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Evaluation of the Efficacy Rate of Rebamipide Combined with Triple Therapy in the Treatment of Senile Peptic Gastric Ulcers

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Abstract: *Objective:* To evaluate the efficacy rate of rebamipide combined with triple therapy in the treatment of senile peptic gastric ulcers. *Methods:* A cohort of 68 elderly patients diagnosed with peptic gastric ulcers was enrolled in this study between January 2022 and December 2024. Using the envelope method for randomization, the patients were divided into two equal groups: a control group administered standard triple therapy and an observation group that received the same triple therapy supplemented with rebamipide. The clinical efficacy, gastric mucosal morphology (mucosal thickness, gland density, active inflammatory cell infiltration, chronic inflammatory cell infiltration), and pepsinogen I/II were compared between the two groups. *Results:* The total effective rate in the observation group was significantly higher than that in the control group, with a statistically significant difference ($p < 0.05$). After treatment, the scores of all items in both groups were significantly lower than those before treatment, and the scores in the observation group were significantly lower than those in the control group, with statistically significant differences ($p < 0.05$). After treatment, the ratios in both groups were significantly higher than those before treatment, and the ratio in the observation group was significantly higher than that in the control group, with statistically significant differences ($p < 0.05$). *Conclusion:* Rebamipide combined with triple therapy can significantly improve the treatment efficacy of senile peptic gastric ulcers, effectively improve the histological status of the gastric mucosa, and promote the recovery of gastric mucosal function, with superior efficacy compared to triple therapy alone.

Keywords: Rebamipide; Triple therapy; Elderly; Peptic gastric ulcer; Gastric mucosal morphology; Pepsinogen

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1. Introduction

With the acceleration of the aging process of the global population structure, the prevention and treatment of digestive system diseases in the elderly have increasingly become a clinical focus. Peptic gastric ulcers have a high incidence rate among the elderly population. Due to characteristics such as physiological functional decline, the coexistence of multiple diseases, and reduced drug tolerance in patients of this age group, the difficulty of

treatment and the risk of recurrence significantly increase [1]. The traditional triple therapy, as a common regimen for Helicobacter pylori eradication, although having certain therapeutic effects, still presents issues such as slow ulcer healing and incomplete mucosal repair in some elderly patients, affecting overall treatment efficiency and prognostic quality [2]. Rebamipide is a gastric mucosal protective agent that can exert protective and repairing effects in multiple aspects by promoting epithelial cell proliferation, inhibiting the release of inflammatory mediators, and enhancing mucosal barrier function [3]. Therefore, this study aims to explore the clinical efficacy of rebamipide combined with triple therapy in elderly patients with peptic gastric ulcers through a retrospective analysis:

2. Materials and methods

2.1. General information

A total of 68 elderly patients with peptic gastric ulcers admitted to our hospital from January 2022 to December 2024 were selected and randomly divided into an observation group and a control group using the envelope method, with 34 cases in each group. There were no statistically significant differences in the basic information between the two groups of patients ($p > 0.05$), as shown in **Table 1**. This study was approved by the hospital's ethics committee. This study complies with the relevant ethical principles outlined in the Declaration of Helsinki.

Table 1. Comparison of general information between the two groups of patients ($\overline{x} \pm s/n$)

Characteristic	Observation group (n = 34)	Control group (n = 34)	t/χ^2	*p*-value
Gender (Male/Female)	18 / 16	19 / 15	0.059	0.808
Age (years)	60–87	61–89	0.043	0.966
	76.15 ± 6.84	76.08 ± 6.73		
Disease duration (years)	1–8	1–9	0.787	0.434
	3.69 ± 1.22	3.91 ± 1.08		

2.2. Inclusion and exclusion criteria

2.2.1. Inclusion criteria

(1) Age ≥ 60 years old
(2) Diagnosed with active gastric ulcers through gastroscopy
(3) Positive *Helicobacter pylori* test results
(4) Patients are conscious, possess basic communication skills, and can cooperate to complete treatment and follow-up
(5) Complete clinical data
(6) Signed informed consent forms

2.2.2. Exclusion criteria

(1) Patients with concurrent gastric malignancy or suspicious malignant lesions
(2) Patients who have received systemic treatment with proton pump inhibitors, antibiotics, or gastric mucosal protective agents within the past four weeks

(3) Patients with a history of allergy to any medication used in this study
(4) Patients with severe cardiac, hepatic, or renal insufficiency
(5) Patients with coagulation dysfunction or those currently receiving anticoagulant therapy
(6) Patients with mental illnesses that prevent cooperation with treatment

