EFFICACY OF CO-ADMINISTRATION OF PANTOPRAZOLE SODIUM AND SOMATOSTATIN ON SEVERE ACUTE PANCREATITIS

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ABSTRACT

Objective: *This study aims to investigate the efficacy of co-administration of pantoprazole sodium and somatostatin on severe acute pancreatitis.*

Methods: *In this hospital, we selected a total of 90 patients with severe acute pancreatitis between February 2018 and January 2019; then, we divided them into the control and observation groups. Patients in the control group took pantoprazole sodium, while the somatostatin and pantoprazole sodium were co-administrated for those in the observation group. Following medication, we compared the efficacy, remission time of abdominal pain, the recovery time of gastrointestinal tract function, remission time of ascites, weaning time of ventilator, levels of inflammatory indicators (TNF-α, IL-8, and hs-CRP) before and after treatment, Glasgow Coma Scale scores, APACHE II scores, and the adverse reactions, including pulmonary infection, acute respiratory distress syndrome, and pancreatic pseudocyst.*

Results: *First and foremost, the total efficacy rate of patients in the observation group was significantly higher than that in the control group (P<0.05). Before the treatment, comparisons of the inflammatory indicators, Glasgow Coma Scale scores, and APACHE-II scores in patients of two groups presented no significant differences (P>0.05); however, significant changes were observed in these indicators after treatment (P<0.05). The treatment for patients in the observation group shortened the remission time of abdominal pain, the recovery time of gastrointestinal tract function, remission time of ascites, and weaning time of the ventilator significantly compared to their counterparts in the control group (P<0.05). However, patients in the observation group suffered less from the adverse reactions than those in the control group, with a lower incidence rate of some of such reactions, including pulmonary infection, acute respiratory distress syndrome, and pancreatic pseudocyst (P<0.05).*

Conclusion: *Co-medication of pantoprazole sodium and somatostatin presents a promising outcome in the treatment of severe acute pancreatitis patients.*

Keywords: *Pantoprazole sodium, somatostatin, co-administration, severe acute pancreatitis, efficacy.*

DOI: 10.19193/0393-6384_2022_1_95

Received *March 15, 2021;* ***Accepted*** *December 20, 2021*

Introduction

Acute pancreatitis, as a kind of acute abdominal disease, is the inflammatory response to the activation of trypsin inside the pancreas. According to the lesion type, it is divided into edema and hemorrhage, with the clinical manifestations of abdominal pains, nausea, and fever. Moreover, acute pancreatitis is usually concomitant with multiple complications, including the pancreatic abscess and pseudocyst[1, 2]. Severe acute pancreatitis is a special type of acute pancreatitis that presents a severe condition, with a high mortality rate, blockage, increased pressure of the pancreatic duct, or dysfunction in the blood supply to the pancreas. So far, the pathogenesis of severe acute pancreatitis remains unknown; however, it may be associated with alcohol intake and intraductal lithiasis[3, 4]. Generally, severe acute pancreatitis is featured by the acute onset and severe condition, making patients more susceptible

to multiple symptoms and harshly affecting their life and health. Any failure in disease condition can contribute to multiorgan failure and general inflammatory syndromes, threatening the life of patients[5]. Clinically, medication is preferred for the treatment of severe acute pancreatitis, including somatostatin and pantoprazole sodium[6].

In this study, we investigated 90 patients with severe acute pancreatitis admitted to this hospital for treatment between February 2018 and January 2019. They were randomized into the control group for administration of pantoprazole sodium and the observation for co-administration of pantoprazole sodium and somatostatin to analyze the treatments' efficacy.

Material and methods

General material

In this study, we enrolled 90 patients with severe acute pancreatitis admitted to this hospital for treatment between February 2018 and January 2019; then, they were randomized into the observation group and the control group.

