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Changes in Morphometric Parameters of the Gastric Mucosa under the Influence of Polypharmacy in 3-Month-Old Purebred Male Rats

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Annotation: Although treating patients with complex medical problems with the right medications can improve clinical outcomes, quality of life, and life expectancy, the risk of adverse drug reactions due to polypharmacy increases, in some cases leading to hospitalization and even death. Therefore, it is critical to have systems in place to ensure that medications are only started when indicated, that patients are fully informed of the benefits and potential complications of treatment, and that patients are regularly reviewed to ensure compliance with their medication regimen.

Keywords: polypharmacy, morphology, stomach, drugs, mucous membrane, morphometry.

INTRODUCTION.

The main anatomical sections of the stomach, which differ according to their structural and functional characteristics, are the following: cardiac section, gastric fundus and body, pyloric section. Regarding the secretory function of the stomach, it should be noted the ability of the mucous membrane to secrete hydrochloric acid, bicarbonates, pepsinogens, gastrin, and mucus, but different parts of the stomach have different secretion properties.

The malfunction of at least one member of the tract can lead to the failure of the entire system. All organs of the gastrointestinal tract perform their function and serve for the normal functioning of the body. The alimentary canal is interconnected, and the pathological process in

one part of the alimentary canal cannot affect the other parts. Like any other organ, the stomach performs several important functions at the same time. The special position of the stomach among the members of the alimentary canal allows for the separate passage of chyme in it and its it should be noted its attractiveness as an important link in digestion, as well as a multifunctional organ that provides secretion and metabolic products of exocrine and endocrine absorption of nutrients. Gastrointestinal tube is an important link of mutual location and action of digestive organs. All these parts are closely related to each other, the gastrointestinal tract

The stomach performs a number of digestive and non-digestive functions, the disturbance of which in pathological conditions can lead not only to the disturbance of stomach and intestinal digestion, but also to the development of anemia, hormonal imbalance, acid-base imbalance, electrolyte imbalance and other changes. The main functions of the stomach are secretory, moving, evacuation, reservoir, excretory, absorption and endocrine.

Materials and methods of research. The experiment was carried out in a vivarium on 180 five-month-old white male rats. Rats weigh 190-240 g. organized. At the beginning of the experiment, all mature rats were quarantined for 7 days; after eliminating somatic or infectious diseases, they were transferred to the usual vivarium regime with 2 meals a day. To study the effects of polypharmacy in experimental groups of animals, the following anti-inflammatory drugs were used: aspirin (a group of non-steroidal anti-inflammatory drugs - salicylic acid derivatives); paracetamol (a group of non-steroidal anti-inflammatory drugs - anilide derivatives); ibuprofen (a group of non-steroidal anti-inflammatory drugs - propionic acid derivatives); dexamethasone (synthetic glucocorticosteroid); plaquinyl sulfate (anti-inflammatory, antimalarial). White rats were divided into 5 groups (n=240): group I - control (n=40); Group II - rats treated with 2 types of anti-inflammatory drugs: paracetamol 15 mg/kg, aspirin 5 mg/kg (n = 50); III - group - white rats treated with 3 types of anti-inflammatory drugs: paracetamol 15 mg/kg, aspirin 5 mg/kg, ibuprofen 6 mg/kg (n = 50); Group IV - white rats treated with 4 types of anti-inflammatory drugs: paracetamol 15 mg/kg, aspirin 5 mg/kg, ibuprofen 6 mg/kg, dexamethasone 0.1 mg/kg. (n = 50); Group V - white rats treated with 5 types of anti-inflammatory drugs: paracetamol 15 mg/kg, aspirin 5 mg/kg, ibuprofen 6 mg/kg, dexamethasone 0.1 mg/kg, hydroxychloroquine sulfate 6.5 mg/kg (n = 50).

Doses of this drug were calculated empirically and administered intragastrically daily as a solution for 10 days using a metal tube. From days 141 to 150 (5 months), rats were intragastrically administered 0.5 ml of distilled water (control group) and various combinations of anti-inflammatory drugs (experimental groups) for 10 days.

Results of our own research. In experimental animals, changes in the histomorphometric parameters of the main parts of the gastric mucosa were observed.

In the control group, the average number of intraepithelial lymphocytes per 100 villous epithelial cells in the cardiac section of the stomach was 10.5±0.5, in the middle section 13.9±0.2 and in the distal section

15.1±0.3. In the dynamics of the second and third groups, a clear increase in the number of intraepithelial lymphocytes was not detected, but in groups 4 and 5, intraepithelial lymphocytes increased by 20% and 32%, to a greater extent in the pyloric region of the stomach. This indicates the migration of lymphocytes to the gastric mucosa, infiltration of the mucous membrane (Fig. 1).

