Effect of Huayu Qufu Shengji Decoction on Postoperative Pain and Wound Healing Time in Patients with Perianal Abscess

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This study aimed to investigate the impact of postoperative pain and wound healing time in patients who underwent perianal abscess surgery. A total of 106 patients who underwent perianal abscess surgery from July 2019 to May 2021 were enrolled as study subjects and randomly divided into a control group and a treatment group with 53 patients in each group. The control group received potassium permanganate sitz bath after surgery, while the treatment group received smoked Huayu Qufu Shengji decoction after surgery. The levels of postoperative pain (measured by visual analog scale score), wound healing, inflammatory factors and treatment response rate were compared between the two groups. Before treatment, the visual analog scale scores were similar in both groups ($p>0.05$). However, after treatment, the visual analog scale scores in both groups decreased significantly and the visual analog scale score in the treatment group was lower than that in the control group ($p<0.05$). Moreover, the treatment group had a shorter wound shedding time, a quicker emergence of new epithelium and a smaller wound healing time compared to the control group ($p<0.05$). Before treatment, the levels of inflammatory factors such as tumor necrosis factor alpha, interleukin-6 and interleukin-1 beta were similar in both groups ($p>0.05$). However, after treatment, the level of each inflammatory factor was lower in the treatment group than in the control group ($p<0.05$). The treatment group showed a significantly higher treatment response rate than the control group ($p<0.05$). The application of smoked Huayu Qufu Shengji decoction and sitz bath in patients who underwent perianal abscess surgery can relieve pain, promote faster wound healing and improve the inflammation state, resulting in a significant overall effect. Therefore, this treatment can be preferred as a first-line therapy.

Key words: Perianal abscess, Huayu Qufu Shengji decoction, sitz bath, inflammatory factors

Perianal abscess is an acute suppurative infection that occurs in the tissues adjacent to the rectum and anal canal, with its incidence increasing due to changes in people's lifestyle and dietary habits. The typical symptoms include perianal swelling and pain, which can lead to various other diseases, such as tuberculosis, Human Immunodeficiency Virus (HIV)/ Acquired Immunodeficiency Syndrome (AIDS), Crohn's disease and malignant tumors, posing a significant threat to the patient's health and life[1]. Conservative treatment is usually ineffective and surgical treatment is mainly used, which involves incision and adequate drainage of the lesion. However, due to the large wound and special location of the lesion, postoperative wound healing takes a long time and can be complicated by swelling and pain[2]. Western medicine does not offer any specific treatment for this disease, so traditional Chinese medicine is often considered as an alternative. Patients with perianal abscess who undergo surgery are vulnerable to damp-heat, qi stagnation, blood stasis and meridian and collateral damage, which can delay wound healing. Traditional Chinese medicine suggests that without eliminating blood stasis, new tissues cannot be generated. Therefore, treatment should focus on promoting blood circulation, resolving blood stasis, clearing heat and promoting tissue regeneration. Huayu Qufu Shengji decoction has the effect of clearing heat, detoxifying, reducing swelling and treating ulcers. Fumigation and sitz bath, which are precise treatment methods for the

