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## FEATURES OF THE DISTRIBUTION OF THE CONCENTRATION ON THE MUCOUS STOMACH OF ACTIVE AND INACTIVE FORMS OF HELICOBACTERIAL INFECTION IN PATIENTS WITH CHRONIC NON- ATROPHIC GASTRITIS, SUFFERING AND NOT SUFFERING FROM CHRONIC CONSTIPATION

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### Abstract

The frequency of detection and the degree of colonization of the gastric mucosa by the active and inactive form of *Helicobacter pylori* infection was analyzed in 50 patients with chronic non-atrophic gastritis, suffering from chronic constipation, and in 50 patients with chronic non-atrophic gastritis, who did not suffer from constipation. In the group of patients suffering from chronic constipation, the frequency of occurrence of the active form of *Helicobacter pylori* infection in different topographic zones of the stomach ranged from 46% to 56% with an average degree of mucosal seeding from  $1.12 \pm 0.13 (+)$  to  $1.48 \pm 0.13 (+)$ , the frequency of occurrence of an inactive form of *Helicobacter pylori* infection in different

topographic zones of the stomach ranged from 0% to 48% with an average degree of mucosal colonization from  $0 \pm 0.0 (+)$  to  $1.30 \pm 0.13 (+)$ , while while in the group of patients who did not suffer from chronic constipation, the frequency of occurrence of an act distinct *Helicobacter pylori* infection in different topographic zones of the stomach ranged from 36% to 52% with an average degree of mucosal seeding from  $1.02 \pm 0.13 (+)$  to  $1.34 \pm 0.13 (+)$ , and the frequency of occurrence of the inactive *Helicobacter pylori* infections in different topographic zones of the stomach ranged from 0% to 58% with an average degree of mucosal seeding from  $0 \pm 0.0 (+)$  to  $1.56 \pm 0.13 (+)$ . In patients of the first group, the frequency of detection of intracellular "depots" of HP infection was 2.3 times higher than in patients of the second group.

**Key words: chronic non-atrophic gastritis; chronic constipation; active and inactive forms of *Helicobacter pylori* infection.**

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**Особливості розподілу концентрації на слизовій шлунка активних і неактивних форм гелікобактерної інфекції у хворих на хронічний неатрофічний гастрит, які страждають і не страждають на хронічні запори**

**І. М. Шухтіна, А. О. Авраменко**

**Резюме**

Було проаналізовано частота виявлення і ступінь обсіменіння слизової шлунка активною і неактивною формою гелікобактерної інфекції у 50-ти хворих на хронічний неатрофічний гастрит, які страждають на хронічні запори, і у 50-ти хворих на хронічний неатрофічний гастрит, які на запорами не страждають. У групі хворих, які страждають на хронічні запори, частота виявлення активної форми гелікобактерної інфекції в різних топографічних зонах шлунка коливалася від 46% до 56% при середньому ступені обсіменіння слизової від  $1,12 \pm 0,13 (+)$  до  $1,48 \pm 0,13 (+)$ , частота виявлення неактивної форми гелікобактерної інфекції у різних топографічних зонах шлунка коливалася від 0% до 48% при середньому ступені обсіменіння слизової від  $0 \pm 0,0 (+)$  до  $1,30 \pm 0,13 (+)$ , в той час як в групі хворих, які не страждають на хронічні запори, частота виявлення активної форми гелікобактерної інфекції у різних

топографічних зонах шлунка коливалася від 36% до 52% при середньому ступені обсіменіння слизової від  $1,02 \pm 0,13 (+)$  до  $1,34 \pm 0,13 (+)$ , а частота виявлення неактивної форми гелікобактерної інфекції у різних топографічних зонах шлунка коливалася від 0% до 58% при середньому ступені обсіменіння слизової від  $0 \pm 0,0 (+)$  до  $1,56 \pm 0,13 (+)$ . У пацієнтів першої групи частота виявлення внутрішньоклітинних «депо» НР-інфекції була в 2,3 рази вище, ніж у пацієнтів другої групи.

