

# Evaluation of the Effectiveness of Chinese Herbal Steam Baths in Treating Postoperative Incision Pain from Hemorrhoid Surgery

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**Abstract:** *Objective:* To investigate the efficacy of Chinese herbal fumigation and washing therapy on postoperative incisional pain following hemorrhoid surgery. *Methods:* Fifty-two patients undergoing hemorrhoid surgery at our hospital between February 2020 and February 2025 were enrolled. Using a random number table, all patients were divided into two equal groups: the conventional group (receiving standard care) and the fumigation group (receiving Chinese herbal fumigation). Clinical efficacy was assessed by comparing various indicators between the two groups. *Results:* The fumigation and washing group demonstrated a higher treatment efficacy rate than the conventional group ( $p < 0.05$ ). Pre-treatment pain scores showed no significant difference between groups ( $p > 0.05$ ). At 3, 5, and 7 days post-treatment, pain scores in the fumigation and washing group were lower than those in the conventional group (all  $p < 0.05$ ). Before treatment, there was no significant difference in vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) levels between the two groups ( $p > 0.05$ ). After treatment, VEGF and PDGF levels in the fumigation and washing group were higher than those in the conventional group ( $p < 0.05$  for both). *Conclusion:* Chinese herbal fumigation therapy demonstrates significant efficacy, effectively alleviating postoperative incision pain and improving patients' growth factor indicators. It warrants further promotion as a primary treatment modality.

**Keywords:** Chinese herbal fumigation and washing; Post-hemorrhoid surgery; Incision pain; Treatment efficacy rate; Pain score; Growth factor

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## 1. Introduction

Hemorrhoids are a common clinical anorectal condition with no specific target population, though they tend to occur more frequently among individuals who sit for prolonged periods. Patients may experience a thinning of the anal venous walls due to hemorrhoids, increasing the risk of rupture during bowel movements and causing severe pain. Currently, clinical treatment involves surgical removal of hemorrhoids combined with medication to restore patients' quality of life [1]. However, since the surgical incision cannot heal within a short period post-surgery, patients suffer significantly from

incision pain, which continues to diminish their quality of life. Therefore, scientific intervention measures are necessary to alleviate this pain. With the deepening of clinical research into traditional Chinese medicine (TCM), herbal fumigation and washing, a common external treatment method in TCM has garnered increased clinical attention. It warrants further validation of its efficacy for patients experiencing incision pain following hemorrhoid surgery<sup>[2]</sup>. This study will examine the efficacy of Chinese herbal fumigation therapy in alleviating postoperative incision pain following hemorrhoid surgery. The sample comprises 52 patients who underwent hemorrhoid surgery at our hospital between February 2020 and February 2025. The findings are reported below.

## 2. Materials and methods

### 2.1. General information

Fifty-two patients who underwent hemorrhoid surgery at our hospital between February 2020 and February 2025 were selected. Using a random number table, all patients were divided into two equal groups: the conventional group and the sitz bath group. The conventional group comprised 26 patients, including 18 males and 8 females, aged 29–63 years with a mean age of  $42.16 \pm 5.22$  years. The disease duration ranged from 2 to 6 years, with a mean duration of  $4.16 \pm 0.68$  years. The fumigation and washing group comprised 26 patients, including 16 males and 10 females, aged 25–65 years with a mean age of  $42.32 \pm 5.74$  years. The disease duration ranged from 2 to 5 years, with a mean duration of  $4.05 \pm 0.36$  years. No significant differences were observed between groups ( $p > 0.05$ ).

#### 2.1.1. Inclusion criteria

- (1) Meet indications for hemorrhoid surgery<sup>[3]</sup>
- (2) Complete and accessible clinical records
- (3) Age between 18 and 80 years;
- (4) Signed informed consent and voluntary participation in the study.

#### 2.1.2. Exclusion criteria

- (1) Coexisting coagulation disorders
- (2) Psychiatric disorders
- (3) Coexisting immune disorders
- (4) Significant functional abnormalities in major organs (heart, liver, kidneys, etc.)
- (5) Inability to comply with medical instructions and cooperate with the study.