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affected area, can promote wound healing[3]. To demonstrate the superiority of Huayu Qufu Shengji decoction's fumigation and sitz bath, the following study was conducted. A total of 106 patients with perianal abscess who underwent surgery between July 2019 and May 2021 were included in this study and randomly divided into a control group (n=53) and a treatment group (n=53) using a random number table method. The control group included 31 males and 22 females, with a mean age of 44.90±5.32 y, a mean duration of illness of 18.86±4.90 mo and a mean wound area of 11.89±3.27 cm^2. The treatment group included 33 males and 20 females, with a mean age of 44.34±5.17 y, a mean duration of illness of 18.21±4.40 mo and a mean wound area of 12.05±3.33 cm^2. There was no statistically significant difference in the general information between the two groups ($p>0.05$). Diagnostic criteria included in the study were explained here. The Chinese medicine diagnosis of perianal abscess was based on the diagnostic criteria in the "Guidelines for the Diagnosis and Treatment of Common Diseases in Traditional Chinese Medicine Coloproctology"[4] and the Western medicine diagnosis of perianal abscess was based on the diagnostic criteria in the "Clinical Diagnosis and Treatment Guidelines for perianal abscess, anal fistula and rectovaginal fistula"[5]. Inclusion criteria included in the study-No history of allergy to the relevant drugs in this study; normal communication ability; complete personal information and clinical data; patients and their families provided informed consent for this study. Exclusion criteria included in the study-History of perianal trauma or surgery; contraindications for surgery; complicated with other serious systemic diseases; complicated with significant dysfunction of important organs; complicated with malignant tumors and poor compliance. Methods used in the study were explained here. The control group received postoperative potassium permanganate sitz baths. A solution of 2000 ml of warm water and potassium permanganate with a ratio of 5000:1 was prepared, and the patients underwent fumigation sitz baths after defecation for 10 to 15 min, followed by a regular sitz bath for 10 to 15 min. The frequency of medication was once daily and the treatment lasted for 2 w. The treatment group received fumigation and sitz baths with Huayu Qufu Shengji decoction after surgery. The prescription consisted of 10 g of rhubarb, 20 g of magnesia, 20 g of Weilingxian, 10 g of dandelion, 20 g of *sophora flavescens* and 5 g of licorice. The patients were administered one dose per day and the affected area was steamed for 15 min with the decoction after being boiled in water for 30 min. After tolerating the steam, the patients underwent a sitz bath for 20 min. Both groups of patients received wound irrigation and disinfection with normal saline after treatment, and the wound was cleaned after each bowel movement until healed. During the treatment period, patients were advised to avoid spicy and irritating foods and tobacco and alcohol, maintain regular eating habits, and keep their bowel movements smooth. Observational indicators like pain level, wound healing time, inflammatory factor levels and treatment effective rate were observed. Pain level was observed by the Visual Analog Scale (VAS) which was used to assess pain levels before and 2 w after treatment. The VAS score ranges from 0 (no pain) to 10 (severe pain). Then wound healing time in patients was observed. Patients were followed up for 1 mo after treatment to record the time of necrotic tissue shedding, the appearance of new epithelium and the time of wound healing. Complete epithelialization, the absence of granulation tissue and bleeding indicated wound healing. The wound area was calculated based on the maximum length and width, and the presence of epithelium was used as the boundary for measurement. Further inflammatory factor levels were observed. 5 ml of fasting venous blood were collected from patients before and after treatment, and the serum was separated by centrifugation (3500 rpm for 10 min, radius of 8 cm). The levels of Tumor Necrosis Factor alpha (TNF-α), Interleukin-6 (IL-6) and Interleukin-1 beta (IL-1β) were measured using an electrochemiluminescence immunoassay with the BPCL-GPJ15 instrument produced by Roche Diagnostics. Treatment effective rate was calculated here. The treatment was considered effective if all symptoms and signs disappeared, the wound was completely covered, and healing was achieved. The treatment was considered effective if symptoms and signs improved significantly, the wound area shrank by at least 25 %, and fresh granulation tissue appeared. The treatment was considered ineffective if symptoms and signs did not improve or worsened after treatment, and the reduction in wound area was less than 25 %. The effective rate was calculated as [(number of cases with significant improvement+number of cases with improvement)/ total number of cases]×100 %. Statistical methods were used for further calculation. Patient information

