The effect of somatostatin retained enema in the treatment of pancreatic ileus

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Abstract. – OBJECTIVE: To analyze the therapeutic effects of somatostatin retained enema in the treatment of pancreatic ileus in the clinic.

PATIENTS AND METHODS: 79 patients randomly divided into 41 cases in the observation group and 38 cases in the control group were analyzed. The control group applied basic treatment plan. The observational group applied the same treatment combined with somatostatin retained enema, conducted twice every day and at least 30 minutes every time. Every 7 days treatment made a course. The clinical therapeutic effects were compared.

RESULTS: The levels of the hemo diastase and urinary amylase in both groups were decreased prominently after treatment. The levels of blood calcium were prominently increased (p<0.05) with even more improvement in the observation group (p<0.05). The relief times of the abdominal ache and distention, the recovery time of bowel sound and the first defecation time in the observation group were shorter (p<0.05) than those in the control group. The levels of blood serum IL-6 and TNF-α in the two groups were prominently decreased (p<0.05) after treatment, with even more obvious improvement in the observation group. The therapeutic effective rate of the observational group was prominently higher (p<0.05) than that in the control group. The occurrence rate of the complications was lower.

CONCLUSIONS: The application of somatostatin retained enema in the treatment of pancreatic ileus is preferably safe and effective, and it deserves clinical promotion and application.

Key Words: Somatostatin, Retained enema, Pancreatic ileus, IL-6, TNF-α.

Introduction

Severe acute pancreatitis (SAP) takes a percentage of about 30% in acute pancreatitis, the conditions by which it is critically severe when it occurs. It has a percentage of up to 70-90% of the severe complication and important organ failure and extremely high death rate. The body of SAP patient releases a large number of cytokines and mediators of inflammation. It aggravates the acid-base unbalance and disorder of water and electrolyte, and induces paralytic ileus, also called pancreatic ileus. The occurrence of ileus may further aggravate the condition of the patients. So, it is of important significance of the positive and effective intervention of pancreatic ileus in the early stage for the improvement of the therapeutic effect and survival prognosis. Researches confirm that somatostatin plays an important role in the aspects of the relief of SAP disease progress and the promotion of the functional recovery of the organs. Previous animal experiments indicate that somatostatin retained enema can prominently reduce the incidence of pancreatic ileus and relieve the complication after the obstruction. Based on the theories above, this work aimed at analyzing the clinical effect of somatostatin retained enema in the treatment of pancreatic ileus, in order to provide references to increase the safety and effectiveness of the SAP therapy.
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Somatostatin and octreotide, inhibition of gastric acid secretion by PPI depressant, rectification of acid-base balance and disorder of the electrolyte and blood glucose, intimate supervision of the disease process, prevention and rectification of incidence of the organ function disorder in time, full dose application of the selected antibacterial in early stage, surgical pancreatic fenestrated drainage when necessary, supplement of nourishment such as amino acid, fat milk, microelements.

Based on the treatment above, the control group applied 500 ml warm normal saline retained enema twice every day; the observation applied 3 mg somatostatin retained enema twice every day and at least 30 minutes every time; every 7 days’ treatment made a course.

**Observation Index and Judgment Criteria**

The levels of hemo diastase, blood calculus and urinary amylase 7 days after treatment in the two groups were compared; the relief time of the abdominal ache and distention, the recovery time of bowel sound and the first defecation time were compared. The levels of blood serum interleukin-6 (IL-6) and tumor necrosis factor-α (TNF-α) before and after treatment were compared. The therapeutic effective rate and the occurrence rate of the complications were compared.

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The ELISA kit provided by Jiancheng Biotechnology Co., Ltd., Nanjing, China was used for the tests of blood serum IL-6 and TNF-α, the microplate reader was provided by the Bio-Rad Co., Hercules, CA, USA. The standard concentration curve was built, and data after rectification were compared. The judging standard of the therapeutic effect was as follows: cure meant that both the clinical symptoms and physical signs disappeared, and each biochemical indicator recovered to the normal level; marked effectiveness meant that there was no complication, or there was slight complication which can turn to the normal level after expected treatment, or had no influence on the future life, and each biochemical indicator recovered to the normal level; effectiveness meant that both the clinical symptoms and physical signs of the SAP and ileus relieved prominently, and each biochemical indicator indicated prominent relief, one or several kinds of complications occurred.

**Therapeutic Method**

All the patients applied the basic treatment, including food and water deprivation, gastrointestinal decompression and expansion, magnesium sulfate spasmyolytic, inhibition of the pancreatic endocrine and exocrine enzyme by somatostatin and octreotide, inhibition of gastric acid secretion by PPI depressant, rectification of acid-base balance and disorder of the electrolyte and blood glucose, intimate supervision of the disease process, prevention and rectification of incidence of the organ function disorder in time, full dose application of the selected antibacterial in early stage, surgical pancreatic fenestrated drainage when necessary, supplement of nourishment such as amino acid, fat milk, microelements.
Software SPSS20.0 (SPSS Inc., Chicago, IL, USA) was used for statistical analysis. Measurement data were presented by means ± standard deviation. Independent sample t-test was used for comparisons between groups; paired t-test was used for comparisons within the group. Enumeration data were presented by cases or (%); (rectified) χ² was used for comparisons between groups. Rank sum test was used for the ranked data. p<0.05 suggested statistical differences.

