



Acetylcholine Regulator of Functional Activity at Healthy and Sick

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Abbreviations: Ach: Acetylcholine; Che: Acetylcholinesterase; PhAC: Physiologically Active Compound; ANS: Autonomic Nervous System; GIT: Gastrointestinal Tract; DU: Duodenal Ulcer; GU: Gastric Ulcer

Introduction

Acetylcholine (Ach) is a mediator that is rapidly degraded by acetylcholinesterase (Che), a priority physiologically active compound (PhAC), releasing in neuro-effector synapses, is constantly present in the body as a primary neurotransmitter in the parasympathetic division of the autonomic nervous system (ANS), tissue hormone, stimulant physiological functions of systems and organs, a modulator of memory, learning, a regulator of the characterological characteristics of a person and his diseases. An increase or decrease in the concentration of Ach plays a major role in the development and maintenance of the pathological process.

The goal is to reveal the change in the concentration of Ach depending on the location of the pathology and the stage of the disease. To establish the level of Ach concentration, which can complicate the course of the disease, promote recovery and suggest the prognosis of the disease. Material. The concentrations of Ach and Che activity in the blood serum of practically healthy individuals, volunteers n= 56 without diseases of the gastrointestinal tract (GIT), patients with duodenal ulcer n= 112 (DU), gastric ulcer (GU) n = 65 and chronic pancreatitis of alcoholic etiology (ACP) n=67. Patients were treated from 1980-1990 at the Central Research Institute of Gastroenterology. In practically healthy individuals, it was found that the concentration of Ach in the blood serum has three characteristic types: low from 0.46 to 1.0mlmol/l, occurs in 30% of cases; average at 60%; 1.02-1.5mlmol/l; and in 10% high 1.5mlmol/l and above (Table 1).

Discussion

Analyzing the mass of data obtained in patients with GU, DU and ACP. It has been established that the presence of these diseases determines the concentration of Ach and the level of Che activity. Significant differences in Ach concentration and Che activity between Ach and PUD, PUD, ACP and control (Figure 1) were statistically calculated. In case of a long-term illness, ACP-concentration of Ach is in the zone of high values from 1.5 to 2.0mmol/l, which is not observed at the initial stage of the disease. Similarly, in the process of ulceration, the concentration of FAS is constantly changing, significant differences are present during the period of exacerbation and healing, the observed ratios made it possible to discover the contents of FAS that are "characteristic" for the acute and chronic stages of the disease. We believe that the usual system of regulation is violated, which requires the inclusion of protective mechanisms, reducing the aggressiveness of damaging factors. There is a need to demonstrate the multifaceted role of Ach in the process of ulcer formation and healing. But this work can be carried out only under experimental conditions. Used 50 white Wistar rats of both sexes, weighing 180-220. Animals were divided into two series of experimental studies, consisting of several groups: the first "acute" ulcers - 3 hours, the second "chronic" ulcers - 10 days after reproduction. The first series consisted of three groups of experimental animals: the first - control animals without drug administration, the second - the introduction of acetylcholine chloride at a dose of

100mg/kg of body weight, 3 hours after the reproduction of the experimental gastric ulcer, the slaughter of animals 3 hours after

the drug administration. Ultimately, acetylcholine chloride causes an increase in the affected area.

