ECRONICON OPEN ACCESS

EC GASTROENTEROLOGY AND DIGESTIVE SYSTEM

Research Article

Stomach Erosion: Focus on the Motor Function of the Gastrointestinal Tract

Lychkova Alla Eduard[1]* and Puzikov Alexander Mikhail[2]

[1]Head of the Department of Scientific and Patent-inventive Work of the Moscow Scientific Research Center Named After Loginov A.S, Moscow, Russia

[2]Employee of the Department of Scientific and Patent-inventive Work of the Moscow Scientific Research Center Named After Loginov A.S, Moscow, Russia

***Corresponding Author:** Lychkova Alla Eduard, Head of the Department of Scientific and Patent-inventive Work of the Moscow Scientific Research Center Named After Loginov A.S, Moscow, Russia.

Received: August 26, 2019; **Published:** December 04, 2019

Abstract

Aim: The study of violations of the motor function of the gastrointestinal tract and biliary tract with erosion of the stomach.

Materials and Methods: The study was conducted on 12 patients suffering from erosion of the stomach (EC); mean age 36.5 ± 7.8 years. In 19.9% of EFs were combined with pancreatitis and cholecystitis, *H. pylori* invasion was detected in 25% of cases, biliary dyskinesia in every 4 patients; in 20.3% of EC, combined with diverticular disease and concomitant diarrhea. The control group consisted of 10 patients with gastric ulcer at the age of 52.7 ± 7.3 years. Electromyography (EMG) of the gastrointestinal tract and biliary tract was conducted.

Results: With ES, the following are noted:

- Pronounced hypermotor dyskinesia of the stomach with a decrease in motor function of the small and large intestine.
- Motility of the biliary tract is characterized by an increase in tonic activity with a slight increase in phasic one.

Conclusion: The motor function in patients with stomach erosion is characterized by a greater power of stomach contractions, lesser power of small intestine contractions and multidirectional changes in the motility of various parts of the colon.

Keywords: *Gastric Erosion; Edectomyography; Hypermotor Dyskinesia of the Stomach*

Introduction

The main role in erosive and ulcerative lesions of the stomach is played by neuropsychiatric diseases, nutritional errors, bad habits, taking medications that lead to an imbalance between aggression and defense factors, as well as *Helicobacter pylori* (*H. pylori*), hereditary-constitutional features [1].

Chronic erosion of the stomach (ES) is relatively common, found in 2 - 15% of patients undergoing endoscopic examination [2].

According to various authors, *H. pylori* is found in 80 - 95% of cases of peptic ulcer disease, which defines it as a leading etiological factor in the disease. Among the causes of hypersecretion of hydrochloric acid in the stomach, *H. pylori* invasion is also crucial [3].

The direct effect of *H. pylori* on the secretory process of the stomach is determined by excessive alkalization of the antrum of the stomach with urea hydrolysis products from urease produced by these bacteria. The result of excessive alkalization is hypergastrinemia and hyperproduction of hydrochloric acid. Violations in the regulation of acid formation are also caused by the specific inflammation process itself and its mediators (cytokines and epidermal growth factors) synthesized in the mucous membrane of the antrum in response to infection with *H. pylori*.

The main difficulty in studying the etiology of EF is the emergence of a "closed" pathological circle in the development of chronic erosion. On the one hand, an increase in aggression factors (hyperacidity, *Helicobacter pylori* infection) leads to the formation of inflammation and defects of the gastric mucosa, which contributes to the appearance of local foci of ischemia in the submucosal layer of the stomach, which, in turn, disrupt the motor activity of the antroduodenal complex (decreased clearance, weakened peristalsis, increased duodenogastric reflux). Delayed evacuation of gastric contents and reflux of bile support inflammatory changes in the stomach and slow down the regeneration of the mucosa.

Circulatory disturbance is an important point in the pathogenesis of chronic erosion the stomach. Patients with multiple and often recurrent erosions, as well as with erosions associated with *Helicobacter pylori*, revealed more significant microcirculatory disorders, especially in the antrum of the stomach. Violations of microcirculations are manifested by narrowing of arterioles, increased capillary permeability, interstitial edema, impaired blood rheological properties: increased viscosity, intravascular aggregation of red blood cells and platelets, decreased mucosal oxygenation, which reflects the important role of ischemia in the pathogenesis of chronic erosive changes in the stomach [2].

