The Protective Effect of Maluodan against Chronic Gastritis

ABSTRACT

Objective To explore the protective effect of the Maluodan Honey Pill (MHP) to chronic gastritis.

Methods The effects of gastric emptying and intestinal propulsion effects were observed by charcoal method. The ligation of pylorus was applied to investigate the effect of acid suppression.

Results During gastric emptying and intestinal propulsion experiments, the MHP groups (7 mg/kg/d or 3.5 mg/kg/d) had significant difference compared with the blank control group (P < 0.01). The gastric residual rate was decreased significantly in MHP-H and MHP-L groups, while the intestinal residual rate was increased significantly. Compared with the blank control group, the value of pH on gastric juice significantly increased in MHP groups (P < 0.01). The total acidity of gastric juice significantly decreased in MHP group (7 mg/kg/d or 3.5 mg/kg/d) compared with the blank control group (P < 0.01).

Conclusion The protective effect of MHP to chronic gastritis was performed via promoting of gastric emptying, intestinal propulsion and acid suppression.

KEYWORDS Maluodan Honey Pill (MHP), acid suppression, gastric emptying, intestinal propulsion

INTRODUCTION

Chronic gastritis, one of the most common digestive system diseases, is inflammation of the lining of the stomach with a long duration. This disease is usually caused by Helicobacter pylori bacteria and non-steroidal anti-inflammatory drugs. Patients diagnosed with chronic gastritis often suffer from upper abdominal pain, indigestion, bloating, nausea, vomiting, belching, loss of appetite and weight loss. Therefore, this disease would lead to the decrease of the quality of life. At present, medications and diet are the most common ways of treating chronic gastritis.

Maluodan Honey Pill (MHP) applied for the therapy of chronic gastritis in the clinical practice for decades of years is a kind of traditional proprietary Chinese medicines. MHP contains 18 kinds of raw plant materials, namely, Bulbus lilii, Radix ophiopogonis, Caulis dendrobii, Poria, Rhizoma atracylodis macrocephalae, Radix linderae, Radix angelicae dahuricae, Radix et rhizoma notoginseng, Rhizoma corydalis, Endothelium corneum gigeriaegalli, Radix scrophulariae and Radix angelicae sinensis. However, the mechanism of protective effect of MHP to chronic gastritis is still unknown, which would limit the use of MHP in the clinical practice.

Therefore, the aim of this study was to assess the effects of MHP that involved in the therapy of the chronic gastritis. The biological properties of MHP, including gastric emptying, intestinal propulsion and acid suppression effects were evaluated in this study.

MATERIALS AND METHODS

Preparation of MHP

Maluodan Honey Pill (batch number 141309) was provided by Handan Pharmaceutical Company Limited.
Animals

Kunming mice (male; 13–16 g) were purchased from Guangdong Medical Laboratory Animal Center (Guangzhou, China). All mice were acclimatized in a pathogen-free animal room and the feeding environment: relative humidity was 75 ± 10%, the temperature was 23 ± 2°C, lighting time was 12 h per day of the light-dark cycle. All mice were provided with standard laboratory diet and water.

Experimental design

The experimental mice were randomly divided into four groups, namely, blank control, positive control and two MHP groups (7 g/kg or 3.5 g/kg MHP) which were described as MHP-H and MHP-L. Each group contained ten mice. Positive drug and MHP were orally administrated for 3d, while mice in the normal control were administrated physiological saline.

Gastric emptying and intestinal propulsion

Mice in the positive group were given Zhizhu Kuanzhong. After the administration of drug, all mice were fasting for 18 h. Next, all mice in each group were administrated corresponding liquid containing carbon and drug. Mice were killed after 20 min, and they sectioned, ligated pyloruses and gastric cardia, removed stomachs and weighed them which were referred to as the full weight the stomach. Then, they were dissected along the big-curve, followed by washing them which were referred to as the net weight of the stomach. The ability of gastric emptying was calculated using the ratio between the net weight and gross weight of the stomach. At the same time, small intestines were quickly taken out, gently peeled mesenteric, pulled into a straight line. The percentage of intestinal propulsion was calculated by measuring the length of the pylorus to the ileocecal junction of the small intestine and the distance of pylorus to ink front.