### 2.2. Method

The conventional group received standard intervention with the medication Mayinglong Hemorrhoid Ointment (Manufacturer: Mayinglong Pharmaceutical Group Co., Ltd., National Drug Approval Number Z42021920, Specification: 10 g). For patients experiencing severe pain, it may be combined with diclofenac sodium suppositories (Manufacturer: Hubei Dongxin Pharmaceutical Co., Ltd., National Drug Approval Number H10920060, Specification: 50 mg). The fumigation group underwent traditional Chinese medicine fumigation using a modified Sanhuang Decoction. All herbs were boiled vigorously and then simmered gently. After straining, 1.5 L of decoction was collected and placed in a sitz bath basin. Patients performed anal fumigation for 10 minutes per session. The decoction temperature was maintained at 40 °C to prevent vasodilation and exacerbation of hemorrhoidal symptoms. Both groups received continuous treatment for 28 days.

### 2.3. Observation indicators

- (1) Treatment efficacy rate

If a patient's symptoms have essentially disappeared and no infection is present, this is classified as marked

improvement; if symptoms show improvement and no infection is present, this is classified as improvement; if symptoms have not alleviated or have worsened and infection is present, this is classified as no improvement<sup>[4]</sup>. Patients classified as marked improvement and improvement are both included in the treatment efficacy rate statistics.

(2) Pain intensity assessment

The Visual Analogue Scale (VAS) was used as the evaluation tool, with a maximum score of 10 points. Higher scores indicate more severe pain in patients<sup>[5]</sup>.

(3) Growth factor indicators

5 mL of fasting venous blood was collected from patients. After centrifugation, vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) levels were measured using enzyme-linked immunosorbent assay (ELISA).

## 2.4. Statistical analysis

Data processing was performed using SPSS 24.0 statistical software. Count data were analyzed using the chi-square test, while continuous data were evaluated with the *t*-test. Differences were considered statistically significant at  $p < 0.05$ .

## 3. Results

### 3.1. Treatment efficacy rate

The fumigation and washing group demonstrated a higher treatment efficacy rate than the conventional group ( $p < 0.05$ ). See the **Table 1** below.

**Table 1.** Treatment efficacy rate [n (%)]

Grouping	Example count	Become effective	Effective	Invalid	Overall efficiency
Standard group	26	11 (42.31)	8 (30.77)	7 (26.92)	19 (73.08)
Steam and wash team	26	15 (57.69)	10 (38.46)	1 (3.85)	25 (96.15)
$\chi^2$	-	-	-	-	5.318
<i>p</i>	-	-	-	-	0.021

### 3.2. Pain rating scale

Before treatment, there was no significant difference in pain scores between the two groups ( $p > 0.05$ ). At 3 days, 5 days, and 7 days post-treatment, the pain scores in the fumigation and washing group were lower than those in the conventional group ( $p < 0.05$  for all comparisons). See the **Table 2** below.

**Table 2.** Pain intensity scores ( $\bar{x} \pm s$ , points)

Grouping	Example count	Before treatment	3 days after treatment	5 days after treatment	7 days after treatment
Standard group	26	6.53 $\pm$ 1.02	5.32 $\pm$ 0.85	4.26 $\pm$ 0.78	3.65 $\pm$ 0.48
Steam and wash team	26	6.46 $\pm$ 0.89	4.36 $\pm$ 0.97	3.16 $\pm$ 0.54	2.35 $\pm$ 0.42
<i>t</i>	-	0.264	3.795	5.912	10.393
<i>p</i>	-	0.793	0.000	0.000	0.000

### 3.3. Growth factor indicators

Before treatment, there was no significant difference in vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) levels between the two groups ( $p > 0.05$ ). After treatment, VEGF and PDGF levels in the fumigation group were higher than those in the conventional group ( $p < 0.05$  for both). See the **Table 3** below.

