

Motor Function of the Gastrointestinal Tract and Biliary Tract in Diverticular Disease of the Small Intestine

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Abstract

Aim of the Study: The aim of the study was to identify disorders of the motor function of the gastrointestinal tract and the gastrointestinal tract in diverticular disease of the small intestine.

Materials and Methods: The study included 12 patients with diverticular duodenal disease. The ratio of women:men is 3:1, and women aged 61.3 ± 7.4 years, men- 69.0 ± 8.1 years. Diverticulosis was characterized by chronic pancreatitis, chronic cholecystitis - in half of the cases, chronic bulbitis, unstable stools-in 33.4% of cases. An objective examination reveals a thickening of the mucous and submucosal layer of the intestine. The motor function of the small intestine was analyzed electromyographically.

Results: The study showed that the duodenal diverticula, located near the large duodenal papilla, is 16.7% and is observed in the development of duodenum ulcer and recurrent pancreatitis and hiatal hernia-in 8.3% of cases. The study showed that in diverticular disease, pronounced hypermotor dyskinesia of the stomach, small intestine and left colon was observed, which reflects the presence of dysbiosis of the small and large intestine.

Keywords: *Diverticular Disease of the Small Intestine; Motor Function*

Introduction

Diverticulum-a congenital or acquired protrusion of the wall of a hollow organ, protruding through the circular muscle layer beyond the intestinal wall [1]. The presence of diverticula is the basis for the diagnosis of diverticular disease [2].

Diverticula of the small intestine are localized mainly in the duodenum and in every third patient are multiple, localized near the large duodenal papilla and can be acquired as a result of duodenal ulcer and recurrent pancreatitis. Diverticula occur, probably, in the places of penetration of small arteries into the intestinal mucosa, where, due to the relative weakness of the muscle wall, herniated protrusion of the mucous membrane and submucosal base occurs. The muscular wall of the intestine is thickened, the longitudinal bands (thenia) are thinned. Morphologically, the structure of muscle cells in diverticulosis is normal, but contains an excessive amount of elastic fibers between the muscle cells and in the joints [3] with an increase in the threshold of visceral sensitivity of the intestine [4].

Diverticulosis is often combined with a hernia of the esophageal opening of the diaphragm and gallstone disease - the so-called Saint's triad, which can occur in people with an innate amount of elastic fibers in the connective tissue of internal organs. Elastosis increases gastration and increases the spastic readiness of the intestine, especially with an increase in age-related changes in the circular muscles in the form of structural disorders of collagen and loss of tissue extensibility.

Uncomplicated diverticular disease occurs either asymptotically or with minimal clinical manifestations: intermittent abdominal pain, bloating, irregular fragmented stools (such as sheep) or loose stools.

Diverticulitis occurs as a result of inflammation of the mucosa of the diverticulum with possible bleeding and perforation. Fecal masses in the absence of perforation are compressed, turn into concretions, which leads to chronic inflammation and destruction of the wall. There are pains in the lower left abdomen, leukocytosis, fever, nausea, vomiting.

Detection of diverticula was carried out endoscopically, irrigoscopically, based on the data of computer tomography of the abdominal cavity, separate studies of the motility of the colon were carried out. However, a comprehensive study of the motor function of the gastrointestinal tract (GI) and biliary tract (VD) in diverticular disease has not been conducted.

Aim of the Study

The aim of the study was to identify disorders of the motor function of the gastrointestinal tract and the gastrointestinal tract in diverticular disease of the small intestine.

Materials and Methods

The study included 12 patients with diverticular duodenal disease. The ratio of women:men is 3:1 and women aged 61.3 ± 7.4 years, men- 69.0 ± 8.1 years. Diverticulosis was characterized by chronic pancreatitis, chronic cholecystitis - in half of the cases, chronic bulbitis, unstable stools-in 33.4% of cases. With the development of diverticulitis, there were pronounced pains in the left half of the abdomen, hyperthermia. An objective examination reveals a thickening of the mucous and submucosal layer of the intestine. The motor function of the small intestine was analyzed electromyographically by placing bipolar silver electrodes on the anterior abdominal wall in the projection area of the organ under study. The amplitude-frequency characteristics of slow waves and spikes, the power of phase and tonic contractions, and propulsive activity were analyzed using the Conan-M hardware and software complex with a bandwidth of 0.1 - 10 mV. The comparison group consisted of 9 patients suffering from chronic gastritis. Statistical analysis was performed using the Mann-Whitney small sample method at $p < 0.05$.