At present, the role of psychoemotional mechanisms in the pathogenesis of erosive gastritis can be considered proven. Prolonged and chronic overstrain of neuropsychic processes arising under the influence of emotional upheaval, chronic stress, various kinds of conflicts, difficult life situations, chronic pain syndromes and other similar processes causes a violation of the functional relationship of the cerebral cortex and subcortical centers, as well as the centers of the autonomic nervous system.

The role of disorders of the motor function of the antrum in the pathogenesis of chronic erosion is to directly visualize the peristaltic activity of the output of the stomach and the upper horizontal part of the duodenum (DC). In this case, a new criterion was used - the coefficient of antroduodenal coordination, which significantly increases the accuracy and information content and, as a result, the diagnostic value of the non-invasive method of ultrasound examination, allows us to determine the role of chronic erosion in the violation of the motor-evacuation function (MEF) of the gastroduodenal complex [5].

Aim of the Study

The aim of the study of violations of the motor function of the gastrointestinal tract and biliary tract with erosion of the stomach.

Materials and Methods

The study was conducted on 12 patients suffering from erosion of the stomach (ES); mean age 36.5 ± 7.8 years. In 19.9% of EFs were combined with pancreatitis and cholecystitis, *H. pylori* invasion was detected in 25% of cases, biliary dyskinesia in every 4 patients; in 20.3% of ES, combined with diverticular disease and concomitant diarrhea. The control group consisted of 10 patients with gastric ulcer at the age of 52.7 ± 7.3 years.

Electromyography (EMG) of the gastrointestinal tract and biliary tract was performed using non-invasive bipolar silver electrodes with an area of 0.5-0.6 cm^2 placed in the area of the projection of the organ on the anterior abdominal wall. On the EMG curve, the frequency-amplitude characteristics of the slow waves and spikes, as well as the power of the contraction (the product of the amplitude by the frequency of tonic/phase slow waves/spikes) using the Conan-M hardware-software complex with a passband of 0.1 - 10 kHz [4].

Statistical processing of the obtained data was carried out using the Statistica-17 software package. All quantitative data obeying the normal distribution are presented as M ± m. To process the obtained data, Student's criterion (t) was used with subsequent determination of the level of significance of differences (p) and χ^2 criterion. The differences between the mean values were considered significant at $p < 0.05$.

Results and Discussion

Measurements of peristalsis of the esophagus and stomach in patients with acute erosion of the stomach. In the group of patients with acute erosion of the stomach in 8 patients, the peristalsis of the stomach and esophagus was increased, which amounted to 66,6%, but it was significantly lower than with gastric ulcer - 2 times (comparison group). In 4 patients with gastric erosion, peristalsis is normal, which indicates the influence of other factors not related to the inflammatory process on the motility of the gastrointestinal tract.

The frequency of slow waves of EMG of the stomach in patients with ES was 7.3 ± 0.6 per min (increase by 32.7% $p < 0.05$), amplitude - 0.64 ± 0.03 mV (increase by 327% $p < 0.01$), the power of contractions was 4.672 (increase by 415.2% $p < 0.01$); spike frequency was 1.8 ± 0.22 (increase by 79.9% $p < 0.05$), amplitude - 0.09 ± 0.004 per min (decrease by 10% $p < 0.05$).

The slow-wave activity of the small intestine was reduced in frequency to 6.2 ± 0.9 per min (the decrease by 60% $p < 0.01$), in amplitude - 0.3 ± 0.02 mV (increase by 200% $p < 0.01$), the power of reductions was 1.86 (a decrease of 7% $p < 0.05$); spike frequency was reduced to 0.2 ± 0.01 (a decrease of 79.9% $p < 0.05$), the amplitude was 0.01 ± 0.0033 per min (the decrease of 99% $p < 0.05$).

The motor function of the right colon changed as follows: the frequency of slow waves of EMG was 6.4 ± 0.35 per min (decrease by 41.8% $p < 0.05$), the amplitude was 0.16 ± 0.0033 mV (increase by 59.9% $p < 0.05$), the power of contractions was 1.024 (decrease by 6.6% $p < 0.05$); spike activity was not observed.

The frequency of slow waves of EMG of the left colon was 6.35 ± 0.35 per min (increase by 6% $p < 0.05$), amplitude to 0.16 ± 0.002 mV (increase by 58.9% $p < 0.05$), the power of reductions was 2.016 (an increase of 41.6% $p < 0.05$); spike frequency was 0.11 ± 0.02 (increase by 10% $p < 0.05$), amplitude - 0.01 ± 0.002 per min (decrease by 99% $p < 0.01$).