**Table 3.** Growth factor indicators ( $\bar{x} \pm s$ , ng/L)

Grouping	Example count	Vascular endothelial growth factor		Platelet-derived growth factor	
		Before treatment	After treatment	Before treatment	After treatment
Standard group	26	84.59 ± 10.35	97.59 ± 9.26	41.06 ± 7.59	47.49 ± 6.69
Steam and wash team	26	85.98 ± 11.14	113.05 ± 14.74	42.31 ± 6.68	56.62 ± 8.28
<i>t</i>	-	0.466	4.529	0.630	4.373
<i>p</i>	-	0.643	0.000	0.531	0.000

## 4. Discussion

Surgery is the primary clinical treatment for hemorrhoids, but patients may experience intense pain at the incision site postoperatively. This is because the anorectal region contains a high density of nerve endings that sensitively transmit pain signals, making even relatively minor stimuli likely to cause significant discomfort [6]. Simultaneously, surgical incisions directly damage the skin, mucosa, and subcutaneous tissue near the anus, enhancing the activity of inflammatory cells. This leads to the release of large amounts of inflammatory mediators, increasing pain sensitivity at nerve endings. Some patients may also experience reflex spasm due to anal sphincter pain. Spasm increases the risk of metabolic waste accumulation and tissue hypoxia, further exacerbating pain [7]. Therefore, alleviating postoperative incision pain in patients after hemorrhoid surgery is crucial. Not only does it help ensure patients' quality of life, but it also accelerates the wound healing process, reduces the likelihood of complications, and shortens the treatment cycle.

As clinical research into traditional Chinese medicine deepens, external therapies in traditional Chinese medicine are gradually gaining prominence in clinical practice. Herbal steam therapy, a classic external treatment in traditional Chinese medicine, delivers therapeutic effects through warm steam inhalation and herbal soaking. Its advantages are as follows:

(1) Direct action to relieve pain

The high-temperature steam generated promotes vasodilation around the anus, improving local blood circulation. This helps alleviate tissue edema and hypoxia, preventing nerve compression. Simultaneously, the medicinal components act on incision sites and peripheral nerve endings, inhibiting pain signal transmission. Pain relief is typically noticeable within 15 minutes after treatment [8].

(2) Anti-inflammatory repair

Unlike simple pain relief, Chinese herbal fumigation and washing utilizes medicinal herbs with properties to promote blood circulation and tissue regeneration, reduce swelling and alleviate pain, clear heat, and eliminate dampness. These herbs can mitigate local inflammatory responses through their anti-inflammatory components while increasing the release of blood-activating substances. This accelerates blood circulation at the wound site, ensuring adequate nutrient supply to granulation tissue and preventing recurrent pain.

(3) Safe administration

As an external treatment, herbal fumigation allows direct absorption through the skin without passing through the digestive tract. This minimizes impact on the liver and kidneys, making it generally gentle. Water temperature can be adjusted based on patient tolerance, making it suitable for most individuals.

