

Comparison of Mayinglong musk hemorrhoids ointment and musk hemorrhoids suppository on postoperative pain and healing in mixed hemorrhoids after PPH or RPH

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Abstract: Background: Mixed hemorrhoids are common colorectal diseases; Mayinglong Musk Ointment and Musk Suppositories are used. Their post-PPH/RPH efficacy is unclear. **Objective:** Compare the efficacy of Mayinglong Musk Hemorrhoids Ointment and Suppository in mixed hemorrhoid patients undergoing PPH or RPH. **Methods:** A retrospective study enrolled 139 mixed hemorrhoid patients who underwent PPH/RPH at the hospital from Jan to Dec 2024; after exclusions, 131 were analyzed. They were divided into Group A (64 cases, Mayinglong Musk Hemorrhoids Ointment) and Group B (67 cases, Musk Hemorrhoids Suppository). Main outcomes included VAS, wound healing time/effect; secondary outcomes covered anal function indexes (ADP, ARP, HZL, AMSP), WCS score, postoperative complications, anal edema/exudation score and wound granulation morphology score. **Results:** Compared with Group A, Group B had lower VAS, WCS and wound granulation morphology scores (all $P < 0.05$); Group A showed higher ADP, ARP, AMSP (all $P < 0.05$), lower HZL and anal edema/exudation scores (all $P < 0.05$) and superior wound healing time ($P = 0.047$). No significant differences were found in wound healing effect or postoperative complication rate between the two groups (all $P < 0.05$). **Conclusion:** Both Mayinglong Musk Hemorrhoids Ointment and Musk Hemorrhoids Suppository benefit postoperative recovery with distinct advantages and clinical medication should be tailored to patients' specific postoperative conditions.

Keywords: Mayinglong musk hemorrhoids ointment; Musk hemorrhoids suppository; Mixed hemorrhoids; Procedure for prolapsing hemorrhoids; Ruiyun procedure for hemorrhoids

Submitted on 29-09-2025 – Revised on 03-11-2025 – Accepted on 13-11-2025

INTRODUCTION

Mixed hemorrhoids, as a common and frequently occurring disease in anorectal clinics, have a persistently high morbidity among anorectal diseases. According to relevant epidemiological surveys, the morbidity of mixed hemorrhoids can reach 5-10% globally and even exceed 15% in some regions of China, seriously affecting patients' quality of life. Mixed hemorrhoids are lesions formed by the fusion of internal hemorrhoids and external hemorrhoids, possessing symptoms of both internal and external hemorrhoids, such as hematochezia, prolapse, pain and cutaneous pruritus, bringing great physical and mental distress to patients (Chen *et al.*, 2021, Zhu and Lin, 2024). From the perspective of pathological mechanisms, the formation of mixed hemorrhoids is closely related to factors such as anal cushion displacement and varicose veins. Positioned at the distal end of the rectum, the anal cushion is a normal anatomical structure that contributes to the process of defecation. When the supporting structure of the anal cushion becomes loose or fractured, the anal cushion will shift downward, forming internal hemorrhoid; while external hemorrhoids are mostly caused by varicose vein or thrombosis of the perianal subcutaneous venous plexus. When the venous plexuses of internal and external

hemorrhoids communicate and fuse with each other, mixed hemorrhoids are formed. This pathological change not only leads to morphological abnormalities in local tissues, but also affects the blood circulation and nerve sensation in the perianal region, causing patients to experience a series of discomfort symptoms (Chen *et al.*, 2021, Du *et al.*, 2022).

With the change of people's life-style, such as unreasonable diet structure, excessive intake of spicy and irritating food and refined grains and insufficient intake of dietary fiber; prolonged sitting and standing, lack of appropriate exercise, leading to poor blood circulation in the anal area; increased mental stress, long-term tension and anxiety, affecting the normal peristalsis of the intestine, etc., the morbidity of mixed hemorrhoids shows a rising trend year by year and the patient population is gradually younger. This situation makes the treatment of mixed hemorrhoids an important issue to be concerned and solved in the field of anorectal surgery (Pata *et al.*, 2021). For patients with mild mixed hemorrhoids, conservative treatments are usually used to relieve symptoms, such as adjusting diet, warm water sitz bath and topical medication; however, for patients with severe conditions, such as repeated prolapse of hemorrhoids, massive hematochezia and ineffective conservative treatment, surgery is required (Fiordaliso *et al.*, 2023). With the continuous development of medical technology, procedures for prolapse and hemorrhoids

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(PPH) and Ruiyun procedure for hemorrhoids (RPH) have been widely used in clinical practice due to their unique advantages. PPH has the advantages of short operation time, small trauma, mild postoperative pain and rapid postoperative recovery. Patients can usually return to normal life and work within 1-2 weeks after the operation (Luo *et al.*, 2022). This procedure is suitable for grade III and IV internal hemorrhoids and grade II internal hemorrhoids that are ineffective with conservative treatment, especially for the treatment of circular mixed hemorrhoids. A meta-analysis of 23 randomized controlled studies showed that PPH was superior in reducing postoperative stricture of anus compared with 9 other interventions ($P<0.05$) (Yuan *et al.*, 2023). RPH is a minimally invasive treatment technique that has been gradually rolled out in recent years. RPH is easy to operate and doctors can master it proficiently after short-term training; it has high safety, with less intraoperative and postoperative haemorrhage and less injury to perianal tissues; postoperative complications are relatively few and symptoms such as pain and edema are mild. This procedure is suitable for the treatment of internal hemorrhoids of all degrees and the internal hemorrhoid part of mixed hemorrhoids and has been widely used in primary hospitals (Yu *et al.*, 2021).

