



**BRITISH**

**MEDICAL JOURNAL**



**British Medical Journal**

**Volume 2, No 1., 2022**

**Internet address:** <http://ejournals.id/index.php/bmj>

**E-mail:** [info@ejournals.id](mailto:info@ejournals.id)

Published by British Medical Journal

Issued Bimonthly

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**British Medical Journal** Volume-2, No 1

## **Morphological changes in duodenal ulcers during the use of physiotherapy in patients with duodenal ulcer**

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**Purpose of the study** - to study the state of changes in the mucous membrane of the edges of duodenal ulcers in conjunction with infection with *Helicobacter pylori*

**Material and research methods.** The studies were carried out in 57 patients with intestinal dysbiosis (ID). There were 22 women, 27 men. At the age of 18-65 years. All patients were diagnosed with DC. The patients were divided into 3 groups: 23 patients who received CMW therapy for the duodenal triangle area, 19 patients who received transcranial electrical stimulation (TES) therapy, 15 patients who received CMW therapy for the duodenal triangle and TES therapy. The control group consisted of patients (20 patients) who received standard eradication therapy according to the recommendations of the Maastricht V/Florence consensus for the *Helicobacter pylori* infection treatment (2017): PPI 2 times a day for 14 days; 2 antibiotics 2 times a day for 14 days; Bismuth tripotassium dicitrate 120 mg 4 times a day; Probiotic preparation in the appropriate daily dose for 14 days;

A comprehensive assessment of the general histological structure of the mucous membrane of the edges of duodenal ulcers was carried out after endoscopic examination with the taking of material for histological examination in 51 patients with localization of the ulcer in the duodenum. Histological preparations were assessed in accordance with the modern classification of chronic gastritis by M. Dixon (2006), recommendations by L.I. Aruina (2008) and V.Yu. Golofeevsky (2004).

Microscopy of histological preparations focused on the state of the epithelium and the height of the villi and crypts (enterocytes, goblet cells), the presence of dystrophy, atrophy and foci of gastric metaplasia, and assessed the condition of the Brunner glands.

In addition, the condition of the stroma (severity of neutrophilic, eosinophilic, lymphocytic and plasmacytic infiltration) was assessed qualitatively and semi-quantitatively (in 10 fields of view), which, as is known, is directly involved in the immune regulation of the processes of regeneration and differentiation of epitheliocytes, implements the mechanisms of immune defense, involved in the formation of acute and chronic inflammation.

**Research results:** In patients with peptic ulcer localized in the duodenal bulb, the main morphological features were pronounced dystrophy of villi enterocytes, a decrease in the number of goblet cells in the villi and crypts, a decrease in the height of the villi, as well as areas of gastric villus metaplasia.

In patients, a certain relationship of morphological changes with the fact of infection with *Helicobacter pylori* was also noticed. Thus, moderate and severe dystrophy was observed much more often in the presence of infection with

*Helicobacter pylori* (44.7% of cases). In the absence of *Helicobacter pylori* infection, epithelial dystrophy was observed only in 8 patients, while the severity of dystrophic changes was minimal. However, the differences between the frequency of villous dystrophy and atrophy at the edges of duodenal bulb ulcers in the compared groups of patients were not significant.

Therefore, the known facts have been confirmed that dystrophy and atrophy in the mucous membrane of the duodenal bulb are regular morphological elements of duodenal ulcers, and even more so in its edges. Apparently, therefore, no fundamental connection between these changes and infection with *Helicobacter pylori* was found. Gastric metaplasia of villi enterocytes was detected in a total of 38 of 59 patients, but the frequency of detected infection with *Helicobacter pylori* had only a non-significant tendency to be higher than in patients without gastric metaplasia. Therefore, one should agree with the point of view that gastric metaplasia can be a compensatory morphological factor in conditions of inflammation and dystrophy of the bulbar mucosa in patients with duodenal ulcers.

In this regard, the results of the assessment of the stroma of the mucous membrane of the edges of ulcers of the duodenal bulb and morphometry are of the greatest interest. Inflammatory infiltrate in the examined patients before treatment (table 1) and after treatment (table 2).

**Table 1.**

Morphometric characteristics of the stroma of the mucous membrane of the edges of ulcers of the duodenal bulb before treatment

	1 group n=20	2 group n=23	3 group n=19	4 group n=15
Neutrophil infiltration	322±112	487±98	401±89	326±89
Lymphocytic infiltration	3697±115	2997±157	3025±412	2689±501
Plasma cell infiltration	3266±254	3122±239	2798±405	4123±304

Table 2. Morphometric characteristics of the stroma of the mucous membrane of the edges ulcers of the duodenal bulb after treatment

	1 group n=20	2 group n=23	3 group n=19	4 group n=15
Neutrophil infiltration	212±62	177±53*	115±15**	110±18**
Lymphocytic infiltration	800±92**	904±69*	225±25**	189±92**

Plasma cell infiltration	2266±250	1922*237	1898±405	1723±214*
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Note: \* -  $p < 0,05$ ; \*\* -  $p < 0,001$ .

From the tables and figures, it is obvious that against the background of the ongoing eradication therapy according to any schemes, a clear improvement in morphometric parameters characterizing the inflammatory process in the edges of ulcerative defects of the duodenal bulb was noted. At the same time, the most pronounced changes were related to a decrease in the density of neutrophilic and lymphocytic infiltration in almost all groups of patients.

At the same time, the data obtained allow us to state that the inclusion of physical factors in the treatment regimens leads to a more pronounced positive change in the cellular composition of the duodenal mucosa. Thus, the density of neutrophilic (from  $401 \pm 89$  -  $326 \pm 89$  to  $115 \pm 15$  -  $110 \pm 18$ , respectively, in the 3rd and 4th groups,  $p < 0.001$ ) and lymphocytic (from  $3025 \pm 412$  -  $2689 \pm 501$  to  $225 \pm 25$  -  $189 \pm 92$ , respectively, in the 3rd and 4th groups,  $p < 0.001$ ) of infiltration, which in turn may indicate a decrease in the activity of inflammatory and immunoinflammatory processes. In addition, it was noted that the inclusion of TES in eradication therapy significantly ( $p < 0.05$ ) reduces the density of plasmacytic infiltration in the 4th group of patients (from  $4123 \pm 304$  to  $1723 \pm 214$ ).

The density of inflammatory infiltration is closely related to such morphological changes as microcirculation disorders (vasodilation, sludge, leukopedesis and erythrocytopedesis) and mucosal stromal edema. It is characteristic that in the 3rd and 4th groups these changes were almost completely stopped during the control histological examination.

Thus, the therapy regimens with the inclusion of physical factors, namely, CMW-therapy on the area of the duodenal triangle and TES therapy, in terms of their morphological effectiveness, significantly exceeded the similar direction of the effects of standard eradication therapy regimens. It is possible that the higher efficiency of schemes with the inclusion of physiotherapy is associated with a more positive dynamics of these schemes in relation to the elimination of *Helicobacter pylori* infection.

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