In the observation group, there were 26 males and 19 females, aged between 41 and 82 years old, with an average of (56.31±5.11) years; the duration from the onset to the admission ranged from 10 h to 3 d, with an average of (1.62±0.81) d. In the control group, there were 25 males and 20 females, aged between 41 and 81 years old, with an average of (56.29±5.25) years; the duration from the onset to the admission ranged from 10 h to 2.8 d, with an average of (1.64±0.84) d. Comparison of the general data between the two groups revealed no significant difference (P>0.05).

Inclusion criteria included conforming to the diagnostic criteria of severe acute pancreatitis and cooperating with the treatment. Exclusion criteria included having a condition that may affect the efficacy evaluation, failing to cooperate with the treatment, or having drug contraindications. Patients were informed of the content of the study and agreed to participate.

Methods

For all patients, symptomatic treatment was performed, including the anti-infection medication, maintenance of the water-electrolyte balance, decompression of the gastrointestinal tract, analgesia, and spasmolysis. Specifically, for patients in the control group, 40 mg pantoprazole sodium (SFDA Approval No.: H20065419, Shenyang Guangda Pharmaceutical Co., Ltd.) was dissolved in 100 mL normal saline for intravenous infusion, 1 or 2 times/day for 30 to 60 min. Treatment lasted for one week.

In the observation group, patients received co-medication of pantoprazole sodium and somatostatin (SFDA Approval No.: H20058249, Shandong NewTime Pharmaceutical Co., Ltd).

In addition to the drugs used for patients in the control group, they would take 3 mg somatostatin via intravenous pumping in 500 mL normal saline at a rate of 250 μg/h, twice per day for a week.

Observation and efficacy evaluation

We compared the following indexes between two groups: efficacy, remission time of abdominal pain, restoration time of gastrointestinal function, disappearance time of ascites, evacuation time of ventilator, inflammatory indicators in serum (TNF-α, IL-8, and hs-CRP) before and after treatment, Glasgow scores (0 to 15 points and a higher score represents the milder coma) APACHE-II score (a higher score represents the more severe condition, and score higher than 20 points represents the critical condition), and the adverse reactions, including the pulmonary infection, acute respiratory distress syndrome, and pancreatic pseudocyst.

Criteria for ventilator evacuation

Ventilator could be evacuated as per the medical advice when the patients recovered from the anesthesia, with the restoration of autonomous respiration, smooth breath, SaO_2>95%, effective deglutition reflex, and cough reflex.

Criteria for evaluating efficacy

These criteria included excellence for patients with no symptoms and regular indexes, improvement for patients with amelioration in symptoms and indexes, failure for patients not meeting the criteria above. The total efficacy rate is the total of the excellence and improvement rates[2].

Statistical analysis

SPSS 18.0 software was used to analyze the data of this study. Measurement data were presented by mean ± standard deviation and compared by t-test, while enumeration data were presented by rate (%) and compared by chi-square test.

P<0.05 suggested that the difference had statistical significance.

Results

Comparison of the efficacy between two groups

Comparison of the efficacy between two groups showed that in the observation group, the efficacy rate was 97.78%, significantly higher than 80.00% in the control group (P<0.05; Figure 1).

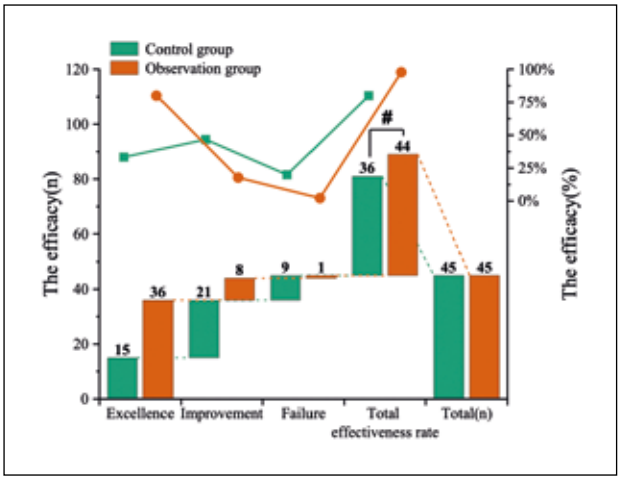

Figure 1: Comparison of the efficacy between two groups.