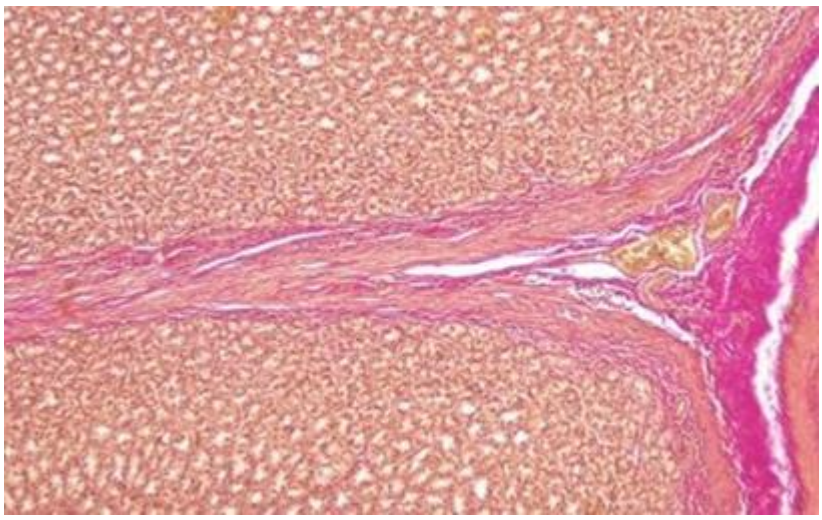

Fig. 1. Average number of intraepithelial lymphocytes in white rats in the control and experimental groups, in 100 epithelial cells of the stomach, pcs.

In the pyloric part of the stomach, the number of individual glandular tissues in the control group was 11±0.3, and in the 5th experimental group, after using 5 types of anti-inflammatory drugs, the number of glandular tissues decreased to 8.7±0.14. on average, which is comparable to the first group, 20% less. In group 4, the number of individual gland tissues decreased by 17% and amounted to 9.1±0.21. In the 3rd group, the gland tissue decreased by 13.6%, and in the 2nd group by 11.8%, respectively.

The average number of individual glandular tissues in the corporal part of the stomach of rats is 14±0.32. In the studied groups, the amount of tissue of individual glands in the body of the stomach decreased by 12.8% in 5 groups, by 7.8% in 4 groups, by 6.8% in 3 groups and by 5% in 2 groups, depending on the number of drugs used .

In the studied groups, the amount of glandular tissue in the pyloric part of the stomach also decreased by 15% in 5 groups, by 11% in 4 groups, by 9.7% in 3 groups and by 1.9% in 2 groups (Fig. 2).

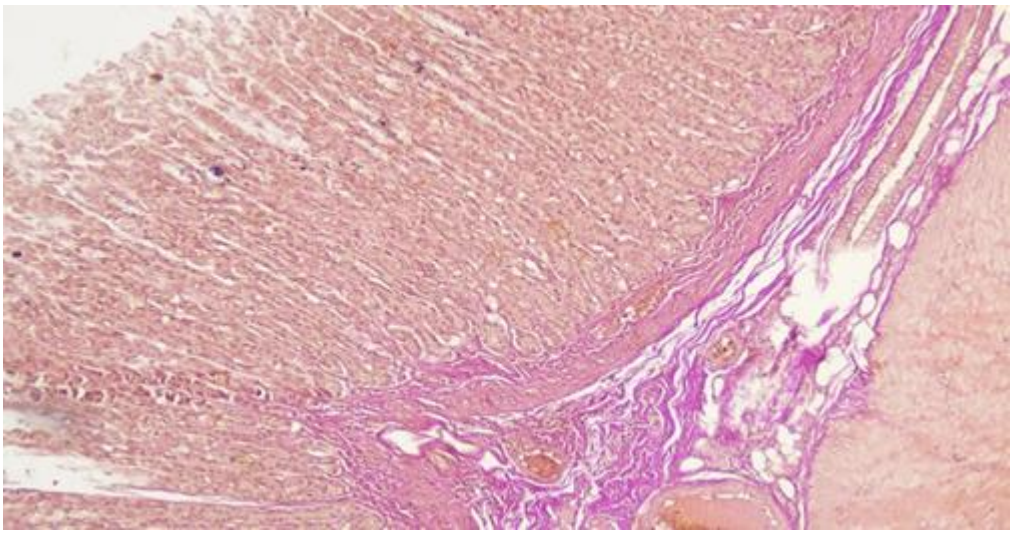

Figure 2. Average amount of glandular tissue in the control and experimental groups depending on the stomach, cm2

The experiment revealed changes in the size of glandular tissues and the distance between them during a macroscopic examination of gastric preparations in white rats. In dynamics, the distance between glandular tissues in the proximal stomach increased by 3.3% in groups 5 and 4, and in groups 3 and 2, the distance between glandular tissues did not significantly decrease (Fig. 3).