**Ключові слова:** хронічний неатрофічний гастрит, хронічні запори, активна і неактивна форми гелікобактерної інфекції.

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**Особенности распределения концентрации на слизистой желудка активных и неактивных форм хеликобактерной инфекции у больных хроническим неатрофическим гастритом, страдающих и не страдающих хроническими запорами**

**И. Н. Шухтина, А. А. Авраменко**

**Резюме**

Были проанализированы частота выявления и степень обсеменения слизистой желудка активной и неактивной формой хеликобактерной инфекции у 50-ти больных хроническим неатрофическим гастритом, страдающих хроническими запорами, и у 50-ти больных хроническим неатрофическим гастритом, которые запорами не страдали. В группе больных, страдающих хроническими запорами, частота встречаемости активной формы хеликобактерной инфекции в разных топографических зонах желудка колебалась от 46% до 56% при средней степени обсеменения слизистой от  $1,12 \pm 0,13 (+)$  до  $1,48 \pm 0,13 (+)$ , частота встречаемости неактивной формы хеликобактерной инфекции в разных топографических зонах желудка колебалась от 0% до 48 % при средней степени обсеменения слизистой от  $0 \pm 0,0 (+)$  до  $1,30 \pm 0,13 (+)$ , в то время как в группе больных, которые не страдали хроническими запорами, частота встречаемости активной формы хеликобактерной инфекции в разных топографических зонах желудка колебалась от 36% до 52 % при средней степени обсеменения слизистой от  $1,02 \pm 0,13 (+)$  до  $1,34 \pm 0,13 (+)$ , а частота встречаемости неактивной формы хеликобактерной

инфекции в разных топографических зонах желудка колебалась от 0% до 58 % при средней степени обсеменения слизистой от  $0 \pm 0,0 (+)$  до  $1,56 \pm 0,13 (+)$ . У пациентов первой группы частота выявления внутриклеточных «депо» НР-инфекции была в 2,3 раза выше, чем у пациентов второй группы.

**Ключевые слова:** хронический неатрофический гастрит, хронические запоры, активная и неактивная формы хеликобактерной инфекции.

**Introduction.** According to global statistics, in recent decades there has been a significant increase in the number of patients suffering from chronic constipation. Their prevalence ranges from 10 to 50% among the adult population of developed countries and up to 30% among children aged 6-12 years, which allows us to regard constipation as a problem of the century [9]. The prevalence of constipation on the globe ranges from 0.7% to 40%, while residents of America and Southeast Asia suffer from it 2 times more often than Europeans. More often constipation affects people of older age groups, mainly women. [7, 8, 11, 12].

According to the Rome III criteria of revision, for the diagnosis of functional constipation is necessary for the presence of at least two of the following symptoms over the past 3 months (with a total duration of complaints of 6 months):

- straining in at least a quarter of all bowel movements;
- hard or fragmented feces in at least 25% of bowel movements;
- a feeling of incomplete bowel movement after at least 25% of bowel movements;
- sensation of an obstruction in the anorectal region in at least 25% of bowel movements;
- the need for manual manipulations to empty the intestines in at least 25% of bowel movements;
- less than three bowel movements per week;
- liquid feces only after taking laxatives.

In the Roman criteria of the IV revision, the indicated signs of functional constipation were left practically unchanged, it was only added that when evaluating the stool consistency (2nd symptom), one should focus on the Bristol Stool Form Scale, in which constipation corresponds to the 1st and 2 types of feces consistency ("separate solid lumps of feces in the form of nuts" and "feces of normal shape, but with solid lumps") [5, 10].

However, the digestive process in the gastrointestinal tract (GIT) is a sequential process that forms a proteolytic cascade in which all the organs of the gastrointestinal tract are

involved [3]. From this position, the problems of the large intestine cannot be torn off from the problems of the stomach, from where the active proteolytic cascade begins. The discovery in 1983 by Australian scientists B. Marshall and J. Woren of a bacterium, later called *Helicobacter pylori* (HP), revolutionized the understanding of the etiology and pathogenesis of chronic gastritis, peptic ulcer disease and gastric cancer [2]. The effect of HP on the digestion process in the stomach depends on the presence and concentration of active forms of bacteria on the mucosa of this organ [2, 3]. In the literature available to us, there is no data on the concentration of active and inactive forms of HP infection in patients with chronic atrophic gastritis, suffering from chronic constipation, which was the reason for our work.

**Purpose of the study.** To study the features of the concentration distribution of active and inactive forms of *Helicobacter pylori* infection in patients with chronic non-atrophic gastritis, suffering and not suffering from chronic constipation, on the gastric mucosa.

**Materials and research methods.** On the bases of the clinical department of the problem laboratory for chronic helicobacteriosis of the Black Sea National University named after Petro Mohyla (Nikolaev) and SE Ukrainian Research Institute of Transport Medicine of the Ministry of Health of Ukraine, 100 patients with chronic non-atrophic gastritis were comprehensively examined. The first group consisted of 50 patients suffering from chronic constipation, the second - 50 patients who did not suffer from constipation. The age of patients ranged from 18 to 72 years (average age was  $40.27 \pm 1.08$  years). Men were 40 people (40%), women - 60 people (60%).