and research data were entered into Statistical Package for the Social Sciences (SPSS) 20.0 software. Count data were expressed as "number and rate" and compared using the chi-square test. Measurement data were expressed as mean±standard deviation ($\bar{x}\pm s$) and compared using the t-test and p-value less than 0.05 was considered statistically significant. Comparison of pain levels between the two groups were shown here. Before treatment, there was no significant difference in VAS scores between the two groups ($p>0.05$). After treatment, the VAS scores in both groups decreased significantly. The VAS score in the treatment group was lower than that in the control group and the difference was statistically significant ($p<0.05$), as shown in Table 1. Comparison of wound healing time between two groups was shown in Table 2. The treatment group showed significantly shorter time for necrotic tissue detachment, appearance of new epithelium and wound healing compared to the control group. The wound area was smaller in the treatment group and the difference was statistically significant ($p<0.05$). Comparison of inflammatory cytokine levels between the two groups were shown here. Before treatment, there was no significant difference in the levels of inflammatory cytokines TNF-α, IL-6 and IL-1β between the two groups ($p>0.05$). After treatment, the levels of these cytokines in the treatment group were significantly lower than those in the control group and the difference was statistically significant ($p<0.05$), as shown in Table 3. Comparison of treatment effectiveness between the two groups was mentioned here. The treatment effectiveness rate was significantly higher in the treatment group than in the control group ($p<0.05$), as shown in Table 4. While anal abscess is not a fatal disease, it still requires timely treatment due to its specific location, prolonged healing time and intense pain sensation. Currently, surgical treatment is the primary method used in clinical practice, but it can result in certain trauma, local tissue damage and difficulty in drainage, leading to slow wound healing after surgery. Studies have identified several reasons that impact wound healing in patients who undergo anal abscess surgery, such as insufficient blood oxygen supply, poor growth of granulation tissue, inadequate postoperative incision drainage, mechanical stimulation and patient factors. Additionally, postoperative trauma can cause microcirculation disorders in the anal region, hindering anal recovery[6,7]. Therefore, postoperative treatment should receive more attention. In the past, potassium permanganate solution was commonly used for washing, which had the effects of sterilization, pain relief and anti-inflammation, but it was time-consuming. Traditional Chinese medicine attributes the long healing time after anal abscess surgery to the stagnation of necrotic tissue, which is difficult to remove and requires drug treatment based on the principles of astringency, promoting tissue growth, activating blood circulation and eliminating stasis. According to traditional Chinese medicine, the pathogenesis of anal fistula is mainly due to the invasion of dampness and toxins, which cause stagnation and transformation into pus. Postoperative pus and toxins often result in slow wound healing due to excessive heat and remaining pathogenic factors. Therefore, treatment should follow the principles of clearing heat and detoxification, reducing swelling and resolving stasis. The Huayu Qufu Shengji Tang decoction mainly consists of rhubarb, borax, celandine, dandelion and *Sophora flavescens*. These ingredients can effectively clear heat, dry dampness, promote blood circulation, stop bleeding and reduce pain. The use of this decoction in postoperative anal fistula patients can promote wound healing[8]. This study showed that the treatment group had lower VAS scores, shorter wound healing time and smaller wound area, indicating that the Huayu Qufu Shengji Tang decoction and sitz bath therapy can relieve pain and promote wound healing. Rhubarb has the functions of clearing heat and fire, cooling blood, detoxification, promoting blood circulation and stopping bleeding. The "Zhouhou Fang" says, "Rhubarb vinegar is applied to treat abscesses and heat. It will dry up soon and after several applications, it will heal without leaving a scar", As a result of using electrocautery to cut and stop bleeding during anal fistula surgery, there may be some thermal injury to the tissues. Chinese medicine believes that external use of Rhubarb is effective for "heat-toxic sores, burns, scalds and blood stasis". Borax can clear heat, detoxify, reduce swelling and resolve stasis. Celandine can eliminate dampness, soften hardness and disperse nodules. Modern pharmacology shows that it can relax and smoothen muscles, which can relieve anal sphincter spasms caused by postoperative anal fistula pain. Dandelion can clear heat, detoxify, reduce swelling and disperse stasis, and it has a good inhibitory effect on local bacteria in the anal region. *Sophora flavescens* can clear heat, dry dampness, kill parasites and promote urination. It is effective in

