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Research Article

Value of High-Frequency Ultrasound-Guided Combined Kangfuxin Liquid in Ameliorating Clinical Symptoms of Patients with Perianal Abscesses

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Abstract

Background and Objective: Perianal abscess is a common anal ailment and can greatly impact patients' quality of life if untreated. Surgical procedures pose a risk of incision site contamination. Kangfuxin liquid promotes blood circulation, nourishes yin and promotes granulation. To analyze the clinical value of high-frequency ultrasound-guided combined Kangfuxin liquid in patients with perianal abscesses. **Materials and Methods:** Patients with perianal abscesses treated at Ganzhou Traditional Chinese Medicine Hospital from January, 2021 to June, 2023 were retrospectively selected. Control group contains 49 patients receiving conventional wound irrigation with Kangfuxin liquid, while 50 patients undergoing wound irrigation with Kangfuxin liquid under ultrasound guidance were allocated to research group. The clinical treatment effects, wound edema and granulation tissue growth, wound healing and the differences in serum inflammatory factor levels before and after treatment were compared between these two groups. **Results:** The overall effective rate was significantly higher in the research group (96.00%) than in the control group (83.67%) ($p < 0.05$). After treatment, the patients in the research group had lower scores in pain intensity, granulation tissue growth, edema and secretion than those in the control group ($p < 0.05$). Wound healing time, edema relief time, bleeding remission time, the levels of IL-6 and hs-CRP were lower in the research group than in the control group ($p < 0.05$). **Conclusion:** The application of Kangfuxin liquid under ultrasound guidance demonstrates affirmative therapeutic value in the treatment of patients with perianal abscesses, which contributes to accelerating wound recovery and alleviating local pain symptoms.

Key words: Perianal abscesses, ultrasound guidance, Kangfuxin liquid, clinical effect, wound recovery, inflammatory factor

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Competing Interest: The authors have declared that no competing interest exists.

Data Availability: All relevant data are within the paper and its supporting information files.

INTRODUCTION

Perianal abscess refers to an abscess around the anus and rectum, which is generally caused by bacterial invasion (especially *Escherichia coli* and *Staphylococcus aureus*) of the anorectum, leading to suppurative infection in the perianal and rectal space, ultimately resulting in the formation of a pus-filled cavity¹. Perianal abscess belongs to a common type of anal disease. Data reveal that approximately one-third of perianal disease sufferers are affected by perianal abscesses, with occurrences across various age groups, but the incidence among males aged 20-40 surpasses that among females^{2,3}. The epidemiological investigation reveals an estimated annual incidence of approximately 14,000 to 20,000 cases of perianal abscesses in the United Kingdom, with Sweden exhibiting an incidence of about 16.1 per 100,000 individuals⁴. Pain and swelling around the anus are the most prevalent clinical symptoms of perianal abscesses. If a patient develops a high perianal abscess, they might also experience pain in the perineum, waist and lower back, without prompt and effective treatment, the condition may progress, leading to high fever and lethargy, significantly impacting their quality of life⁵.

Surgical procedures serve as a crucial means to treat perianal abscesses. However, due to the contaminated nature and large wound size of perianal abscess incisions, these sites are susceptible to secondary infections caused by bacterial or other contaminant infiltration, thus prolonging the postoperative recovery process for patients⁶. The main ingredient of Kangfuxin liquid consist of extract from dried American cockroach bodies, which possess effects of promoting blood circulation, nourishing yin and promoting granulation. Clinically, it is commonly utilized in the treatment of conditions such as gastric and duodenal ulcers, burns and scalds and has been proved to accelerate wound healing⁷. Ultrasound belongs to non-invasive imaging examination means, which is often used in the diagnosis of perianal abscess. However, recent studies have indicated that ultrasound-guided irrigation with Kangfuxin liquid accelerates the recovery of patients with breast abscesses^{8,9}. The purpose of this retrospective study was to explore the feasibility of wound irrigation with Kangfuxin liquid under ultrasound guidance in patients undergoing surgical treatment of perianal abscesses and analyze whether the combined use of Kangfuxin liquid facilitates expedited perioperative recovery and enhances the perioperative experience for patients.