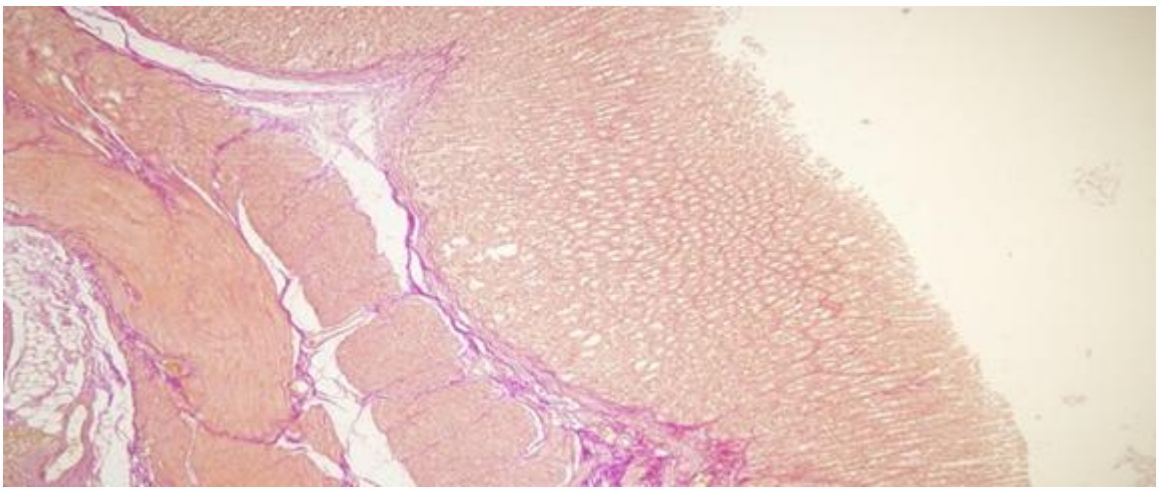

Fig. 3. Sizes of lymphoid nodes in the distal stomach in rats of the control and experimental groups, mm.

When examining the tissues of the gastric glands, it was found that there were no significant changes in the number of tissues of the gastric glands as a result of the action of anti-inflammatory drugs, that is, in the first group they amounted to 18.7 ± 0.33 pieces, in the second group 18.9 ± 0.4 pieces ., in the third group 17.3±0.34 pieces, in the fourth group 17.9±0.22 pieces, in the fifth group 18.1±0.24 pieces.

Based on the results of the study, a decrease in the size of the gland tissue was determined. In the control group, the average size of glandular tissue in the proximal stomach was 2.8x3.21 mm, in group 2 - 2.4x3.16 mm, in group 3 - 2.2x3.0 mm, in group 4 it was 2.3x2.9mm and in group 5 1.6x2.0 mm in group equally. The size of the glandular tissue in the bodily part is larger than the glandular tissue in its proximal part; in the experimental groups, the size of the glandular tissue in the bodily part of the stomach decreased as follows, that is, the average size of the glandular tissue in the first group was 3.36x4.25 mm, in the 2nd group 3.14x4.04 mm, 3rd group 3.0x4.0 mm, 4th group 3.1x4.0 mm and 5th group 3.0x3.9 mm organized.

According to the results of the examination, an increase in the distance between the glandular tissues was detected. The distance between the glandular tissue of the gastric cardia increased by 17.2% in group 2, 21.4% in group 3, 27.3% in group 4 and 37.7% in group 5 compared with the control group. The distance between the glandular tissue in the body of the stomach increased by 2.1% in the second group, by 5% in the third, by 8.8% in the fourth and by 25.2% in the fifth group, respectively.

In the pyloric region, the distance between glandular tissues in the control group averaged 25.46 ± 0.59 mm, in the second group the distance between glandular tissues increased to 28.6 ± 0.65, in the third group 30.3

± 0.59, in the fourth group 33.1 ± 0.57 and increased to 41.6 ± 0.93 mm in the fifth and last group (Fig. 4).