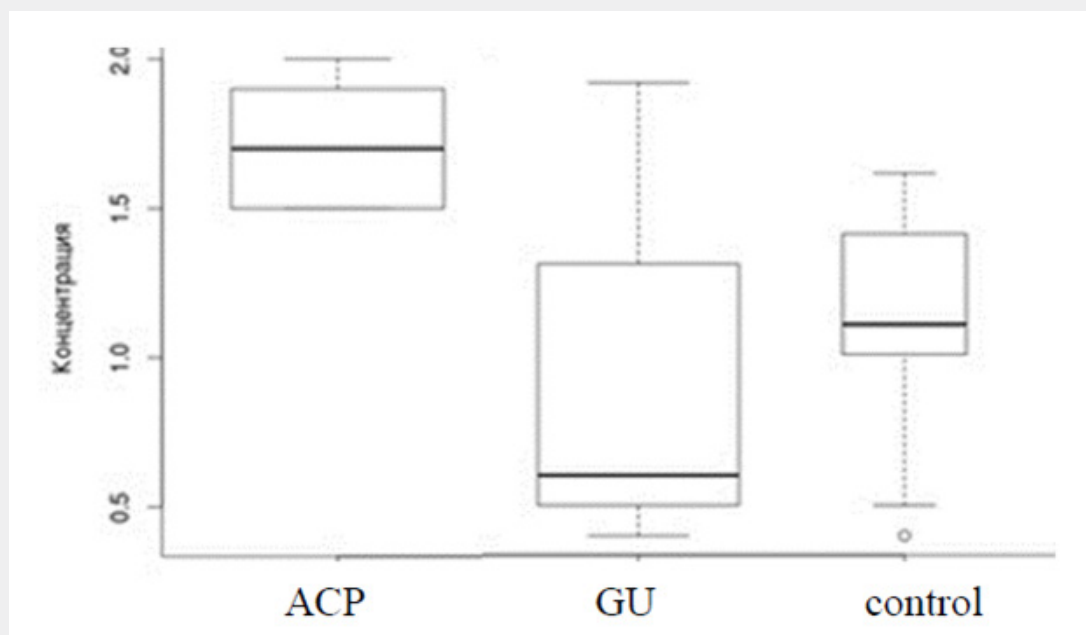


Figure 1: Concentration of acetylcholine in blood serum mmol/liter.

Table 1: Frequency of occurrence of content variations. Ach and Che activity in healthy individuals and patients with GU, DU, ACP.

Ach Che	Low Low	Average Average	High High
Ach %	15	60	25
Che %	35	30	35
Value zones	Low	Average	High
Characteristic diseases	Healthy 30%; GU 50%; DU20%	Healthy 60%; GU45%; DU50%; ACP 10%	Healthy 10 %, GU 5%; DU30%; ACP 90%

Third, rats were preliminarily injected with atropine 0.1%, 0.2ml/200g. 10 minutes before the reproduction of the experimental ulcer. Pre-introduction of atropine 0.1%, 0.2ml / 200g. 10 minutes before application with acetic acid reduces the area of the defect. The second series of experiments: the animals were divided into 5 groups. The first control "acetate" ulcer, the animals were injected daily with intramuscular saline, the second - on the 10th day, acetylcholine chloride was injected intramuscularly at a dose of 100 mg/kg of body weight, slaughtered after 3 hours. The third group - from the third day, acetylcholine chloride was injected daily intramuscularly at a dose of 10mg/kg, the animals were slaughtered on the 10th day. The fourth group - from the third day the animals were injected daily intramuscularly with proserin at a dose of 0.2ml / 200g of a 0.05% solution, the fifth group - from the third day the animals were injected daily with atropine 0.1ml / 200g. 0.1% solution. It is undoubted that

both the decrease, which was modeled by the administration of atropine, and a significant increase in the content of acetylcholine, by the administration of ACh or prozerin, increase the area of the ulcer in both acute and "chronic" gastric ulcers. Nevertheless, interesting and unusual material was demonstrated under the conditions of the experiment. A slight increase in Ach, especially endogenous (after the introduction of prozerin) promotes the healing of the ulcer. (it can be assumed that this is similar to what is observed when using PPI). Under experimental conditions and in patients with PU, the use of these drugs contributes to the increase in Ach by reducing ChE activity. It is characteristic that at the peak of destructive processes, with a stomach ulcer, an increase in acetylcholine is an unfavorable factor. Practice shows that both the decrease, which was modeled by the introduction of atropine, and the increase in the content of acetylcholine increase the area of the ulcer in a "chronic" gastric ulcer. A slight increase

in acetylcholine, especially endogenous (with the introduction of prozerin), promotes the healing of an ulcer. We believe that this is similar to what is observed with the use of PPIs, the level of Ach increases due to a decrease in cholinesterase activity. At the peak of destructive processes, an increase in acetylcholine is an unfavorable factor, the introduction of atropine reduces the area of damage, but during the healing period, a slight increase in Ach concentration is, oddly enough, a favorable factor.

Conclusion

Both in humans and in animals, the Ach concentration depends on the location of the disease and the phase of its development and affects the healing and exacerbation of the disease. An increase in the concentration of Ach is fatal, at the same time, its decrease delays the healing processes, which is unfavorable prognostically.



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