Although PPH and RPH procedures have obvious advantages in the treatment of mixed hemorrhoids, a series of complications may still occur after surgery (Xu *et al.*, 2025). Postoperative pain and impaired wound healing are the main problems affecting patients' recovery and quality of life. The incidence of postoperative pain can be as high as 60%-80% and the pain intensity is mostly grade II to grade III. This pain not only causes severe discomfort to patients, affecting their sleep, diet and mood, but may also lead to patients not daring to defecate, causing constipation, which in turn further aggravates pain during defecation and injury to the wound surface, forming a vicious cycle (Hawkins *et al.*, 2024). The incidence of impaired wound healing is about 10%-20%. Impaired wound healing will prolong the patient's recovery time, requiring longer periods of care and treatment, increasing the burden on families and society and also increasing the risk of infection and may even lead to disease relapse, seriously affecting the therapeutic effect of surgery. Therefore, how to effectively alleviate postoperative pain of mixed hemorrhoids PPH and RPH and promote wound healing has become the focus of clinical doctors (Talaie *et al.*, 2022).

In postoperative adjuvant therapy, traditional Chinese medicine (TCM) plays an important role. TCM treatment of hemorrhoids has a long history and has accumulated rich experience. Its treatment principles are mainly clearing heat and removing toxins, subduing swelling to relieve pain, cooling blood and stopping bleeding, activating blood and resolving stasis and promoting tissue regeneration to close wounds. Mayinglong Musk Hemorrhoids Ointment

and Musk Hemorrhoid Suppository are commonly used Chinese patent medicines for the treatment of hemorrhoids in clinical practice. The main ingredients of Mayinglong Musk Hemorrhoids Ointment include artificial musk, artificial bezoar, pearl, calamine (calcined), boron, borneol, etc. The compatibility of these ingredients enables Mayinglong Musk Hemorrhoids Ointment to have good effects of clearing heat and removing toxins, subduing swelling to relieve pain, stopping bleeding and promoting tissue regeneration. Mayinglong Musk Hemorrhoids Ointment is an external ointment that is directly applied to the affected area during use. The drug can quickly act on the lesion site and exert its therapeutic effect, especially for the inflammatory reaction, pain and haemorrhage of the postoperative wound (Yu *et al.*, 2024). The main components of Mayinglong Musk Haemorrhoids Suppository are artificial musk, borneol, *panax notoginseng*, *galla chinensis*, belladonna liquid extract, etc. The combined use of these ingredients enables musk haemorrhoids suppository to have the effects of clearing heat and removing toxins, subduing swelling to relieve pain and promoting haemostasis and tissue regeneration. Musk haemorrhoids suppositories are suppositories administered through the rectum. The drug is absorbed through the rectal mucosa and can directly act on the lesion site, with rapid efficacy. It also has a good improvement effect on postoperative pain, haemorrhage, inflammation and other symptoms (Yan *et al.*, 2024). Both have good effects in relieving haemorrhoids symptoms and have accumulated rich experience in clinical application, but there is still a lack of systematic and in-depth discussion on the comparative study of the pain and healing effects of mixed hemorrhoids PPH and RPH after surgery.

Clarifying the differences in the application effects of Mayinglong Musk Hemorrhoids Ointment and Musk Hemorrhoids Suppository after PPH and RPH for mixed hemorrhoids is of great significance for clinical selection of appropriate drug therapy regimens. This study aims to compare the effects of the two on postoperative pain intensity, wound healing time, healing quality and postoperative complications in patients after PPH and RPH for mixed hemorrhoids, so as to provide a scientific basis for clinical drug use, with a view to better alleviating postoperative pain, promoting early recovery and improving the quality of life of patients. At the same time, this study will also help to further explore the potential of TCM in the postoperative treatment of anorectal diseases and provide strong support for the modernization and internationalization of TCM.

MATERIALS AND METHODS

General information

A retrospective selection was conducted based on previous medical records of 139 patients with mixed hemorrhoids who underwent PPH or RPH in the Hospital from January 2024 to December 2024. The study compared and analyzed

the effects of Mayinglong Musk Hemorrhoids Ointment and Musk Hemorrhoids Suppository on postoperative pain and healing after PPH and RPH for mixed hemorrhoids, as shown in the flow chart in fig. 1. After exclusion, 136 cases were included, with 2 cases of data deletion and 3 cases of unqualified data. Finally, a total of 131 cases were analyzed. Based on different postoperative medication regimens, they were divided into Group A, with 64 patients who received local treatment with Mayinglong Musk Hemorrhoids Ointment after surgery; and Group B, with 67 patients who received Mayinglong Musk Hemorrhoids Suppository after surgery.

Inclusion criteria

(1) Patients who meet the relevant diagnostic criteria for mixed hemorrhoids in the “Guidelines for Integrated Traditional Chinese and Western Medicine Diagnosis and Treatment of Hemorrhoids (2025 Edition)” (Zhi *et al.*, 2025) compiled by the Colorectal and Anorectal Disease Professional Committee of the China Association of Chinese and Western Medicine; (2) Patients with mixed hemorrhoids who have no relief after 6-8 months of conservative treatment and undergo PPH or RPH surgery; (3) Aged 18-70 years; (4) No obvious anal deformity before surgery; (5) No history of anal surgery; (6) Patients who strictly adhere to medical advice (Huang *et al.*, 2023); (7) Complete medical records and related investigation.

Exclusion criteria

(1) Patients with anal fistula, fissured anus and other perianal diseases (such as perianal abscess); (2) Patients with other organic lesions (such as anal polyp); (3) Patients with severe cardiovascular disorder; (4) Patients with clotting disorder; (5) Patients with atopic infection (such as colitis ulcerative and Crohn’s disease); (6) Patients with gastrointestinal tract infectious diseases; (7) Patients with allergy to the therapeutic drugs (Sha *et al.*, 2022); (8) Patients who are pregnant or breastfeeding; (9) Patients with mental disorder.

Ethical statement

This study strictly adheres to the Declaration of Helsinki and the ethical guidelines established by the Council for International Organizations of Medical Sciences, ensuring that all research activities involving subjects comply with ethical norms and fully protect the rights, safety and well-being of the subjects. The study protocol has been submitted to and approved by the hospital ethics committee and all subjects participating in this study have full informed consent. Researchers have provided detailed explanations to the subjects and their legal representatives regarding the study purpose, study procedures, potential risks and the rights of the subjects. After ensuring complete understanding of the above information, written informed consent was voluntarily signed.