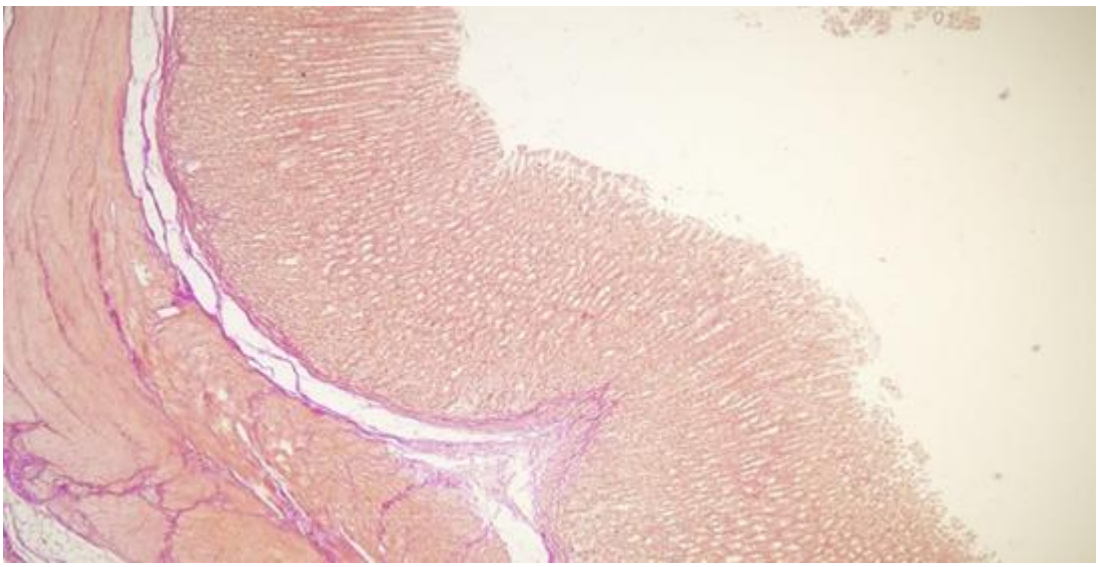

Figure 4. Change in the dynamics of the distance between the tissues of the gastric gland in the control and experimental groups, mm.

According to the identified data, significant changes in the nodes in the glandular tissue of the stomach walls were also revealed. Compared to the number of nodes in the control group, it was found that the number of glandular tissue decreased in number and size. And the distance between the fields is much greater, which was clearly manifested in the glandular tissue of the pyloric section of the stomach. (Fig. 5).

Dimensions of glandular tissue in the body of the stomach: 0.76x0.86 mm in the first group, 0.72x0.83 mm in the second group, 0.62x0.74 mm in the third group, 0.6x0.7 mm in the fourth group, and in the fifth group 0.54x0.68 mm.

The results of the study showed that the gastric gland tissue in the first control group had an oval (61.2%), round (32.9%) and irregular (5.9%) shape. The total area of accumulation of glandular tissue was 5.06% of the total area of the stomach. The accumulation of glandular tissue of the stomach in the second group was oval (59.3%) and round (34.6%), less often rectangular and irregular in shape (6.1%), the total area of the collected lymphoid nodes was 4.03% of the total area stomach. In the third group, the collected lymphoid nodes were oval (50.5%) and round (36.0%), rectangular and irregular (13.5%), the total area of the collected lymphoid nodes was 3.69% of the total area of the stomach. In the fourth group, the collected lymphoid nodes were oval (45.2%) and round (37.5%), rectangular and irregular (17.3%), the total area of the collected lymphoid nodes was 3.28% of the total area of the stomach.

Clusters of gastric lymph nodes in the fifth group had an oval (40.3%), round (40.1%), rectangular and irregular shape (19.6%), the total area of the cluster of lymphoid nodes was 2.85% of the total area of the stomach.

CONCLUSION. The effect of polypharmacy of anti-inflammatory drugs in the experimental group of rats on the mucous membrane of the stomach wall, submucosa and glandular tissue was corrected in group 5 compared to control group 1. At the same time, in the cardiac section of the wall of the organ of group 5, the height of the mucous layer of the stomach wall is 8.4%, the mucous base - 10.5%, the gland tissue - 37.0%, the mucous layer - 7.60. % at the bottom of the stomach and 17.8% falls on the mucous membrane, and in the gland tissue by 29.7%, the height of the mucous membrane in the body of the organ by 6.52%, the base of the mucous membrane by 16.7% and in the gland tissue by 34.4%, the height of the mucous membrane in the pyloric part of the stomach by 6.2%, in the mucous membrane it was found that the base decreased by 15.9% and in the gland tissue by 32.2%.

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