Comparison of the inflammatory indicators, Glasgow scores, and APACHE-II scores between two groups

Before treatment, a comparison of the inflammatory indicators in serum, Glasgow scores, and APACHE-II scores between the two groups showed no evident differences (all P>0.05). In contrast. after treatment, more significant improvement in the indicators was observed in the observation group (P<0.05; Figure 2).

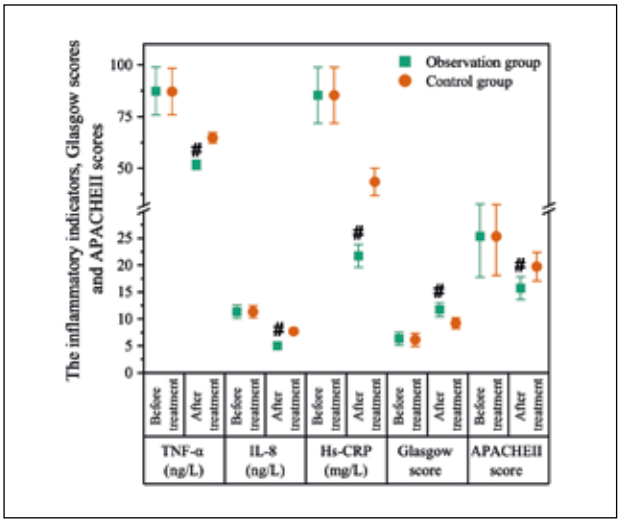

Figure 2: Comparison of the inflammatory indicators, Glasgow scores, and APACHE-II scores.
Note: #P<0.05 vs. the control group after treatment.

Comparison of the remission time of abdominal pain, restoration time of gastrointestinal function, disappearance time of ascites, and evacuation time of ventilator between two groups

Following treatment, the remission time of abdominal pain, restoration time of gastrointestinal function, disappearance time of ascites, evacuation time of ventilator of patients in the observation group was significantly earlier than those in the control group (P<0.05; Figure 3).

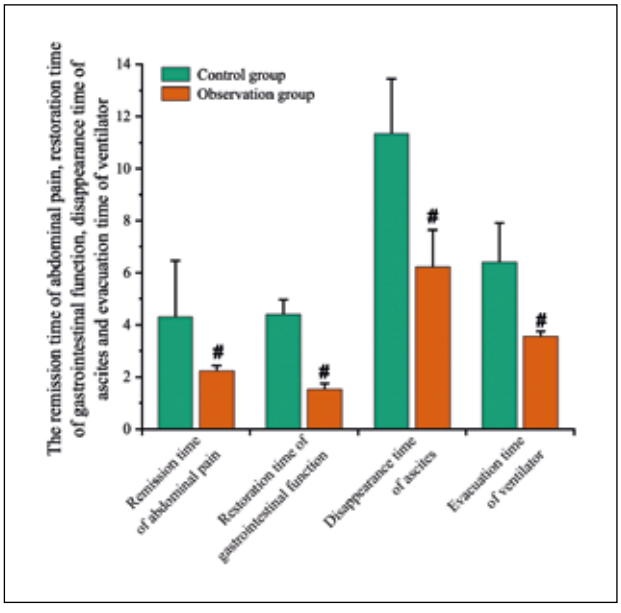

Figure 3: Comparison of the items between two groups.

Comparison of the incidence of adverse reactions between two groups

Comparison of the incidence of adverse reactions between the two groups showed that the incidence rate of adverse reaction was 4.44% in the observation group, significantly lower than 22.22% in the control group (P<0.05; Figure 4).