Treatment protocol

According to the medical record data, patients were divided into two groups. Group A included 64 patients, of

whom 30 patients were treated with PPH procedure and 34 patients were treated with RPH procedure; Group B included 67 patients, of whom 32 patients were treated with PPH procedure and 35 patients were treated with RPH procedure. PPH was performed using a circular stapler for hemorrhoids (Jiang *et al.*, 2024) (PPH01, Registration No. 20152093310, Johnson & Johnson, USA); RPH was performed using an automatic ligation device (Yu *et al.*, 2021) [ZDFR-TZQ-02, Guangdong Food and Drug Administration Machinery (Standard) 2009 No. 2660513, Qinhuangdao Kangtai Medical System Co., Ltd., China]. Both groups of patients received haemostasis, anti-infective therapy, defecation management and potassium permanganate sitz bath after surgery.

In addition, Group A patients used Mayinglong Musk Hemorrhoids Ointment (SFDA approval number Z42021920, 2.5g*5 pieces, Mayinglong Pharmaceutical Group Co., Ltd.). The hemorrhoids ointment was applied to sterile gauze for external use, twice a day (Lin and Zang, 2022); Group B patients used Mayinglong Musk Hemorrhoids Suppository (SFDA approval number Z42021461, 1.5g*12 suppositories, Mayinglong Pharmaceutical Group Co., Ltd.), rectally administered, one suppository inserted into the anus in the morning and evening, as well as after defecation, twice a day (Yan *et al.*, 2024). Both groups of patients were administered the drugs for 14 days.

Visual analogue scale (VAS)

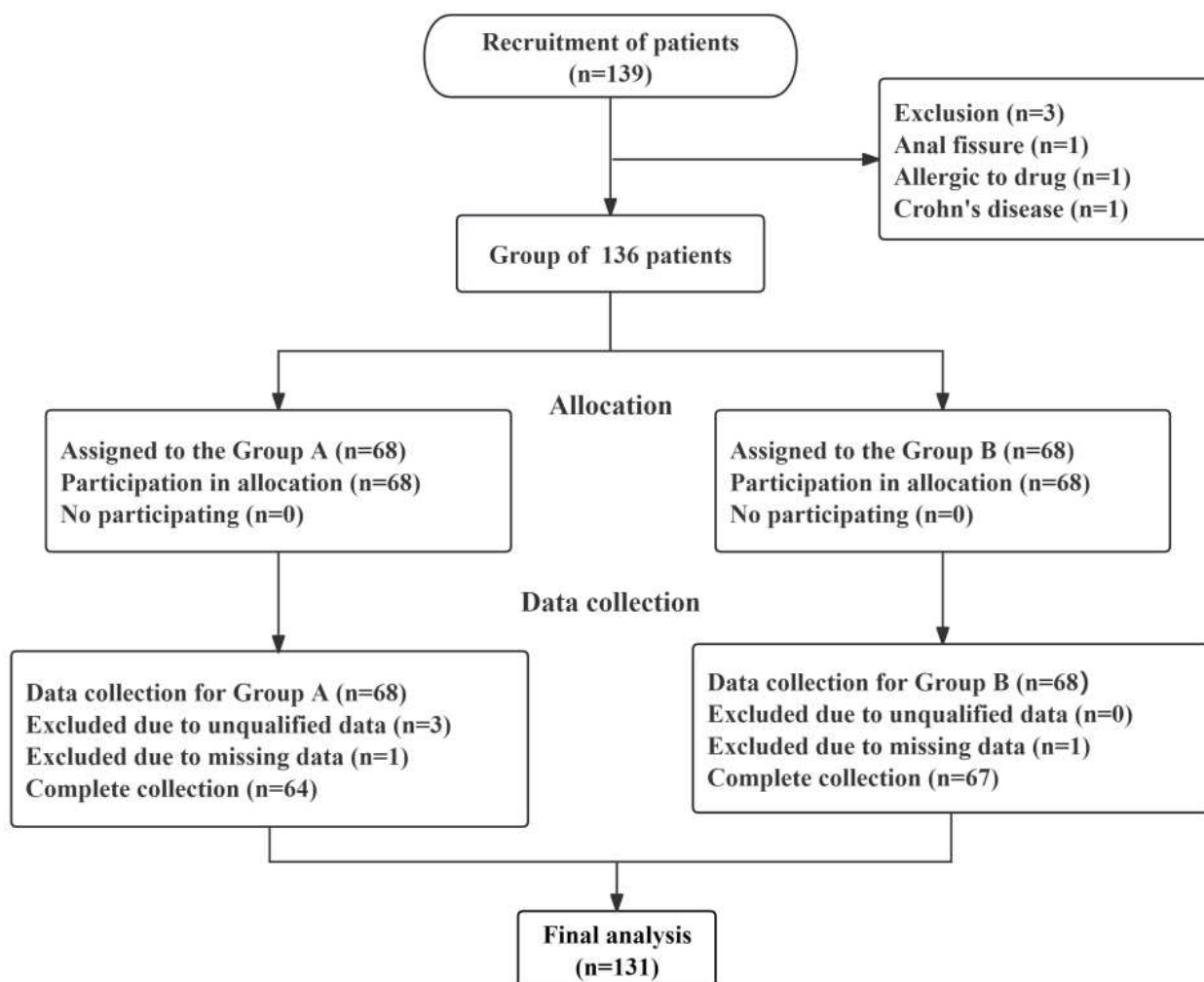
VAS score is a commonly used quantitative assessment tool for pain. The scoring standard is 0-10, where 0 represents no pain and 10 represents the most severe pain. The higher the score, the more severe the pain (Nguyenhuy *et al.*, 2022).