Electromyographically, the frequency of the slow waves of the common bile duct was 6.5 ± 0.4 per min (a decrease of 18.8% $p < 0.05$), the amplitude was 0.28 ± 0.03 mV (an increase of 179% $p < 0,01$). The power of contractions was 1.82 (an increase of 127.5% p. < 0.01). The frequency of spikes was 1.3 ± 0.15 (an increase of 30% $p < 0.05$), the amplitude of spikes was within the reference values (0.1 ± 0.01 mV).

The slow-wave activity of the gallbladder was: frequency - 5.2 ± 0.3 per min (decrease by 38% $p < 0.05$), amplitude - 0.21 ± 0.003 mV (increase by 110% $p < 0.05$). The power of contractions was 1,092 (an increase of 21.3% $p < 0.05$). The frequency of the spikes was 1.0 ± 0.11 (within the reference values), the amplitude of the spikes was 0.11 ± 0.02 mV (an increase of 10% $p < 0.05$).

The results obtained indicate that ES occurs against an altered background of motor activity. So, the slow-wave activity (tonic) of the smooth muscles of the stomach is characterized by a multiple increase in tonic activity with an increase in phase activity, that is, pronounced hypermotor stomach dyskinesia is observed in patients with ES.

The motor function (tonic) of the small intestine is slightly reduced, but the phase activity is increased, which indicates hypomotor dyskinesia of the small intestine.

The motility of the right colon is characterized by mild hypomotor dyskinesia of the longitudinal muscle layer with a decrease in phase activity. In the left parts of the colon, motility changed in the following respect, an increase in tonic activity was noted, with a decrease

in phase. That is, with erosion of the stomach, a marked increase in the motor activity of the stomach is observed with a decrease in the activity of the lower sections of the small and large intestine.

The motility of the biliary system in patients with ES was significantly altered. So, the power of contractions of the longitudinal muscle layer of the common bile duct is increased by 127.5% with an increase in the phase activity of the circular muscle layer. A similar trend was observed with respect to the motor function of the smooth muscles of the gallbladder: an increase in the thickness of the longitudinal layer with a slight increase in the contractile activity of the circular muscle layer, which can contribute to the flow of bile into the duodenum.

The motor function of the gastrointestinal tract of patients with gastric ulcer (comparison group) undergoes the following changes: contraction of smooth muscles of longitudinal and circulatory.

The motor function of the gastrointestinal tract of patients with gastric ulcer (comparison group) undergoes the following changes: the smooth muscle contraction of the longitudinal and circular muscle layer is increased, which is also characteristic of gastric erosion leads to a more rapid flow of acidic gastric contents into the duodenum with the possible development of erosion the duodenum. The propulsive motor activity of the small intestine with gastric ulcer is reduced, which is characteristic for the development of duodenal ulcer.

The motor function of the right and left parts of the colon with gastric ulcer is reduced in the phase and tonic units, which, along with a decrease in the motor intestine, may indicate the development of the syndrome of excessive bacterial growth.

The motor function of the common bile duct in gastric ulcer (comparison group) was increased with a slight increase in the phase activity of the gallbladder.

Conclusion

Motor function in patients with gastric erosion is characterized by a greater power of contractions of the stomach, less contraction of the small intestine and multidirectional changes in the motility of various parts of the colon, with a slight increase in the phase activity of the biliary tract.

Electromyography is an adequate method for studying the motor function of the gastrointestinal tract and gastrointestinal tract with erosion of the stomach.

Bibliography

1. Selezneva EYa and Ilchenko AA. "Gallstone disease, combined with peptic ulcer of the duodenum (literature review)". *Clinical and Experimental Gastroenterology* 5 (2008): 48-55.

2. Mayev IV., *et al*. "Frequency of detection of biliary sludge in peptic ulcer". *Clinical and Experimental Gastroenterology* 6 (2004): 23.

3. Yunusov MS. "Features of the biliary tract in patients with duodenal ulcer". *Russian Journal of Gastroenterology, Hepatology and Coloproctology* 13.5 (2003): 110.

4. Lychkova AE and Puzikov AM. "Digestive tract electrical activity and its enteral correction". *Clinical and Experimental Gastroenterology* 120.8 (2015): 25-29.

5. RF patent No. 2277859, "Method for differential diagnosis of antroduodenal coordination" (2006).

Volume 7 Issue 1 January 2020