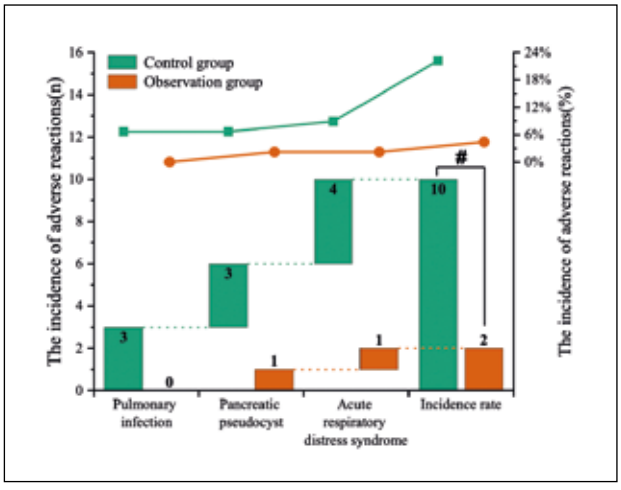

Figure 4: Comparison of the incidence of adverse reactions between two groups.

Discussion

As a general inflammatory condition, severe acute pancreatitis has a higher prevalence and mortality rate, with manifestations of diffuse pancreatic hemorrhage and tissue necrosis. In recent years, the continuous development and progression in medical technology have also improved the efficacy of treatment for severe acute pancreatitis, which, however, failed in decreasing the high prevalence, about 17%, severely threatening the health of human beings[7, 8]. Somatostatin can inhibit the secretion of pancreatic enzymes and juice in order to alleviate the pressure of the pancreatic duct, ease the pains, and eradicate the toxins to protect the pancreatic cells[9]. Pantoprazole sodium, as a novel proton pump inhibitor, can suppress the enzymatic activity selectively, inhibiting pancreatic and gastric secretion. Pantoprazole sodium, after administration, can rapidly bind to two sites in the enzyme system of parietal cells to inhibit the generation of gastric acid. However, the application of pantoprazole sodium in clinical practice is limited due to the dose dependence; however, for a severe case, the dose can be added appropriately. It can stimulate the gastric mucosal cells to inhibit the secretion of gastric acid, which can last for over 24 h; also, the intravenous administration of pantoprazole sodium performs better in the bioavailability[10, 11].

In terms of severe acute pancreatitis, pantoprazole sodium principally aims to reduce the digestive activity and the secretion of pancreatic enzymes, thereby protecting the liver, pancreas, kidney, and other organs, which can be further optimized when combined with somatostatin. Somatostatin, a common drug for the treatment of severe acute pancreatitis, is a kind of artificially synthesized tetracyclic amino acid similar to the natural growth hormone in chemical structure and mechanism[12, 13]. Somatostatin can suppress the secretion of insulin, thyrotropin, and growth hormone after intravenous administration and assist the pantoprazole sodium in inhibiting the secretion of gastric acid, thereby improving the gastrointestinal functions, including the absorption, gastric dynamics, nourishment, and blood in organs. In addition, somatostatin can decrease the blood flow in the organs but with no significant changes in the general arterial pressure. By reducing the internal and external secretion of the pancreas, somatostatin can treat severe acute pancreatitis to prevent and manage complications. Combined treatment can benefit the patients by mitigating the clinical symptoms and vital signs of severe acute pancreatitis to improve the clinical efficacy and prognosis[14, 15].

In this study, patients in the control group took pantoprazole sodium, while those in the observation group received the combined medication of pantoprazole sodium and somatostatin. As a result, the total efficacy rate of patients in the observation group was significantly higher than that in the control group ($P<0.05$). Before treatment, comparisons of the inflammatory indicators, Glasgow Coma Scale scores, and APACHE-II scores in patients of the two groups presented no significant differences ($P>0.05$); however, significant changes were observed in these indicators after treatment ($P<0.05$). The treatment for patients in the observation group shortened the remission time of abdominal pain, the recovery time of gastrointestinal tract function, the remission time of ascites, and the weaning time of the ventilator significantly compared to their counterparts in the control group ($P<0.05$). However, patients in the observation group suffered less from the adverse reactions than those in the control group, with a lower incidence rate of such reactions, including pulmonary infection, acute respiratory distress syndrome, and pancreatic pseudocyst ($P<0.05$).

To be concluded, co-medication of pantoprazole sodium and somatostatin presents a promising outcome in the treatment of severe acute pancreatitis patients.

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