MATERIALS AND METHODS

General data: A total of 99 patients with perianal abscesses treated at Ganzhou Traditional Chinese Medicine Hospital

from January, 2021 to June, 2023 were retrospectively selected and screened according to inclusion and exclusion criteria. The study was conducted in accordance with the Declaration of Helsinki and was approved by the Ethics Committee of Ganzhou Traditional Chinese Medicine Hospital.

Inclusion criteria: (1) Patients who met the diagnostic criteria for perianal abscess, (2) Patients aged ≥ 18 in weeks, (3) Patients who received routine laboratory tests (e.g., coagulation, hepatitis B, hepatitis C, urine routine, etc.) before the procedure and were free of abnormality, (4) Patients who underwent incision and drainage of perianal abscess in our hospital and (5) Data on basic information (gender, age, etc.), laboratory test indices (preoperative and post-treatment levels of serum IL-6 and hs-CRP) and clinical symptom assessment indicators (post-treatment effects, clinical symptom scores, etc.) were complete.

Exclusion criteria: (1) Pregnant or lactating women, (2) Concomitant other anal diseases such as anal fissure and fistula, (3) Concomitant malignant tumors and systemic infections, (4) Idiopathic perianal abscesses such as leukemia perianal abscess and inflammatory bowel disease perianal abscess, (5) Drug- or alcohol-dependent individuals, (6) Those who had been included in other studies that had not completed and (7) Lack of treatment follow-up data.

Following screening, 49 patients receiving conventional wound irrigation with Kangfuxin liquid were assigned to the control group, while 50 patients undergoing wound irrigation with Kangfuxin liquid under ultrasound guidance were allocated to the research group. The baseline clinical data such as gender and age of the two groups were compared, which showed good comparability between the two groups, as shown in Table 1.

Intervention methods: Both groups of patients underwent incision and drainage of perianal abscess in our hospital. Patients in the control group were given conventional wound irrigation with Kangfuxin liquid. The patient was placed in a supine position. Following anesthesia, a 3 cm radial incision was made at the lowest point of the patient's abscess. Hemostatic forceps were used for blunt dissection of the abscess cavity. The physician performed separation of multiloculated abscesses using their fingers and cleared the pus and necrotic tissue using negative pressure drainage. Subsequently, a series of washes including hydrogen peroxide, normal saline and Kangfuxin liquid were used to irrigate the abscess cavity until the irrigation fluid appeared clear. A drainage tube was placed and pressure dressings were applied. Postoperatively, normal saline was used daily to

Table 1: Comparison of general clinical data between the two groups of patients ($\bar{x} \pm \text{sec}$)/[n (%)]

General clinical data	Research group (n = 50)	Control group (n = 49)	t/ χ^2	p
Gender				
Male	23	29		
Female	27	20	0.461	0.543
Average age (years)	32.06 $\pm$ 3.65	31.98 $\pm$ 4.10	0.086	0.932
Average BMI (kg/m ²)	22.01 $\pm$ 1.21	21.96 $\pm$ 1.30	0.167	0.868
Type of abscesses				
Retrorectal abscess	13	15	0.556	1.173
Pelviorectal abscess	16	17		
High intermuscular abscess	6	3		

irrigate the patient's abscess cavity and regular dressing changes were performed.

The procedures of preoperative preparation in the research group were the same as those in the control group. However, during the procedure, the Philips-EPIQ5 color Doppler ultrasound diagnostic device was used to accurately record information regarding the location and size of the abscess in the patients. This facilitated pinpointing the lowest position of the abscess for puncture. Subsequently, a syringe was used to aspirate the purulent fluid in the abscess cavity. Once the ultrasound images exhibited a significant reduction in the abscess area and the disappearance of purulent fluid, the abscess cavity was irrigated sequentially with hydrogen peroxide, normal saline and Kangfuxin liquid until the irrigation fluid appeared clear. During the postoperative dressing change, the ultrasonic debridement therapeutic device was employed to irrigate the patient's wound, Kangfuxin liquid was added to the wound cleansing apparatus and the ultrasonic debridement knife was used to irrigate the patient's wound until fresh and vibrant granulation tissue was revealed. Both groups were observed for 4 weeks.