Wound healing time and healing effect

The wound healing criteria were the absence of rectal haemorrhage upon defecation observed using a standardized visual inspection protocol and examination using color ultrasound doppler (Resona R9, Mindray, China) and the patient experienced no pain (Sha *et al.*, 2022), with photographic evidence attached in the medical record. Two independent observers assessed the wound and recorded the wound healing time to ensure consistency and accuracy of the assessment.

The criteria for wound healing effect are as follows: remarkable effect: the patient's hematochezia, pain and other symptoms disappeared after treatment and the wound healing effect was significant; effective: the patient's clinical symptoms improved after treatment and the wound healing effect was relatively good; ineffective: the patient experienced impaired wound healing after treatment and postoperative relapse.

Overall effective rate = (number of effective cases + number of markedly effective cases)/total number of cases × 100% (Sha *et al.*, 2022, Lin and Zang, 2022).

**Fig. 1:** Research flowchart

(The flowchart outlines the recruitment, inclusion, exclusion and allocation of patients. Eventually, 64 patients in the Group A and 67 in the Group B were obtained for analysis and comparison).

Table 1: Baseline characteristics [$\bar{x} \pm s$, n (%)]

Variables	Group A (n=64)	Group B (n=67)	95%CI		P	Effect Size
			Lower	Upper		
Age (years)	57.67 $\pm$ 10.62	56.99 $\pm$ 8.80	-2.68	4.05	0.687	0.07
BMI (kg/m ²)	24.05 $\pm$ 1.56	23.55 $\pm$ 1.71	-0.06	1.07	0.081	0.31
<i>Gender</i>						
Male	35 (54.7)	36 (53.7)	0.52	2.07	0.913	0.01
Female	29 (45.3)	31 (46.3)				
Duration of illness (months)	9.89 $\pm$ 3.11	9.82 $\pm$ 3.07	-1.00	1.14	0.897	0.02
<i>Hemorrhoids grade</i>						
III	33 (51.6)	35 (52.2)	0.49	1.93	0.938	-0.01
IV	31 (48.4)	32 (47.8)				
<i>Surgical methods</i>						
PPH	30 (46.9)	32 (47.8)	0.49	1.92	0.919	-0.01
RPH types of mixed hemorrhoids varicose	34 (53.1)	35 (52.2)				
Type mixed hemorrhoids Connective	23 (35.9)	25 (37.3)	-	-	0.933	0.032
Tissue type mixed hemorrhoids Ring-shape	22 (34.4)	21 (31.3)				
Mixed hemorrhoids	19 (29.7)	21 (31.3)				

Note: BMI: body mass index; PPH: procedure for prolapsing hemorrhoids; RPH: Ruiyun procedure for hemorrhoids.

Ana function indicators

Anal function indicators include anal canal diastolic pressure (ADP), anal canal resting pressure (ARP), length of anorectal hyperbaric zone (HZL) and anal canal maximum systolic pressure (AMSP). Patients were required to empty their bowels 1-2 h before the investigation and were not allowed to have enema, digital rectal examination, or anoscopy at the same time to avoid interfering with sphincter function and rectum mucosa, which would affect the investigation results. ADP, ARP, HZL and AMSP were measured using an anorectal pressure detector (ZGJ-D2, Hefei Aoyuan Science and Technology Development Co., Ltd., China) (Sha *et al.*, 2022).

Wexner constipation scale (WCS) score

The WCS score is a standardized tool used clinically to quantify the severity of constipation, proposed by the Cleveland Clinic in the United States and finds extensive application in the diagnosis, grading and evaluation of the treatment effect of constipation.

Constipation symptoms are scored based on six indicators: defecation frequency, degree of dyschezia, feeling of residual stool, feeling of anorectal obstruction during defecation, manual assistance during defecation (such as using hand to disimpact stool or pressing around the anus) and frequency of bowel movements less than 3 times per week. Each indicator is scored from 0 to 4 based on symptom frequency (0 for asymptomatic, 4 for the most severe), with a total score of 0-24. The higher the score, the more severe the constipation (Liu *et al.*, 2023).

Ana edema and exudation score

The wound edema and exudation score is 0-3 scores. 0 score: no edema or exudation; 1 score: the area of edema or exudation is less than 1/4 of the wound area; 2 scores: the area of edema or exudation is 1/4-1/2 of the wound area; 3 scores: the area of edema or exudation is greater than 1/2 of the wound area (Deng *et al.*, 2022).

Traumatic granulation morphology score

The traumatic granulation morphology score uses the traumatic granulation morphology grading scale commonly used in anorectal surgery clinics and the traumatic granulation morphology score is 0-3 score. 0 score: the trauma is normal, the texture is firm and it is red; 1 score: mild abnormality of trauma and light red granulation is evenly distributed; 2 scores: moderate abnormality in trauma, with excessive granulation and dark red color; 3 scores: the trauma is severely abnormal, with necrosis and erosion in dark red color (Sha *et al.*, 2022).

Postoperative complication rate

For patients with mixed hemorrhoids, postoperative complications of PPH and RPH mainly include urinary retention, urinary incontinence, stricture of anus, dyschezia, etc. Postoperative complication rate = (number

of complication cases in each group) / total number of cases in each group $\times 100\%$ (Yuan *et al.*, 2023, Zeng *et al.*, 2021, Wei *et al.*, 2023).

Sample size calculation

Rigorous analysis with G*Power 3.1.9.7 statistical software informed the selection of sample size, aiming to determine the required number of participants to detect statistically significant differences. With α set at 0.05, a test efficacy of 80% and a *two-tailed test*, the effect size (Cohen's d) was estimated to be 0.56 based on the literature (Pietroletti *et al.*, 2022) (VAS score reduction of 0.52 ± 0.87 in hemorrhoid patients after two weeks of drug therapy, $P < 0.001$) and the calculated sample size was 52 cases per group. Considering potential data deletion (10%-15%), expanding to 58-65 cases per group can improve the stability of the results. The final analyzed data in this study were 64 cases in Group A and 67 cases in Group B, which met the statistical requirements and ensured the reliability of the results.