Results and Discussion

In the stomach with diverticular disease of the small intestine, the frequency of slow waves was $9.0 \pm 1.5/\text{min}$ (an increase of 63.4%, $p < 0.05$), the amplitude was 0.17 ± 0.003 mV (an increase of 13.3%, $p < 0.05$), the power of tonic contractions was 1.53 ± 0.13 (an increase of 85.4%, $p < 0.05$). The frequency of spikes was 3.0 ± 0.07 (an increase of 199.8%, $p < 0.001$), the amplitude - 0.08 ± 0.0011 mV (a decrease of 20%, $p < 0.05$), the power of phase contractions - 0.24 ± 0.012 (an increase of 140%, $p < 0.001$), the propulsive activity - 6.4 ± 0.3 (a decrease of 22.9%, $p < 0.05$). That is, with DB of the small intestine, hypomotor dyskinesia of the stomach is observed.

In the small intestine, the frequency of slow waves was $10.0 \pm 0.4/\text{min}$ (decrease by 49.8%, $p < 0.05$), the amplitude was 0.17 ± 0.002 mV (increase by 69.8%, $p < 0.05$), the power of tonic contractions was 1.7 ± 0.11 (decrease by 15%, $p < 0.05$). The frequency of spikes was 1.2 ± 0.05 (an increase of 20%, $p < 0.05$), the amplitude- 0.07 ± 0.003 mV (a decrease of 30%, $p < 0.05$), the power of phase contractions - 0.084 ± 0.006 (a decrease of 16%, $p < 0.05$), propulsive activity - 20.23 ± 1.2 (an increase of 11.4%, $p < 0.05$). That is, with DB, hypermotor dyskinesia of the small intestine of medium degree was detected.

In the right parts of the colon, the frequency of slow waves was $7.5 \pm 0.5/\text{min}$ (a decrease of 46.7%, $p < 0.05$), the amplitude was $0.12 \pm 0.0011 \text{ mV}$ (an increase of 20%, $p < 0.05$), the power of tonic contractions was 0.9 ± 0.05 (a decrease of 18.2%, $p < 0.05$). The frequency of spikes was 0.8 ± 0.002 (decrease by 20%, $p < 0.05$), the amplitude- $0.05 \pm 0.01 \text{ mV}$ (decrease by 50.1%, $p < 0.05$), the power of phase contractions - 0.040 ± 0.002 (decrease by 60.1%, $p < 0.05$), propulsive activity - 22.5 ± 1.8 (increase by 104.6%, $p < 0.02$). That is, with DB of the small intestine, pronounced hypermotor dyskinesia of the right parts of the colon was revealed.

In the left colon at DB, the frequency of slow waves was $9.0 \pm 1.0/\text{min}$ (an increase of 50.1%, $p < 0.05$), the amplitude was $0.15 \pm 0.003 \text{ mV}$ (an increase of 49.8%, $p < 0.05$), the power of tonic contractions was 1.35 ± 0.12 (an increase of 125%, $p < 0.001$). The frequency of spikes was 1.0 ± 0.04 (within the reference values), the amplitude was $0.1 \pm 0.003 \text{ mV}$ (within the reference values), the power of phase contractions was 0.1 ± 0.002 (within the reference values), and the propulsive activity was 13.5 ± 1.5 (an increase of 125%, $p < 0.001$). That is, with DB of the small intestine, hypermotor dyskinesia of the colon was detected pr.

In DB of the small intestine, the propulsive activity of the choledochus was 13.7 ± 0.12 (an increase of 52.2%, $p < 0.05$) and the propulsive activity of the gallbladder was 10.1 ± 1.7 (an increase of 20%, $p < 0.05$). That is, in DB of the small intestine, the passage of bile into the duodenum is increased compared to that in DB of the large intestine.

Conclusion

The study showed that the duodenal diverticula, located near the large duodenal papilla, is 16.7% and is observed in the development of duodenum ulcer and recurrent pancreatitis and hiatal hernia-in 8.3% of cases. The study showed that in diverticular disease, pronounced hypermotor dyskinesia of the stomach, small intestine and left colon was observed, which reflects the presence of dysbiosis of the small and large intestine. The development of hypermotor dyskinesia of the intestine can be promoted by the increased passage of bile acids through the biliary system and especially by the increased release of concentrated bile during the contraction of the gallbladder.

Antroduodenal coordination, which is normally 1:4, in diverticular disease of the small intestine is 1:3, which indicates a different rate of evacuation of gastric contents in the proximal (in the small intestine) variant in diverticular disease.

Electromyography can be used to analyze the motility of the gastrointestinal tract and biliary tract in diverticular disease.

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