The study was conducted in accordance with the basic bioethical provisions of the Helsinki Declaration of the World Medical Association on the ethical principles of scientific 549 medical research involving human (2013) and the order of the Ministry of Health of Ukraine No. 690 dated September 23, 2009.

A comprehensive examination included: stepwise intragastric pH - metry according to the method of V. Chernobrov, esophagogastroduodenoscopy (EGDS) according to the generally accepted method, double testing for HP: test for urease activity and microscopy of Giemsa-stained fingerprints, the material for which was taken during the test endoscopy from 4 topographic zones: from the middle third of the antrum and body of the stomach according to the greater and lesser curvature according to our methodology, which allows us to determine the presence of intracellular “depots” HP infections, as well as histological studies of the gastric mucosa, the material for which was taken from the same areas, according to the generally accepted method, taking into account the latest classifications [1,6]. To calculate the average acidity level, conventional units (CU) were used [2].

The sequence of the examination: after collecting the anamnesis, the patients underwent pH-metry, and then - endoscopy with sampling of biopsy material for testing for HP and histological studies of the gastric mucosa. The study was conducted in the morning, on an empty stomach, 12-14 hours after the last meal. The obtained data were processed statistically using the Student t-test with the calculation of average values (M) and the estimation of the probability of deviations (m). Changes were considered statistically significant at  $p < 0.05$ . Statistical calculations were performed using Excel spreadsheets for Microsoft Office.

**Research results and discussion.** The data obtained when conducting pH-metry, are shown in table 1.

Table 1

The acidity level in patients with chronic non-atrophic gastritis, suffering from chronic constipation, and in patients with chronic non-atrophic gastritis, who do not suffer from constipation

The level of acidity	The frequency of various acidity levels detected in patients with chronic non-atrophic gastritis, suffering from chronic constipation, and in patients with chronic non-atrophic gastritis, who do not suffer from constipation			
	1st group		2nd group	
	Number of patients (n = 50)	%	Number of patients (n = 50)	%
Hyperacidity expressed	8	16	6	12
Hyperacidity moderate	2	4	6	12
Normacidity	17	34	15	30
Hypoacidity moderate	8	16	9	18
Hypoacidity expressed	14	28	14	28
Anacidity	1	2	0	0

**Note:** n-the number of studies

In a comparative analysis of the acidity level for the groups in the first group, the acidity was  $11.12 \pm 0.79$  CU, in the second -  $11.42 \pm 0.69$  UE, which corresponded to the basal normativity minimal in both groups without significant ( $p > 0.05$ ) differences.

When conducting endoscopy in patients of the 1st group, an active ulcerative process was detected in 3 (6%) patients in the duodenum and in the 1st (2%) in the stomach; 5 (10%) patients had manifestations of past duodenal ulcers in the form of cicatricial deformity of varying severity. In 3 patients (6%), the presence of bile was detected in the stomach cavity.

During endoscopy in patients of the 2nd group in 2 (4%) patients in the duodenum and in the 1st (2%) - an active ulcerative process was detected in the stomach, in 2 (4%) patients erosive and ulcerative damage to the mucosa of the duodenal bulb; 9 (18%) patients had manifestations of past duodenal ulcers in the form of cicatricial deformity of varying severity. In 6 patients (12%), the presence of bile was detected in the stomach cavity.

When analyzing the data of histological studies in all patients in 100% of cases, the presence of chronic non-atrophic gastritis was confirmed both in the active and inactive stages of varying severity.

Data on the identification and degree of contamination of the gastric mucosa with active and inactive forms of HP infection by the topographic zones of the stomach in patients with chronic non-atrophic gastritis suffering from chronic constipation are presented in tables 2, 3.

Table 2

The frequency of detection and the degree of contamination of the gastric mucosa with the active form of HP infection in topographic zones in patients with chronic non-atrophic gastritis, suffering from chronic constipation (n = 50)

Topographic zones of the stomach	Detection frequency, %	The degree of contamination of the gastric mucosa by HP -infection by topographic zones stomach, (+) / (M±M)
1. Antrum, middle one-third, greater curvature	26 (52%)	1,28 ± 0,13
2. Antrum, middle third, small curvature	23 (46%)	1,12 ± 0,13
3. Body of the stomach, middle third, greater curvature	28 (56%)	1,40 ± 0,13
4. Body of the stomach, middle third, small curvature	26 (52%)	1,48 ± 0,13

**Note:** n-the number of studies

Data on the identification and degree of contamination of the gastric mucosa with active and inactive forms of HP infection by the topographic zones of the stomach in patients with chronic non-atrophic gastritis who do not suffer from chronic constipation are presented in tables 4, 5.