The results of this study indicate that the fumigation and washing group demonstrated a higher treatment efficacy rate than the conventional group ( $p < 0.05$ ), confirming the significant therapeutic effects of traditional Chinese medicine fumigation and washing therapy and its considerable potential for clinical application. Before treatment, there was no significant difference in pain scores between the two groups ( $p > 0.05$ ). At 3 days, 5 days, and 7 days post-treatment, the pain scores in the herbal fumigation and washing group were lower than those in the conventional group (all  $p < 0.05$ ). This demonstrates that herbal fumigation and washing aids in alleviating patients' pain, is suitable for postoperative wound care in hemorrhoid surgery patients, and can improve patients' quality of life. The reason lies in the fact that herbal fumigation and washing can regulate the body's nerves and circulation through its warming effect. The herbal solution at 38–42 °C activates temperature receptors in the perianal skin. Through the gate control theory, it inhibits the physiological process of pain signals being transmitted to the central nervous system. The warmth also promotes dilation of capillaries and local arterioles, increasing blood flow velocity. This significantly reduces inflammatory factors and metabolic waste products, diminishing the chemical stimuli received by nerve endings and thereby achieving pain relief<sup>[9]</sup>. Additionally, the herbal components in fumigation and washing formulas contribute to pain relief. Berberine in *Phellodendron* bark inhibits sodium ion influx into nerve endings, preventing the generation of pain signals. *Coptis* rhizome contains berberine and other compounds that strongly suppress the NF-κB signaling pathway, reducing the secretion of inflammatory mediators and thereby alleviating symptoms such as redness, swelling, and pain at the incision site. *Scutellaria baicalensis*, containing baicalin and other compounds, provides sustained analgesic effects while exhibiting antiviral and antibacterial properties that accelerate wound healing. Its ability to clear heat and dry dampness further shortens the patient's recovery time. The combination of *Coptis* and *Scutellaria* exhibits antibacterial, analgesic, and anti-inflammatory effects, promoting wound healing through a multi-target therapeutic mechanism. Before treatment, there was no significant difference in vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF) levels between the two groups ( $p > 0.05$ ). After treatment, VEGF and PDGF levels in the herbal fumigation group were higher than those in the conventional group ( $p < 0.05$  for both), demonstrating that herbal fumigation therapy contributes to the improvement of VEGF and PDGF levels. This effect stems from the herbal fumigation therapy's dual enhancement of both the synthesis and activity of VEGF and PDGF. This occurs through improving the local microenvironment and directly regulating factor expression. Herbal fumigation and washing can improve blood supply and oxygenation, providing a foundation for factor expression. Postoperative pain at the hemorrhoid incision site, along with vasoconstriction and sphincter spasm, may cause local circulatory impairment, depriving the wound of nutrients. This inhibits the synthesis of vascular endothelial growth factor (VEGF) and platelet-derived growth factor (PDGF). Chinese herbal fumigation and washing dilates blood vessels, safeguards wound blood flow, prevents excessive blood viscosity, and optimizes microcirculation. This provides sufficient raw materials and oxygen for vascular endothelial growth factor and platelet-derived growth factor synthesis at the wound site. Modern medicine suggests that active components in traditional Chinese medicine can also exert direct regulatory effects on the gene expression of vascular endothelial growth factor and platelet-derived growth factor. Hypoxia-inducible factor-1 $\alpha$  is one of the transcription factors for vascular endothelial growth factor. Components in Sanhuang Decoction, such as baicalin and berberine, can inhibit hypoxia-inducible factor-1 $\alpha$ , thereby blocking the induced expression of vascular endothelial growth factor<sup>[10]</sup>. Additionally, the active components of Sanhuang Decoction inhibit the phosphorylation of vascular endothelial growth factor-related receptors, thereby blocking their signaling pathways. This suppresses endothelial cell migration or proliferation and regulates vascular permeability. Sanhuang Decoction exhibits potent antioxidant properties, eliminating reactive oxygen species to regulate vascular endothelial growth factor. Platelet-derived growth factor, produced by endothelial cells and platelets, promotes cell proliferation. Upon binding to its receptor on the cell membrane surface, it triggers an autophosphorylation reaction, thereby activating downstream signaling pathways. Sanhuang Decoction can block the aforementioned phosphorylation process, inhibiting the migration or proliferation of vascular smooth muscle cells, thereby regulating this growth factor. Furthermore, the application method of herbal steam baths is relatively simple with a short learning curve, allowing patients to effectively master the treatment technique. This results in high compliance, rapid relief of clinical symptoms, and a shortened disease course, making it a

highly feasible and scientifically sound therapeutic approach.

In summary, traditional Chinese medicine fumigation therapy demonstrates significant therapeutic efficacy, effectively alleviating postoperative incision pain and improving patients' growth factor indicators. It warrants further promotion as a primary treatment modality.

## Disclosure statement

The author declares no conflict of interest.

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