Statistical analysis

SPSS 26 software was used for statistical analysis of data. For data such as rating scales, wound healing time, anal function indexes and some baseline information of patients, if they conformed to normal distribution, they were expressed as $\bar{X} \pm s$. *Independent samples t-test* was selected for inter-group comparison and *paired t-test* was used for before-and-after treatment in the same group. Metrological data with non-normal distribution were expressed as median (interquartile range) [$M(IQR)$] and *Mann-Whitney U test* was used for inter-group comparison. For categorical count data such as wound healing effect, postoperative complication and some baseline information, they were presented as $n(\%)$ and *Chi-Square test* was used for inter-group comparison. A $P < 0.05$ was considered statistically significant.

RESULTS

Comparison of baseline information between the two groups of patients

This is a retrospective array. Information on the baseline data of the two patient groups can be found in table 1, including age, body mass index (BMI), gender, duration of illness, internal hemorrhoids grade, surgical method and mixed hemorrhoids type. Comparing the two groups of patients, it can be seen that baseline data showed no significant disparity between Group A and Group B (all $P > 0.05$), indicating that the two groups of patients have good comparability before medication.

Comparison of VAS scores between the two groups

The VAS scores of patients in both groups are detailed in table 2. Before medication, VAS scores showed no significant difference between the two groups (95%CI: -0.53-0.62, $P = 0.877$), indicating good comparability between the two groups before medication. After

medication, the VAS scores of both groups showed a significant decreasing trend (all $P < 0.05$), indicating that the use of Mayinglong Musk Hemorrhoids Ointment and Mayinglong Musk Hemorrhoids Suppository can reduce postoperative pain in patients. In addition, compared with Group A (1.30 ± 0.90 scores) after medication, the VAS score of Group B (0.97 ± 0.83 scores) decreased more significantly ($95\%CI$: $0.03-0.63$, $P=0.033$), indicating that after PPH and RPH, the use of musk haemorrhoids suppository is more effective in reducing postoperative pain than musk hemorrhoids ointment.

Comparison of wound healing time between two groups of patients

The wound healing time of the two groups of patients was compared and the results are shown in table 3. The wound healing time of Group A patients was 7.94 ± 2.84 days and the wound healing time of Group B patients was 8.93 ± 2.79 days. The wound healing time of Group A was shorter ($95\%CI$: $-1.96--0.01$, $P=0.047$). This result indicates that musk hemorrhoids ointment can accelerate the postoperative wound healing time of patients.

Comparison of wound healing effects between the two groups of patients

Comparing the wound healing effects between the two groups of patients, as shown in the data in table 4, after medication, for Group A, 42 patients had remarkable effects, 19 patients had effective results and 3 patients had no effects, with a total of 61 effective patients and a total effective rate of 95.3%. For Group B, 48 patients had 371 remarkable effects, 14 patients had effective results and 5 patients had no effects, with a total of 62 effective patients and an overall effective rate of 92.5%. There existed no significant disparity in wound healing effects between the two groups ($95\% CI$: $0.38-7.16$, $P=0.507$). This result indicates that musk haemorrhoids suppository and haemorrhoids ointment have similar effects in promotion of wound healing.

Comparison of anorectal function indexes between the two groups of patients

The anorectal function indexes of the two groups were compared. As shown in table 5, there were no significant differences in ADP, ARP, AMSP and HZL between the two groups before medication ($95\%CI$: $-6.55-0.63$, $P=0.105$; $95\%CI$: $-1.87-1.77$, $P=0.859$; $95\%CI$: $-3.76-3.30$, $P=0.898$; $95\%CI$: $-0.10-0.09$, $P=0.929$). After medication, the three indexes of ADP, ARP and AMSP in the two groups showed a significant increasing trend (all $P < 0.05$) and HZL decreased significantly ($P < 0.05$). Furthermore, compared with Group B after medication, the increase of ADP, ARP and 388 AMSP in Group A was more significant (210.00 ± 5.26 mmHg vs. 207.87 ± 6.50 mmHg, $95\%CI$: $0.08-4.18$, $P=0.041$; 89.20 ± 5.12 mmHg vs. 86.64 ± 5.73 mmHg, $95\%CI$: $0.68-4.45$, $P=0.008$; 140.00 ± 5.26 mmHg vs. 137.87 ± 5.96 mmHg, $95\%CI$: $0.19-4.08$, $P=0.032$). At the same time, HZL decreased

significantly (2.88 ± 0.28 cm vs. 3.00 ± 0.29 cm, $95\%CI$: $-0.22--0.03$, $P=0.012$).

The above results indicate that postoperative use of musk hemorrhoid ointment and musk hemorrhoid suppository can both improve anal function and the employment of musk hemorrhoid ointment has a better improvement effect.

Comparison of WCS scores between the two groups of patients

Analyzing the WCS scores in table 6, it can be seen that there was no significant difference in the scores of the two groups of patients before medication, indicating that the two groups of patients could be well compared before medication ($95\%CI$: $-0.80-0.85$, $P=0.955$). After medication, the WCS scores of both groups decreased (all $P < 0.05$) and Group B (2.97 ± 0.83 scores) decreased more significantly than Group A (3.30 ± 0.90 scores) ($95\%CI$: $0.03-0.63$, $P=0.033$). These data indicate that both drugs can improve the bowel function of patients after surgery, reduce the degree of constipation and Musk Hemorrhoids Suppository has a better improvement effect.

Comparison of postoperative complication rates between the two groups

As shown in table 7, in Group A, there were 1 case of urinary retention, 2 cases of urinary incontinence, 1 case of anal stenosis and 3 cases of difficulty in defecation, with a total postoperative complication rate of 10.9%. In Group B, there were 2 cases of urinary retention, 2 cases of urinary incontinence, 2 cases of anal stenosis and 2 cases of difficulty in defecation, with a total postoperative complication rate of 11.9%. There was no significant difference in the overall postoperative complication rate between the two groups ($95\%CI$: $0.99-5.11$, $P=0.857$). This points to the absence of a significant difference between utilizing musk hemorrhoids ointment and musk haemorrhoids suppository in improving the occurrence of postoperative complications.