Acid suppression

Mice in the positive group were given omeprazole. After the administration of drug, all mice were allowed fasting for 24 h. Next, Sodium pentobarbital solution (50 mg/kg) was injected in all mice. Then, the drugs were administrated again by duodenal. Next, full stomach was taken out. The contents in the stomach were collected in the centrifuge tube. The values of pH of gastric contents were examined by precise pH paper. Gastric contents were centrifuged for 10 min (1500 r/min), 1 ml of the supernatant was gently taken out and 1 drop of phenol red indicator was added (1%). The above solution was titrated by NaOH (0.01 mol·L\(^{-1}\)), until the colour disappeared that happens in within 2 s. The amount of NaOH solution was recorded to calculate the total acidity of gastric juice.

Statistical analysis

The data in this study were expressed as mean ± standard deviation (SD). Statistical analysis of data was performed using the ANOVA of SPSS 19.0 system. The unpaired Student’s t-test was used to analyze the significant differences between control and MHP groups. The level of significance was set at 5% or \( P < 0.05 \).

RESULTS

Effects of MHP on gastric emptying

Gastric residual rate can reflect the ability of gastric emptying. In comparison to the blank control group, gastric residual rate was decreased significantly in MHP-H and MHP-L groups (\( P < 0.01 \)), suggesting that MHP could accelerate the emptying of foods from the stomach (Fig. 1). Meanwhile, there was no difference for the MHP-H and MHP-L groups.

Effects of MHP on intestinal propulsion

As shown in Figure 2, intestinal residual rate was increased significantly in MHP groups compared with the blank control group (\( P < 0.01 \)), indicating that the treatment of MHP increased the capacity of intestinal propulsion for mice.

Effects of MHP on acid suppression

In comparison to the blank control group, the value of pH on gastric juice increased after MHP treatment at
a low or high dose (Fig. 3A). The total acidity of gastric juice decreased in MHP groups compared with the normal control group (Fig. 3B). These results revealed that the treatment of MHP could significantly inhibit the excretion of acid in the stomach.

**DISCUSSION**

Chronic gastritis is one of the most common digestive system diseases. Because of changes in people’s living habits and diet, the incidence of chronic gastritis has been increasing year-by-year. The World Health Organization has declared that chronic atrophic gastritis is a precancerous lesion. Therefore, effective treatments for chronic gastritis possess great clinical application value.

MHP is one of the commonly used drugs for the treatment of chronic gastritis in China. However, related experimental data supporting the pharmacological activities of MHP are limited. Therefore, charcoal method and ligation of pylorus were performed to investigate the effects of MHP on chronic gastritis.

The results showed that MHP could significantly speed up the gastric emptying and intestinal propulsion to promote the absorption of food in the gastrointestinal tract. Compared with the blank control group, MHP could reduce the total acidity of gastric juice. Therefore, MHPs are mainly improving the effect of gastrointestinal dynamics and acid suppression to play the protective effect against chronic gastritis.

**CONFLICT OF INTEREST**

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

**CONTRIBUTION OF AUTHORS**

Cai-Yun Jiang and Ji-Wei Huang made the experiments and drafted the article. The interpretation and analysis of data was supplied by Yong-Ming Zhang. The conception and design of the study was supplied by Zhu-Feng Wu. The final approval of the version was submitted by Zhu-Feng Wu.

**ETHICAL STATEMENT**

All animal care and experimental procedures were approved by the Laboratory Animal Ethics Committee.
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of Jinan University (20141011017). All studies were conducted on the basis of the guidelines set by the National Institutes of Health (the 7th edition, USA).

REFERENCES