2.3. Methods

Patients in the control group received triple therapy: clarithromycin tablets (manufacturer: Livzon Pharmaceutical Group Inc., Livzon Pharmaceutical Factory; National Medical Products Administration Approval Number: H10960227; specification: 0.25 g) at a dose of 250 mg twice daily; amoxicillin capsules (manufacturer: Guizhou Bailing Enterprise Group Pharmaceutical Co., Ltd.; National Medical Products Administration Approval Number: H52020236; specification: 0.25 g) at a dose of 1 g twice daily; lansoprazole enteric-coated tablets (manufacturer: Shantou Special Economic Zone Tuobin Pharmaceutical Factory; National Medical Products Administration Approval Number: H10980136; specification: 15 mg) at a dose of 30 mg once daily. Medications were taken with warm water.

Patients in the observation group received rebamipide treatment in addition to the regimen given to the control group: rebamipide tablets (manufacturer: Beijing Tianheng Pharmaceutical Research Institute Nanyang Tianheng Pharmaceutical Factory; National Medical Products Administration Approval Number: H20255306; specification: 0.1 g) at a dose of 100 mg three times daily, taken with warm water.

The treatment duration for both groups was eight consecutive weeks, and efficacy indicators were evaluated uniformly after the completion of the treatment course.

2.4. Observation indicators

2.4.1. Clinical efficacy

The clinical efficacy of patients in both groups was observed and compared, categorized as follows: cured: complete disappearance of clinical symptoms such as abdominal pain and acid reflux, with complete healing of the ulcer observed under gastroscopy; effective: significant improvement in clinical symptoms, with a reduction in ulcer area of 50% or more observed via gastroscopy; ineffective: no significant relief of clinical symptoms, with a reduction in ulcer area of less than 50% observed under gastroscopy, or even an increase in ulcer area.

The overall effective rate was calculated as the percentage of the sum of cured and effective cases out of the total number of cases.

2.4.2. Gastric mucosal morphology

Observe and compare the gastric mucosal morphology of patients in both groups before and after treatment, including four aspects: mucosal thickness, gland density, active inflammatory cell infiltration, and chronic inflammatory cell infiltration. A four-grade scoring system is employed for evaluation, with each aspect categorized into normal, mild, moderate, and severe based on the severity of the lesion, corresponding to scores of 0 to 3, respectively. A lower total score indicates a better state of gastric mucosal morphology.

2.4.3. Pepsinogen I/II

Fasting venous blood samples are collected from patients in the morning before and after treatment. After serum separation by centrifugation, the concentrations of pepsinogen I and II are determined using chemiluminescence

immunoassay, and their ratio is calculated.

2.5. Statistical methods

Our hospital analyzed the study using the SPSS 21.0 statistical software package. Measurement data are presented as mean ± standard deviation ($\overline{x} \pm s$) and conform to a normal distribution. Inter-group comparisons are conducted using the *t*-test. Count data are expressed as relative numbers, and inter-group comparisons are performed using the χ^2 test. Clinical efficacy comparisons are made using the rank-sum test, with $p < 0.05$ indicating a statistically significant difference.

3. Results

3.1. Comparison of clinical efficacy between the two groups

The total effective rate in the observation group is significantly higher than that in the control group, with a statistically significant difference ($p < 0.05$). See **Table 2**.

Table 2. Comparison of clinical efficacy between the two groups [n(%)]

Group	n	Cured	Effective	Ineffective	Total effective
Observation group	34	18 (52.94)	14 (41.18)	2 (5.88)	32 (94.12)
Control group	34	12 (35.29)	13 (38.24)	9 (26.47)	25 (73.53)
χ^2					5.314
p-value					0.021

3.2. Comparison of gastric mucosal morphology between the two groups

Before treatment, there are no significant differences in the scores of various aspects of gastric mucosal morphology between the two groups ($p > 0.05$). After treatment, the scores of all aspects in both groups are significantly lower than those before treatment, and the scores in the observation group are significantly lower than those in the control group, with statistically significant differences ($p < 0.05$). See **Table 3**.