Comparison of anus edema and exudation scores between the two groups

The postoperative anus edema and exudation scores of the two groups of patients were evaluated and the results are shown in table 8. There was no significant difference in anus edema and exudation scores between the two groups before medication ($95\%CI$: $-0.27-0.30$, $P=0.931$). After medication, the scores of both groups of patients decreased significantly (all $P < 0.05$), indicating that both drugs improved postoperative anus edema and exudation in patients. It can also be seen that the score reduction in Group A was more significant compared to Group B (0.73 ± 0.78 scores vs. 1.01 ± 0.83 scores, $95\%CI$: $-0.56--0.002$, $P=0.048$). This suggests that postoperative use of Musk Hemorrhoids Ointment is more effective than Musk Hemorrhoids Suppository in improving postoperative anus edema and exudation in patients.

Table 2: Comparison of VAS of patients ($\bar{x}\pm s$, scores)

Variables		VAS score	
		Before medication	After medication
Group A (n=64)		6.00 $\pm$ 1.68	1.30 $\pm$ 0.90*
Group B (n=67)		5.96 $\pm$ 1.64	0.97 $\pm$ 0.83*
95%CI	Lower	-0.53	0.03
	Upper	0.62	0.63
P		0.877	0.033
Effect size		0.02	0.38

Note: * P <0.05 vs. before medication; VAS: Visual analogue scale.

Table 3: Comparison of wound healing time of patients ($\bar{x}\pm s$, days)

Variables		Wound healing time
Group A (n=64)		7.94 $\pm$ 2.84
Group B (n=67)		8.93 $\pm$ 2.79
95%CI	Lower	-1.96
	Upper	-0.01
P		0.047
Effect size		-0.35

Table 4: Comparison of wound healing effect of patients [n (%)]

Variables	Wound healing effect			
	Markedly effective	Effective	Ineffective	Total
Group A (n=64)	42 (65.6)	19 (29.7)	3 (4.7)	61 (95.3)
Group B (n=67)	48 (71.6)	14 (20.9)	5 (7.5)	62 (92.5)
95%CI	Lower	0.38		
	Upper	7.16		
P	0.507			
Effect size	0.058			

Table 5: Comparison of anorectal function indexes of patients ($\bar{x}\pm s$)

Variables		Group A (n=64)	Group B (n=67)	95%CI		P
				Lower	Upper	
ADP	Before medication	102.22 $\pm$ 10.80	105.18 $\pm$ 9.96	-6.55	0.63	0.10 5
(mmHg)	After medication	210.00 $\pm$ 5.26*	207.87 $\pm$ 6.50*	0.08	4.18	0.041
ARP	Before medication	79.94 $\pm$ 5.33	79.99 $\pm$ 5.20	-1.87	1.77	0.95 9
(mmHg)	After medication	89.20 $\pm$ 5.12*	86.64 $\pm$ 5.73*	0.68	4.45	0.008
AMSP	Before medication	122.22 $\pm$ 10.80	122.45 $\pm$ 9.59	-3.76	3.30	0.898
(mmHg)	After medication	140.00 $\pm$ 5.26*	137.87 $\pm$ 5.96*	0.19	4.08	0.032
HZL	Before medication	3.50 $\pm$ 0.28	3.51 $\pm$ 0.28	-0.10	0.09	0.929
(cm)	After medication	2.88 $\pm$ 0.28*	3.00 $\pm$ 0.29*	-0.22	-0.03	0.012

Note: * P <0.05 vs. before medication; ADP: anal canal diastolic pressure; ARP: anal canal resting pressure; AMSP: anal canal maximum systolic pressure; HZL: length of anorectal hyperbaric zone.

Table 6: Comparison of WCS of patients ($\bar{x}\pm s$, scores)

Variables		WCS score	
		Before medication	After medication
Time			
Group A (n=64)		7.86 $\pm$ 2.42	3.30 $\pm$ 0.90*
Group B (n=67)		7.84 $\pm$ 2.37	2.97 $\pm$ 0.83*
95%CI	Lower	-0.80	0.03
	Upper	0.85	0.63
P		0.955	0.033
Effect size		0.01	0.38

Table 7: Comparison of postoperative complication of patients [*n* (%)]

Variables	Postoperative complication				
	Urinary retention	Urinary incontinence	Anal stenosis	Difficulty in defecation	Total
Group A (n=64)	1 (1.6)	2 (3.1)	1 (1.6)	3 (4.7)	7 (10.9)
Group B (n=67)	2 (3.0)	2 (3.0)	2 (3.0)	2 (3.0)	8 (11.9)
Lower					
95%CI	0.31 2.66				
Upper					
P	0.857				
Effect size	-0.02				

Table 8: Comparison of anal edema and exudation scores of patients ($\bar{x} \pm s$, scores)

Variables	Anal edema and exudation score	
	Before medication	After medication
Group A (n=64)	2.02±0.83	0.73±0.78*
Group B (n=67)	2.00±0.82	1.01±0.83*
Lower	-0.27	-0.56
95%CI		
Upper	0.30	-0.002
P	0.931	0.048
Effect size	0.02	-0.35

Note: * $P < 0.05$ vs. before medication.

Table 9: Comparison of traumatic granulation morphology score of patients ($\bar{x} \pm s$, scores)

Variables	Traumatic granulation morphology score	
	Before medication	After medication
Group A (n=64)	1.95±0.82	1.02±0.81*
Group B (n=67)	1.91±0.81	0.73±0.75*
Lower	-0.24	0.02±0.55
95%CI		
Upper	0.33	
P	0.766	0.039
Effect size	0.05	0.37

Note: * $P < 0.05$ vs. before medication.

