

Morphological Changes in the Esophagus of White Outbred Rats under the Action of Nsaids

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Abstract: Non-steroidal anti-inflammatory drugs (NSAIDs) are a causal factor in damage to the mucous membrane of the stomach, duodenum and esophagus, triggering the development of gastroesophageal reflux disease. NSAIDs (including low-dose aspirin) are known to significantly increase the likelihood of developing peptic esophagitis, with the risk of ulceration, bleeding, or stricture formation. This article presents morphologic changes in the esophagus of white outbred rats under the drug effect of acetylsalicylic acid.

Keywords: esophagus, outbred rat, acetylsalicylic acid, morphology.

Relevance. Currently, NSAIDs are actively used in clinical practice and everyday life for many diseases and are included in the arsenal of doctors of various specialties. Every day in the world, NSAIDs are used as an analgesic, anti-inflammatory and antiplatelet agent by more than 30 million people, among whom about 40% are the elderly and their number is constantly growing [18]. Since the end of the last century, the consumption of NSAIDs has increased by 2-3 times every 10 years. The number of people taking NSAIDs during the year is more than 300 million people, while only 1/3 of them take NSAIDs as prescribed by a doctor [1, 2]. The consequence of such uncontrolled intake is frequent undesirable gastrointestinal phenomena, from mild dyspepsia to erosions (often multiple) and peptic ulcers [3]. Thus, when using NSAIDs for more than 6 weeks, gastro- and duodenopathy is formed in 70% of patients [4]. 30-40% of people taking NSAIDs for a long time develop symptoms of NSAID-associated dyspepsia. In 1/2 of patients with symptoms of dyspepsia associated with taking NSAIDs, endoscopic examination reveals erosions and hemorrhages, and one in five has ulcers. In patients with rheumatoid arthritis who take NSAIDs for a long time, the risk of hospitalization or death due to gastroenterological problems is estimated at 1.3-1.6% per year, so gastrointestinal (GI) complications are one of the common causes of death in this disease [5]. According to calculations made by G. Singh, 107,000 hospitalizations and 16,500 deaths are predicted annually in the United States due to dangerous gastrointestinal complications associated with NSAIDs [6].

In addition, taking NSAIDs is also considered as an independent risk factor for the development of GERD. People who take NSAIDs at least once a week have GERD symptoms more often than people who do not take NSAIDs or take them less than once a week [7]. E.A. Karateev et al. conducted work to study the incidence of esophageal lesion syndrome in patients with rheumatic diseases treated with NSAIDs, and to determine the risk factors for the development of this pathology. A retrospective analysis of the results of esophagogastroduodenoscopy was carried out in 5,608 patients with rheumatic diseases, at least 1 month. taking NSAIDs [8]. It was found that clinical manifestations associated with the presence of pathology of the esophagus (heartburn, belching, retrosternal pain and dysphagia) were observed in 35% of patients, while organic damage to the esophagus - erosive esophagitis (EE) - occurred only in 2.2% of patients.

In addition, gastric and/or duodenal ulcers were detected in 12.6% of cases, which confirms a higher risk of developing NSAID-induced gastropathy in this category of patients than NSAID-induced esophagopathy. The pathology of the esophagus that occurs while taking NSAIDs has been studied much less. However, a number of studies have found that taking NSAIDs (including low-dose aspirin) significantly (approximately 2-fold) increases the likelihood of developing peptic esophagitis, with the risk of ulceration, bleeding, or stricture formation [3, 4]. Thus, the use of NSAIDs is an independent risk factor for the development of GERD.

Purpose of the study. The aim of this study is to determine the morphological changes in the esophagus of white outbred rats under the drug effect of acetylsalicylic acid.

Materials and methods. The micromorphology of the esophageal tissue was studied on 50 white 3-month-old rats under normal vivarium conditions. At the beginning of the experiment, all sexually mature rats were kept in quarantine for one week, after the exclusion of somatic or infectious diseases, they were transferred to the usual vivarial mode with three meals a day.

In experimental groups of animals, Aspirin (NSAIDs are salicylic acid derivatives), 5 mg/kg, was used to study the effect of NSAIDs. This dosage of the drug was calculated empirically and was administered daily intragastrically as a solution for 10 days.

The studies were carried out in compliance with the rules of humane treatment of animals, which are regulated by the “Rules for carrying out work using experimental animals”, approved by the ethical committee of the Bukhara State Medical Institute named after A.I. Abu Ali ibn Sino (No. 18 of 01/16/2018).

In total, 50 rats were used in the experiments, of which only 1 died during the experiments. The animals were slaughtered at the appropriate time in the morning, on an empty stomach by instant decapitation under ether anesthesia. Based on the macroscopic and microscopic examination of the esophageal tissue, a total of 12 organs of the esophagus were examined macroscopically and microscopically during examination. For general morphology, 3 pieces of tissue, i.e. 1.5x1.5 cm from the upper, middle and lower sections, were excised from each esophagus and solidified in 10% neutralized formalin. After washing for 2-4 hours in running water, they were dehydrated in high concentrations of alcohols and xylene, then embedded in paraffin and blocks were prepared. 5–8 µm incisions were made on paraffin blocks and stained with hematoxylin and eosin.

Results and conclusions.

In macroscopic examination, there were practically no visible changes in the esophageal wall. Microscopic examination revealed hyperemia of the esophageal wall, swelling of muscle tissue, hypertrophy of the axillary layer, cell hyperplasia of the submucosal region, and mucosal edema. (Fig 1)

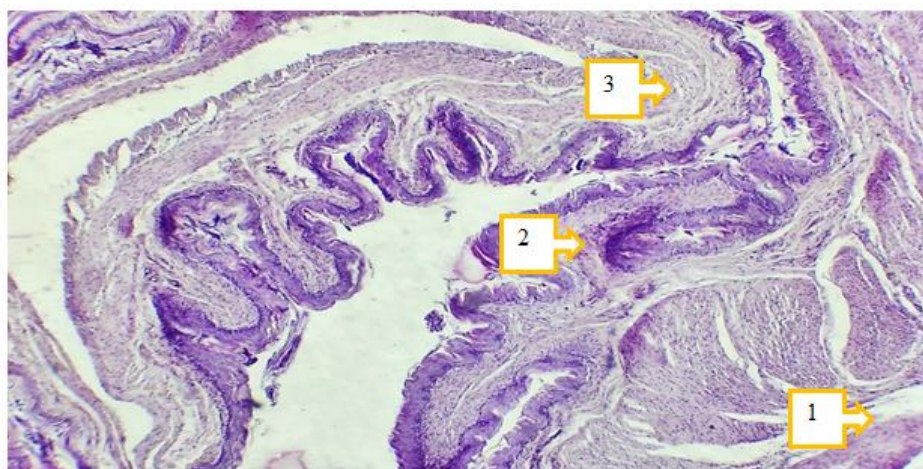


Figure 1. Morphological changes in the esophagus. Expansion of the wall (1), mucous membranes (2) and submucosal layer (3) as a result of edema. Hematoxylin-eosin dye. Size 20x20.

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