Table 3

The frequency of detection and the degree of contamination of the gastric mucosa with the inactive form of HP infection in topographic zones in patients with chronic non-atrophic gastritis, suffering from chronic constipation (n = 50)

Topographic zones of the stomach	Detection frequency, %	The degree of contamination of the gastric mucosa by HP -infection by topographic zones stomach (+) / (M±M)
1. Antrum, middle one-third, greater curvature	0 (0%)	0 ± 0,0
2. Antrum, middle third, small curvature	1 (2%)	0,06 ± 0,09
3. Body of the stomach, middle third, greater curvature	22 (44%)	1,12 ± 0,13
4. Body of the stomach, middle third, small curvature	24 (48%)	1,30 ± 0,13

**Note:** n-the number of studies

Table 4

The frequency of detection and the degree of contamination of the gastric mucosa with the active form of HP infection in topographically zones in patients with chronic non-atrophic gastritis who do not suffer from chronic constipation (n = 50)

Topographic zones of the stomach	Detection frequency, %	The degree of contamination of the gastric mucosa by HP -infection by topographic zones stomach (+) / (M±M)
1. Antrum, middle one-third, greater curvature	19 (38%)	1,02 ± 0,13
2. Antrum, middle third, small curvature	19 (38%)	1,04 ± 0,13
3. Body of the stomach, middle third, greater curvature	18 (36%)	1,08 ± 0,13
4. Body of the stomach, middle third, small curvature	26 (52%)	1,34 ± 0,13

**Note:** n-the number of studies

In a comparative analysis of data on the average degree of seeding with the active form of HP infection of the gastric mucosa by topographic zones in the examined patients of the 1st group, the degree of seeding was significantly higher in the stomach body by a large curvature than in patients of the 2nd group ( $p < 0.05$ ), while in a comparative analysis of the data on the average degree of seeding with an inactive form of HP infection of the gastric mucosa by topographic zones in patients of the 2nd group, the degree of seeding was



significantly higher on the mucosa in the stomach body by large cree izne than those of Group 1 ( $p < 0.05$ ).

Table 5

The frequency of detection and the degree of contamination of the gastric mucosa with the inactive form of HP infection in topographically zones in patients with chronic non-atrophic gastritis who do not suffer from chronic constipation ( $n = 50$ )

Topographic zones of the stomach	Detection frequency, %	The degree of contamination of the gastric mucosa by HP -infection by topographic zones stomach (+) / (M±M)
1. Antrum, middle one-third, greater curvature	0 (0%)	0 ± 0,0
2. Antrum, middle third, small curvature	0 (0%)	0 ± 0,0
3. Body of the stomach, middle third, greater curvature	29 (58%)	1,56 ± 0,13
4. Body of the stomach, middle third, small curvature	18 (36%)	1,02 ± 0,13

**Note:** n-the number of studies

When analyzing data on the identification of intracellular “depots” of HP infection, it was found that in patients with chronic neatrophic gastritis suffering from chronic constipation, the frequency of detection of “depot” was 28 (56%) cases, and in patients with chronic non-atrophic gastritis who did not suffer from chronic constipation, the frequency of detection of "depot" was 12 (24%) cases, that is, 2.3 times more.

These results are explainable from the point of view of the influence of the active form of HP infection on the digestion process and the topography of the location of the glands of the gastric mucosa, which includes parietal cells. Active forms of HP infection secrete a large amount of cytotoxins, which have an extremely negative effect on the entire digestion process, and therefore on the entire body (the higher the concentration of HP, the more pronounced its negative effect) [2,3]. The concentration of parietal glands is highest in the gastric mucosa and in the third stage of development of chronic neatrophic gastritis, the HP infection is maximally concentrated in this zone [3], very often forming the intracellular “depot” of HP [4]. The presence in patients with chronic inactive gastritis suffering from chronic constipation, a 2.3 times greater number of intracellular “depot” of HP than in patients without constipation, indicates a longer and more common process of the

pathological effect of HP infection on the digestive process, which is involved and the intestines.

### **Conclusions and prospects for further research**

1. In patients with chronic non-atrophic gastritis, suffering from chronic constipation, the degree of contamination of the gastric mucosa with active forms of HP infection is significantly higher in the body of the stomach by a large curvature than in patients with chronic non-atrophic gastritis who do not suffer from constipation.

2. The frequency of detection of intracellular "depots" of HP infection in patients with chronic non-atrophic gastritis, suffering from chronic constipation, is 2.3 times higher than in patients with chronic non-atrophic gastritis who do not suffer from constipation, which indicates a longer and more common pathological process the effect of HP infection on the digestive process, in which the intestines are also involved.

The prospect of further research is the study of the reliability of different methods for testing HP infection in patients with chronic non-atrophic gastritis, suffering and not suffering from chronic constipation.

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