the serf, which, to prevent thrombosis, was previously soaked in a heparin solution for 24 hours. The catheter intended for drug administration was hermetically fixed with ligatures, its mating part was connected to the dosing system and serfin was removed. During the experiment, 0.9% NaCl and serotonin solutions were administered through a catheter. The volume of a single injection did not exceed 0.25 ml, which corresponded to the systolic volume of the rat ventricle [9]. The infusion of drugs was carried out for 30 seconds, which corresponded to 150-180 contractions of the animal's heart. Such parameters of administration reduced the risk of developing semilunar valve damage and hemodynamic disorders associated with volume loading, ensuring drug delivery to the aortic arch.

Adreno- and holinoblockers were injected into the subcutaneous tissue of the extremities in an equal dose of 1 mg / kg for each drug. M-holinoblocker hyoscine butylbromide,

ганглиоблокатор ganglioblocker pentamine, alpha-blocker doxazosin, beta-blocker propranolol were used. During the experiments, in order to confirm the blockade of holinoreceptors, control stimuli of the peripheral segment of the right vagus nerve were performed with square pulses of 0.1 mA, 10 Hz, 1.5 ms. The absence of a stomach reaction indicated a reliable blockade of cholinergic receptors. The long half-life of all these drugs guaranteed the reliability of the blockade throughout the entire experiment, which lasted 45-60 minutes. Statistical analysis was performed using the Kolmogorov—Smirnov test for the normality of the distribution of quantitative traits, and the degree of confidence was evaluated using the Student's t-test in the dependent and independent samples. Data processing in the dependent sample included a "pre- and post-exposure" analysis, while the independent sample processed data on the increase in serotonin pressure in intact animals on the background of adreno- and holinoblockers.

At the next stage, we studied the possible role of cholinergic mechanisms in the realization of the stimulant effects of serotonin on 56 animals. As in the previous series with adrenergic blockers, the effect ганглиоблокатора of the pentamine ganglion blocker on background motility was first studied. Pentamine, which was administered to 30 animals, changed the background mechanical and electrical parameters of motor skills: before administration of the drug, they were 10.23 ± 2.32 mm Hg, after administration- 13.52 ± 2.14 mm Hg (32%, $p < 0.05$), regular spontaneous contractions appeared. Following the standard regimen, serotonin was administered 10 minutes after the ganglion blocker injection. Stimulatory responses were observed in all 30 animals: стимуляторные: hydrostatic pressure in the stomach cavity increased from 13.52 ± 2.14 to 18.9 ± 1.67 mm Hg (40%, $p < 0.05$), which exceeded the intracavitary pressure for serotonin.

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Conclusions. The results of all series of experiments with blockade of adreno- and holinoreceptors and administration of serotonin against the background of their action showed that the stimulating effect of serotonin significantly exceeds that of its administration to intact animals. Adrenoblockers are more likely to contribute to the manifestation of stimulant reactions, which should be taken into account when prescribing serotonin preparations in the clinic. In general, cholinergic and adrenergic mechanisms interfere with the activity of serotonin-reactive structures that regulate the motor activity of the stomach.

Literature

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