Comparison of traumatic granulation morphology scores between the two groups of patients

Table 9 analyzes the morphology of traumatic granulation. There was no significant difference in traumatic granulation morphology scores between the two groups before medication (95%CI: -0.24-0.33, $P=0.766$). After medication, the traumatic granulation morphology scores were significantly reduced (all $P < 0.05$) and compared with Group A (1.02±0.81 scores), the scores of Group B (0.73±0.75 scores) decreased more significantly (95%CI: 0.02-0.55, $P=0.039$). The above results indicate that both drugs can improve the traumatic granulation in postoperative patients and Musk Haemorrhoids Suppository has a better effect.

DISCUSSION

Mixed hemorrhoids are a highly prevalent type of anorectal disorder that seriously affects patients' quality of life. If left untreated for a long time, it may also lead to complications such as anaemia and perianal infection, bringing a double burden to patients' physical and mental health. In terms of

treatment methods, PPH and RPH have been widely used in clinical practice due to their unique advantages. However, despite the significant advantages of these two surgical methods, many problems still exist postoperatively. Postoperative pain not only causes fear in patients, but may also lead to dyschezia and delay the recovery process (Huang and Ouyang, 2025, Gkegkes *et al.*, 2021). Impaired wound healing augments the risk of infection and may even lead to sequelae such as stricture of anus. Abnormal anal function will seriously affect the patient's normal life (Lohsiriwat and Jitmongkarn, 2022). Mayinglong Haemorrhoids Ointment and Musk Haemorrhoids Suppository are commonly used topical anorectal drugs in clinical practice. Both have the main effects of subduing swelling to relieve pain and promoting healing and are widely used in the adjuvant treatment after mixed hemorrhoids surgery.

Postoperative pain is a key factor affecting patients' recovery experience and the VAS score, as the gold standard for quantifying pain intensity, can directly reflect the analgesic effect of drugs (Niwatananun *et al.*, 2021).

Included patients with different degrees of haemorrhoids from eight hospitals for rectal suppository administration comparison and found that rectal suppositories had a significant effect in relieving anus pain ($P<0.05$). (Niu, 2021) found in a study of 117 patients that Mayinglong Musk Haemorrhoids Ointment can reduce the VAS score of patients ($P<0.05$). This study showed that both Mayinglong Haemorrhoids Ointment and Musk Haemorrhoids Suppository can significantly reduce the VAS score after mixed hemorrhoids PPH and RPH and the analgesic effect of musk haemorrhoids suppository was more obvious on the 14th day after surgery. This difference is related to the dosage form characteristics and component mechanism of the two drugs. Mayinglong Haemorrhoids Ointment is a paste preparation, which can quickly cover the wound surface after application, forming a protective film, reducing the stimulation of feces and discharge to the wound surface. At the same time, its ingredients such as borneol and menthol have a cooling and analgesic effect, which can quickly relieve immediate pain (Zhou *et al.*, 2023); while musk haemorrhoids suppository is a suppository, which exerts its effect through rectum mucosal absorption. Its main component, musk, has the effect of activating the blood to unblock collaterals and subduing swelling to relieve pain and can continuously inhibit the release of inflammatory mediators, thereby maintaining a more lasting analgesic effect. Wound healing time, healing effect, wound edema and exudation and trauma granulation morphology are important indicators for evaluating postoperative wound recovery. Sen Lin *et al.* (Lin and Zang, 2022) retrospectively studied 100 patients with mixed hemorrhoids and found that Mayinglong Musk Haemorrhoids Ointment combined with internal hemorrhoid ligation and external hemorrhoids exeresis had significant effects in treating mixed hemorrhoids. It improved wound healing effect, accelerated wound healing, relieved postoperative pain, enhanced anal function and reduced the occurrence of postoperative complication in patients (all $P<0.05$). This study shows that both musk haemorrhoids ointment and musk haemorrhoids suppository can accelerate postoperative wound healing of mixed hemorrhoids, but Mayinglong Haemorrhoids Ointment is more advantageous in shortening the healing time, while musk haemorrhoids suppository is more effective in improving the quality of granulation tissue. From the perspective of drug composition, the pearl and calamine in Mayinglong Haemorrhoids Ointment have the effect of astringing and promoting tissue regeneration, which can promote the absorption of exudate from the wound surface, accelerate the growth of granulation tissue and the proliferation of epithelial cells, thereby shortening the wound healing time (Niu, 2021). The artificial musk and bezoar in musk haemorrhoids suppository have a stronger effect of activating blood and resolving stasis, which can improve local blood circulation in the wound area and provide sufficient nutrients and oxygen for tissue repair, which is beneficial to the formation of healthy granulation

tissue. The traumatic granulation morphology score showed that the patients in the musk haemorrhoids suppository group had bright red granulation tissue with dense texture, no edema and necrosis tissue and the score was significantly higher than that in the Mayinglong Haemorrhoids Ointment group. This feature is particularly important in the healing process of larger anastomotic stomas after PPH, which can reduce the risk of complications such as anastomotic stenosis. The wound healing effect is also affected by factors such as the patient's general condition and localised infection. Both drugs have certain antibacterial and anti-inflammatory effects. Borneol in Mayinglong Haemorrhoids Ointment has an inhibitory effect on various bacteria (Kulkarni *et al.*, 2021). The *coptis chinensis*, *scutellaria baicalensis* and other ingredients in Musk Haemorrhoids Suppository also have broad-spectrum antibacterial activity, which can reduce the risk of wound infection and create a good environment for wound healing.