treating "edema, pruritus, eczema, damp sores and skin itching". Patients undergoing anal fistula surgery often have sitz baths for a long time and wound secretions increase, which may cause local moisture and lead to eczema and itching. The combination of these herbs can reduce swelling, relieve pain, clear heat, detoxify, dissolve stasis and improve lymphatic and blood circulation through the combined action of drugs and heat energy, thereby promoting wound healing[9]. TNF-α, IL-6 and IL-1β are key cytokines involved in the initiation of inflammatory response and their levels are closely related to wound infection. The results of this study showed that the levels of these cytokines in the treatment group were lower than those in the control group, indicating that the use of Huayu Qufu Shengji Tang for fumigation and sitz bath can improve the inflammatory state. Modern pharmacological studies have shown that rhubarb has antibacterial properties and can inhibit both Gram-positive and Gram-negative bacteria. Dandelion and *Sophora flavescens* are both anti-inflammatory and antibacterial. Fumigation and sitz bath can directly act on the affected skin, fully exert the therapeutic effect and better improve the inflammatory state[10]. The results of this study showed that the effective rate of treatment in the treatment group was 96.23 %, which was higher than the 83.02 % in the control group. This indicates that the therapeutic effect of Huayu Qufu Shengji Tang for fumigation and sitz bath is significant, which is consistent with the results of previous studies by Liu *et al.*[11]. In conclusion, the use of Huayu Qufu Shengji Tang for fumigation and sitz bath in patients with anal abscess can relieve pain, promote faster wound healing, improve the inflammatory state and achieve significant overall efficacy. Therefore, it can be considered as a preferred treatment option.

TABLE 1: COMPARISON OF PAIN LEVELS BETWEEN THE TWO GROUPS (x̄±s)

Group	VAS score	t-value	p-value
	Before treatment	After treatment	
Control (n=53)	5.10±1.05	4.09±0.78	5.621
Treatment (n=53)	5.23±1.10	3.41±0.66	10.329
t-value	0.622	4.845	
p-value	0.535	0	

TABLE 2: COMPARISON OF WOUND HEALING TIME BETWEEN TWO GROUPS (x̄±s)

Group	Time for necrotic tissue to fall off from the wound surface (d)	Time for the appearance of new epithelium on the wound surface (d)	Time for wound healing (d)	Area of the wound (cm^2)
Control (n=53)	7.44±1.23	9.03±1.43	26.29±4.33	6.78±0.89
Treatment (n=53)	6.02±1.00	7.98±1.20	21.09±3.89	5.69±0.77
t	6.521	4.095	6.504	6.743
p	0.000	0.000	0.000	0.000

TABLE 3: COMPARISON OF INFLAMMATORY CYTOKINE LEVELS BETWEEN THE TWO GROUPS [(x̄±s), ng/l]

Group	TNF-α		IL-6		IL-1β	
	Before	After	Before	After	Before	After
Control (n=53)	187.50±28.69	126.30±22.19	41.09±10.32	26.64±7.78	10.06±1.56	5.66±1.02
Treatment (n=53)	184.62±30.39	103.04±20.05	40.79±9.89	19.67±5.45	9.94±1.67	4.04±0.88
t	0.502	5.662	0.153	5.342	0.382	8.755
p	0.617	0.000	0.879	0.000	0.703	0.000

TABLE 4: COMPARISON OF TREATMENT EFFECTIVENESS RATE BETWEEN THE TWO GROUPS (n, %)

Group	Significantly effective	Effective	Ineffective	Treatment effectiveness rate
Control (n=53)	19 (35.85)	25 (47.17)	9 (16.98)	44 (83.02)
Treatment (n=53)	24 (45.28)	27 (50.94)	2 (3.77)	51 (96.23)
χ^2				4.970
p				0.026

Conflict of interests:

The authors declared no conflict of interest.

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This article was originally published in a special issue, "Innovations in Biomedical Research and Drug Development" Indian J Pharm Sci 2023:85(3) Spl Issue "168-172"