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SMOKING IN ADOLESCENTS AS A FACTOR IN THE DEVELOPMENT OF DYS REGENERATIVE PROCESSES IN THE GASTRIC MUCOSA

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Abstract: We observed 47 adolescents with chronic gastritis who smoke. To verify the diagnosis of chronic gastritis, all adolescents underwent esophagogastroduodenoscopy with biopsy of the gastric mucosa for further morphological and immunohistochemical examination. Based on the study, morphological changes of gastric mucosa were established, which are pathognomonic for chronic gastritis in active teenagers-smokers: lymphocytes plasma-cells infiltration, focal destruction of glands, hypotrophia and microcirculatory changes of the stomach mucosa membrane. Immunohistochemical indexes of cellular restoration are characterized by increased indexes of proapoptotic and decreased proliferative activity. To sum up, microcirculatory and dysregenerative disorders of the gastric mucosa are associated with the negative impact of nicotine.

Key words: smoking, adolescents, chronic gastritis, cellular restoration, lymphocytes infiltration, microcirculatory changes.

According to the prevalence of smoking, Ukraine ranks 17th in the world, among 147 countries. According to modern research, about 8.2 million of adult Ukrainians smoke. The rates of smoking in childhood are especially disappointing: among people aged 12-18 years, 25.5% smoke. A quarter of adolescents smoke only 1-2 times a month, while 29.0% of boys and 16.3% of girls can be classified as regular daily smokers. It should be noted that in Ukraine, according to research, 92.7% of boys and 89.6% of girls tried to smoke before the age of 13 [1, p.458; 2, p.35].

Smoking is a risk factor for many diseases, namely: diseases of the respiratory and cardiovascular systems, gastrointestinal tract (GIT), oncological pathology of various localization, osteoporosis [3; 4, p.69]. The negative effect of smoking on gastrointestinal tract is carried out by the direct action of absorbed tar compounds on the gastric mucosa (GM). It is known that under the influence of nicotine there is an increase in the secretion of pepsin, acidity of gastric juice and decrease the secretion of bicarbonate, mucus [5, p.1050]. All this leads to the development of inflammation and destruction of the stomach mucosa membrane. The above data indicate the scientific and practical significance of studying the mechanisms of influence of smoking on the formation of chronic gastritis in adolescent smokers.

We observed 47 adolescents with chronic gastritis (CG) who smoke. In order to identify active smokers, the urinary cotinine level, which is a product of nicotine metabolism and cannot enter the body in any other way, was used as an indicator. To verify the diagnosis of CG, all adolescents underwent esophagogastroduodenoscopy (EGDS) with biopsy of the GM for further morphological and immunohistochemical examination. To assess the morphological changes of the GM, tissue sections were colored with hematoxylin and eosin and picrofuxin according to Van Gizon. The results of the study were interpreted in accordance with the Kyoto Consensus of 2015. For immunohistochemical examination, sections 4-6 μm thick were applied to Super Frost Plus adhesive slides and an indirect streptavidin peroxidase staining method was used. Apoptosis was determined with mouse monoclonal antibodies to the antiapoptotic protein Bcl - 2 (Clone 124, DAKO, Denmark) and the proapoptotic

protein Bax (Clone 2D2, DAKO, Denmark). Proliferating Cell Nuclear Antigen (PCNA) (Clone: PC10, DAKO, Denmark) was used to determine proliferation. Interpretation of the results of immunohistochemical staining was performed according to the type of reaction. When using monoclonal antibodies to antiapoptotic protein Bcl - 2, proapoptotic protein Bax, color reactions in the cytoplasm of cells were evaluated, when using nuclear antigen of proliferating cells, nuclear staining was taken into account. Positive reactions were counted by the number of edited cells - expressed as a percentage of the total number of cells in the area of the histological preparation.