Table 3. Comparison of gastric mucosal morphology between the two groups [n(%)]

Group	n	Mucosal thickness		Gland density		Active inflammatory cell infiltration		Chronic inflammatory cell infiltration	
		Pre-Tx	Post-Tx	Pre-Tx	Post-Tx	Pre-Tx	Post-Tx	Pre-Tx	Post-Tx
Observation	34	2.35 ± 0.48	0.82 ± 0.39*	2.29 ± 0.45	0.76 ± 0.43*	2.41 ± 0.51	0.68 ± 0.18*	2.18 ± 0.40	0.59 ± 0.13*
Control	34	2.32 ± 0.44	1.35 ± 0.46*	2.26 ± 0.42	1.41 ± 0.44*	2.38 ± 0.49	1.52 ± 0.43*	2.21 ± 0.43	1.47 ± 0.42*
t-value		0.269	5.124	0.284	6.350	0.247	10.507	0.298	11.671
p-value		0.789	< 0.001	0.777	< 0.001	0.805	< 0.001	0.767	< 0.001

Note: Compared with the same group before treatment, *$p < 0.05$.

3.3. Comparison of pepsinogen I/II ratios between the two groups

Before treatment, the pepsinogen I/II ratio was comparable between the two groups ($p > 0.05$). Following treatment, both groups exhibited a significant increase in the ratio from their baseline levels. The observation

group demonstrated a more pronounced elevation, resulting in a significantly higher ratio than that of the control group ($p < 0.05$). See **Table 4**.

Table 4. Comparison of pepsinogen I/II ratios before and after treatment between the two groups ($\overline{x} \pm s$)

Group	n	Before treatment	After treatment
Observation group	34	5.82 ± 1.36	9.45 ± 1.87*
Control group	34	5.91 ± 1.41	7.23 ± 1.52*
t-value		0.268	5.372
p-value		0.790	< 0.001

Note: Compared with the same group before treatment, *$p < 0.05$.

4. Discussion

Peptic gastric ulcers have a high prevalence rate among the elderly population, and their occurrence and development are closely related to various pathophysiological mechanisms, such as the deterioration of the gastric mucosal barrier function, *Helicobacter pylori* infection, and enhanced attack factors like gastric acid and pepsin. Elderly patients often experience delayed ulcer healing and an increased risk of recurrence due to reduced mucosal blood flow, decreased cell renewal capacity, and the presence of multiple chronic diseases [4].

As the standard treatment regimen for *Helicobacter pylori*-associated gastric ulcers, triple therapy involves the use of lansoprazole to inhibit gastric acid secretion, combined with clarithromycin and amoxicillin for synergistic bactericidal effects. However, this regimen primarily focuses on suppressing attack factors and has limited effects on the structural repair and functional reconstruction of the gastric mucosa. Some patients still experience issues such as poor ulcer healing quality and slow resolution of inflammation [5]. In the control group of this study, 26.47% of patients still had poor therapeutic effects, suggesting that relying solely on bactericidal and acid-suppressing therapies has limitations in the elderly population.

Rebamipide, as a gastric mucosal protective agent, has a multi-target mechanism to promote mucosal repair [6]. In the observation group of this study, the overall effective rate increased to 94.12% after the combined use of rebamipide. This result may be related to rebamipide's ability to activate the epidermal growth factor receptor signaling pathway, promote the proliferation and migration of gastric mucosal cells, and accelerate the epithelialization process at the ulcer margin. Meanwhile, this drug can also enhance the expression of heat shock protein 70, inhibit the activation of the nuclear factor-κB pathway, and reduce the release of pro-inflammatory factors such as interleukin-8 and tumor necrosis factor-α, thereby effectively controlling mucosal inflammatory responses. In addition, rebamipide can increase gastric mucus secretion and improve mucosal microcirculation, further consolidating the gastric mucosal barrier function [7,8].

In terms of pepsinogen levels, the pepsinogen I/II ratio in the observation group was significantly higher than that in the control group after treatment. The increase in this ratio primarily reflects the recovery in the number and function of chief cells in the gastric corpus glands, suggesting that rebamipide not only promotes mucosal repair structurally but also aids in restoring the physiological state of gastric glands functionally, thereby improving the gastric internal environment and reducing the risk of further mucosal damage [9].

From the perspective of therapeutic mechanisms, the addition of rebamipide compensates for the deficiencies of triple therapy in the active repair of mucosa, forming a treatment strategy that emphasizes both bactericidal

action and mucosal repair. Its remarkable efficacy in elderly patients may be closely related to characteristics such as decreased mucosal self-healing capacity and persistent inflammatory states in this population [10]. By providing exogenous repair signals and inhibiting inflammatory cascades, rebamipide helps break the vicious cycle commonly seen in elderly patients with gastric ulcers.

5. Conclusion

In conclusion, rebamipide combined with triple therapy can significantly improve the treatment outcomes for elderly patients with peptic gastric ulcers, effectively improving the histological state of the gastric mucosa and promoting functional recovery of the gastric mucosa, with superior efficacy compared to triple therapy alone.

Disclosure statement

The author declares no conflict of interest.

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