Results

The Comparisons on the Levels of Hemo diastase, Blood Calculus, and Urinary Amylase after Treatment

The levels the hemo diastase and urinary amylase from both groups decreased prominently, with even more prominent improvement in the observation group. The differences were statistically significant (p<0.05) (Table I).

The Comparisons on the Relief Times of the Abdominal Ache and Distention, Recovery Time of Bowel Sound and the fist Defecation Time

The relief times of the abdominal ache and distention, as well as the recovery time of bowel sound and the first defecation time in the observation group were obviously shorter than that in the control group (p<0.05) (Table II).

The Comparisons on the Levels of Blood Serum IL-6 and TNF-α before and After Treatment

The levels of blood serum IL-6 and TNF-α in the two groups were prominently decreased after treatment, with even more great improvement in the observation group (p<0.05) (Table III).
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The therapeutic effective rate of the observation group was prominently higher \((p<0.05)\) than that in the control group, while the rate of the complications was lower (Table IV).

Discussion

The main causes of the pancreatic ileus are as follows: 1. Exosmosis of the pancreatic fluid, leading to peripancreatic inflammatory reactions, which directly stimulate the coeliac plexus and bring enter paralysis; 2. Inflammatory edema, bleeding, anabiosis and ulceration of the intestinal mucosa. 3. Hyperpolarization of the nerves of the myenteric plexus and inhibition of the enterokinase led by the endogenous morphine-like substances released by the body, which including met-enkephalin, leu-enkephalin and so on; 4. Enteroparalysis led by the direct erosion of intestinal canal by the inflammatory fluid. The paralytic ileus in the early stage may be playing an important role in the process of pancreatitis. Some scholars believe that the paralytic ileus in the early stage is the originating factor leading to disorders of the systemic inflammatory response of SAP. Therefore, earlier improvement of the intestinal function disorder of the patients can release the pain, effectively shorten the disease course and improve the prognosis.

The somatostatin is a common clinical polypeptide hormone, which mainly distributes in the neurohypophysis, gastric mucosa, pancreas islet, central nervous system and the nerves of the gastrointestinal tract. The somatostatin has multiple biological functions, like inhibition of gastrointestinal peristalsis, inhibition of gastric acid secretion, inhibition of the releasing of the growth hormone and thyroid hormone, inhibition of the releasing of the hypothalamus-pituitary-growth hormone somatotropic hormone, inhibition of the releasing of the gastrin and the pepsin. The somatostatin can also effectively reduce the bleeding of the internal organs and decrease the pressure of portal vein; it also has a certain function on the decrease of the blood perfusion pressure of the body collateral circulation, which effectively reduces the bleeding volume of the liver. The somatostatin can reduce the digestive juice secretion of the patients and relieve the expansion and the ischemic disease of the intestinal canal induced by the aggregation of digestive juice, thus
stimulates the enteric blood circulation and decreases the permeability of the intestinal mucosa. This reduces the absorption of the toxin and the invasion of the bacteria, and helps to relieve the systemic inflammatory reaction\(^\text{13}\). Therefore, the somatostatin is of important clinical value in the treatment of the pancreatic ileus.

This study treated the pancreatic ileus with somatostatin retained enema, and the results suggested as follows: the levels of the hemo diastase and urinary amylase in observation group after treatment were prominently lower than that in the control group; the level of blood calcium were prominently higher; the relief times of the abdominal ache and distention, recovery time of bowel sound and the first defecation time were all shorter; the levels of blood serum IL-6 and TNF-α were prominently lower; the therapeutic effective rate was prominently higher, and the prevalence rate of the complications was lower. All the differences were statistically significant (\(p<0.05\)). The somatostatin retained enema can also be absorbed into blood quickly, it not only aggregates in the local intestinal tract in high concentration, and works directly on the damaged intestinal mucosa cells, which stimulates the functional peristalsis and reduces the inflammatory reaction\(^\text{14}\); but also has high biological availability, and brings no increase of the plasma concentration with the combined application of venous inflow, which means preferable safety of the application\(^\text{15}\).

IL-6 and TNF-α are proinflammatory factors produced by the mononuclear macrophage of the body. The blood serum expression level of which is positively related to the seriousness of acute pancreatitis, and intimately related to the prognosis\(^\text{16}\). At the same time, IL-6 and TNF-α in high concentration can straightly damage the cells of the blood vessel endothelium, which promotes the formation of microthrombus, inhibits the repairing of the endothelial cells and aggravates the body damage\(^\text{17}\). The treatment of pancreatic ileus with somatostatin retained enema is probably correlative with the decrease of expression levels of IL-6 and TNF-α in the blood serum, which is consistent with the result observed in animal model research\(^\text{18}\).

Conclusions

The application of the treatment of pancreatic ileus with somatostatin retained enema is preferably safe and effective, and it deserves clinical promotion and application.

Conflict of interest

The authors declare no conflicts of interest.

References

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