In the morphological investigation of GM in most adolescents who smoke the degree of inflammation of GM was expressed against the background of microcirculatory disorders with microthrombosis, hemorrhage and dystrophic changes in the early stages of development. The relief of GM was disturbed, there was a shortening of the pits and flattening of the rollers, hypotrophy of GM with a decrease in the number of glands in all observations. Superficial epithelium with areas of desquamation and foci of flattening. The native plate of GM is densely infiltrated with lymphocytes and plasma cells, single eosinophils and neutrophils with foci of fibrosis, proliferation of fibroblasts and thin collagen fibers, which have fuzzy contours and are located in both basal and superficial parts. Glands in own plate are located unevenly, with centers of destruction (Fig. 1)

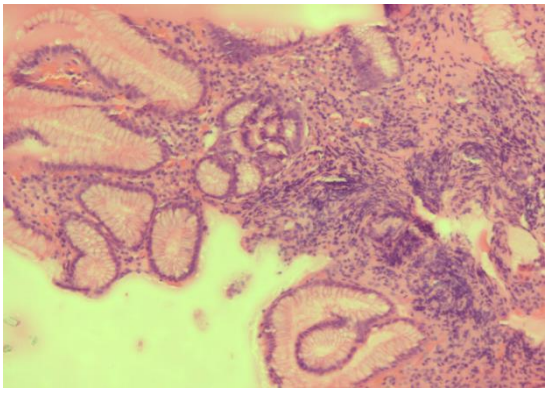
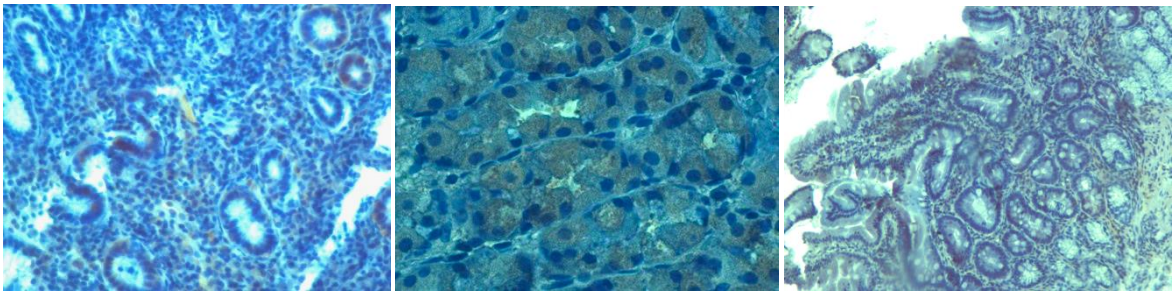


Fig. 1. Microphoto of gastric mucosa's biopsy specimen. Superficial erosion with the phenomena of regeneration. Focal hypotrophy X 200.

Immunohistochemical parameters of cellular homeostasis in CG in adolescent smokers were characterized by increased expression of proapoptotic Bax from 78.1 to 91.1% of positively stained cells with low expression of Bcl - 2 - less than 10% of positively stained cells and a decrease proliferative activity of 10 PCNA 6% to 23% of positively stained nuclei of glandular epithelium (Fig. 2).



a **в** **c**

Fig 2. Microphoto of gastric mucosa's biopsy specimen. Erosive changes of SM.

a - immunohistochemical reaction with antibodies to PCNA. X 200;

b - immunohistochemical reaction with antibodies to Bax. X 200;

c - immunohistochemical reaction with antibodies to Bcl - 2. X 200

Based on the study, morphological changes of GM were established, which are pathognomonic for CG in active teenagers-smokers. Lymphocytes plasma-cells infiltration, focal destruction of glands, hypotrophia and microcirculatory changes of the stomach mucosa membrane were observed in most of the examined. In patients with CG, who are active smokers, the structural features of dysregeneration were revealed which are characterized by disturbance of processes of cellular repair.

The imbalance of cell regeneration was characterized by an increase in apoptosis with reduced proliferative activity of epitheliocytes, which interferes with normal regeneration and is a possible development of atrophic and destructive changes in the stomach mucosa membrane. In our opinion, microcirculatory and dysregenerative disorders of the GM are associated with the negative impact of nicotine.

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