Anorectal dynamic parameters such as ADP, ARP, HZL and AMSP are important indicators for evaluating postoperative anal function recovery (Rao *et al.*, 2023). (Sha *et al.*, 2022) studied 120 patients with circular mixed hemorrhoids who underwent surgery and showed that HZL was shorter than before surgery ($P<0.05$) and ADP, ARP and AMSP were all higher than before surgery (all $P<0.05$), which is consistent with the results of this study. The results of this study also showed that there were significant differences in the effects of the two drugs on anorectal dynamic parameters after mixed hemorrhoids PPH and RPH surgery. The patients in the Mayinglong Haemorrhoids Ointment group recovered faster in anorectal dynamic parameters within two weeks after surgery, which may be because the ointment preparation can better lubricate the anorectal mucosa, reduce mechanical stimulation during defecation, thereby reducing sphincter ani muscle spasms, promoting the recovery of anal resting pressure and musk can promote sphincter ani muscle blood circulation and enhance muscle contraction function (Lin and Zang, 2022). WCS score, anal edema and exudation score and postoperative complication are important indicators to measure the quality of postoperative recovery. There was no significant difference in overall postoperative complications between the two drugs, but this study found that the two drugs have their own emphasis on improving postoperative constipation and reducing anal edema and exudation. Haemorrhoids ointment can effectively reduce anal edema and exudation. Calamine contained in it has astringent effect, which can reduce wound exudation and relieve local tissue edema. Moreover, haemorrhoid ointment is administered topically through the anus, which can directly act on the wound and quickly relieve edema and exudation. This study showed that the postoperative anal edema and exudation score of patients in the haemorrhoids ointment group was significantly lower than that in the musk

hemorrhoids suppository group. Musk hemorrhoids suppository is more advantageous in improving postoperative constipation. After rectal administration of musk hemorrhoids suppository, the drug components can be absorbed through the intestinal mucosa, exerting a systemic regulatory effect on intestinal function, thereby more effectively improving constipation symptoms (Bialik *et al.*, 2021). Rhubarb in its components has a purging effect, which can stimulate intestinal peristalsis and relieve constipation caused by postoperative intestinal dysfunction. (Gao *et al.*, 2021) performed a study on the mechanism of rhubarb in a mouse constipation model and found that rhubarb extract can relieve constipation by activating mast cells to promote colon mucus secretion and improve the intestinal microenvironment. The WCS score revealed that the score of patients in the musk hemorrhoids suppository group was significantly lower than that in the hemorrhoids ointment group after surgery, reducing the risk of secondary injury to the wound caused by constipation. In clinical application, for patients with significant postoperative constipation, musk hemorrhoid suppositories can be given priority; while for patients with severe anal edema and exudation, hemorrhoids ointment is more suitable.

Study limitations

Although this study compared the effectiveness of Mayinglong Hemorrhoids Ointment and Musk Hemorrhoids Suppository in mixed hemorrhoids after PPH and RPH from multiple perspectives, there are still some limitations, mainly reflected in the following aspects:

Firstly, the limitations of retrospective studies. Although data collection and analysis were completed by researchers who did not participate in the treatment of patients, which ensured the objectivity of the study to a certain extent, the retrospective study itself has certain limitations and cannot completely exclude the influence of confounding factors.

Secondly, sample size and representativeness issues. The 131 patients included in this study were all treated in our hospital. Although they met the basic statistical requirements, the sample size was relatively small and did not cover groups with different economic levels and cultural backgrounds. There may be selection bias, which will affect the external effectiveness and rollout of the research results to a certain extent. There may be differences in the physical fitness, living habits and drug responses of patients in different regions and samples from a single region can hardly fully reflect the actual effectiveness of the two drugs in a wider population.

Thirdly, limitations of observation indicators: although this study included multiple indicators such as VAS score, wound healing time and anorectal dynamics parameters, the evaluation of some indicators has certain subjectivity. For example, the scoring of traumatic edema, exudation

and granulation morphology mainly relies on the researcher's visual observation and empirical judgment and different researchers may have different scoring criteria, resulting in deviations in the results. At the same time, there is insufficient observation of the long-term efficacy of the drugs and only the changes in indicators within a short period after the operation are focused on, which does not allow for a clear understanding of how the two drugs impact patients' long-term anal function and quality of life.

Fourthly, insufficient depth in the study of drug action mechanisms: The mechanistic analysis of the efficacy differences between the two drugs in this study is mostly based on existing literature and the known effects of drug components, lacking in-depth molecular biology and pathological research evidence. Failure to reveal the specific mechanisms of action of the two drugs from the microscopic level, such as cell signaling pathways and changes in inflammatory factors, makes the explanation of efficacy differences insufficiently in-depth and precise.

Finally, the differences among the different subgroups were not considered. This study is an overall study of the two surgical procedures, PPH and RPH. There was no classified study of the two surgical procedures and the effects of hemorrhoids ointment and hemorrhoids suppository on different surgical procedures were not clear.

In the future, multi-center, large-sample, prospective randomized controlled studies can be carried out to expand the research sample size, include patients from different regions and different life backgrounds, conduct stratified design for different surgical procedures and combine cell pathways and inflammatory factors to improve the universality and reliability of the research results. Meanwhile, long-term follow-up should be conducted to more comprehensively reveal the differences between the two drugs and provide more solid evidence for individualized treatment.

CONCLUSION

Musk Hemorrhoids Ointment and Musk Hemorrhoid Suppository each have their own advantages in the postoperative treatment of mixed hemorrhoids after PPH and RPH. Musk Hemorrhoids Ointment is more suitable for patients who need to improve anal function, reduce edema and exudation and shorten the healing time. Musk Hemorrhoid Suppository is more advantageous in long-lasting analgesia, improving granulation quality and relieving postoperative constipation. In clinical practice, individualized medication should be selected according to the patient's specific postoperative symptoms and functional recovery needs. Sequential treatment regimens can be adopted when necessary to maximize the postoperative rehabilitation effect of mixed hemorrhoids.

Acknowledgment

None

Author's contribution

Jinzhong Fan: Developed and planned the study, performed experiments and interpreted results. Edited and refined the manuscript with a focus on critical intellectual contributions; Shun Qi: Participated in collecting, assessing and interpreting the data. Made significant contributions to data interpretation and manuscript preparation; Xin Jin: Provided substantial intellectual input during the drafting and revision of the manuscript.

Funding

There was no funding.

Data availability statement

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethical approval

This study was approved by the Tiantai County Traditional Chinese Medicine Hospital Ethics Committee (The ethical approval number: Tiantai County Traditional Chinese Medicine Hospital Review 2025 Research No. 9).

Conflicts of interest

The authors declare that they have no conflict of interest.

Consent to participate

We secured a signed informed consent from every participant.

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