Observation indices and assessment criteria

Therapeutic effects: The therapeutic effects of the 2 groups of patients were collected and compared. The therapeutic effects were evaluated based on the standards for perianal abscess efficacy established by the Chinese Medicine Administration¹⁰, differentiated into three categories: Remarkable effective, effective and ineffective. Remarkable effective denotes the complete disappearance of clinical symptoms and lesions in patients, effective signifies symptom alleviation with a substantial reduction in lesions, ineffective indicates no significant improvement in symptoms.

Improvement in clinical symptoms: The clinical symptom improvement of the enrolled patients was assessed using the "Interpretation of Traditional Chinese Medicine Clinical Diagnosis and Treatment Guidelines: Anal and Intestinal Diseases Subchapter¹¹". The scale was divided into three parts: Granulation tissue growth score, edema score and secretion score, all rated from 0 to 3, where 0 represented no relevant

conditions and 3 indicated poor wound healing. Additionally, the pain intensity of patients was evaluated concerning the timing of scoring. The evaluation was conducted using a visual analog scale ranging from 0 to 10, with 0 indicating no pain and 10 representing severe pain. Subjects selected a specific point on the scale to represent their pain intensity based on their own conditions.

Comparison of wound healing indices: Wound healing time, edema relief time and bleeding remission time of included patients were recorded and compared between the two groups.

Comparison of serum inflammatory factors: The levels of serum inflammatory factors IL-6 and hs-CRP of enrolled patients were collected preoperatively and at 4 weeks postoperatively by relying on the examination system and the differences between groups were compared.

Statistical methods: The data collected in this study were recorded using EXCEL 2021 and analyzed utilizing SPSS 22.0. The analysis revealed that the collected measurement data, such as age and levels of inflammatory factors, conformed to normal distribution and were expressed as (Mean $\pm$ Standard Deviation) and inter-group comparisons were conducted using the t-test. Counting data were described by rates and analyzed utilizing Chi-square test. A significance level of $p < 0.05$ was considered indicative of a statistically significant difference.

RESULTS

Differences in clinical therapeutic effects between the two groups: The follow-up results indicated that among the research group, there were 35 remarkable effective cases, 13 effective cases and 2 ineffective cases, with the overall effective rate of 96.00% (48/50), which was significantly higher than that of 83.67% (41/49) in the control group, exhibiting statistically significant difference between the two groups ($p < 0.05$) (Fig. 1).

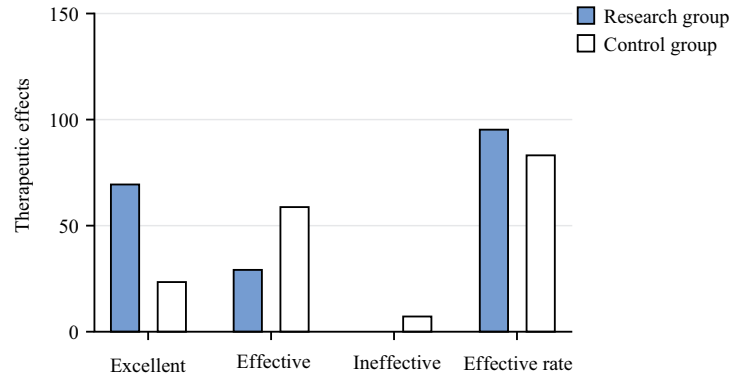


Fig. 1: Comparison of clinical therapeutic effects between the two groups

Overall effective rate of the research group was 96.00% (48/50), significantly higher than that of 83.67% (41/49) in the control group ($p < 0.05$)

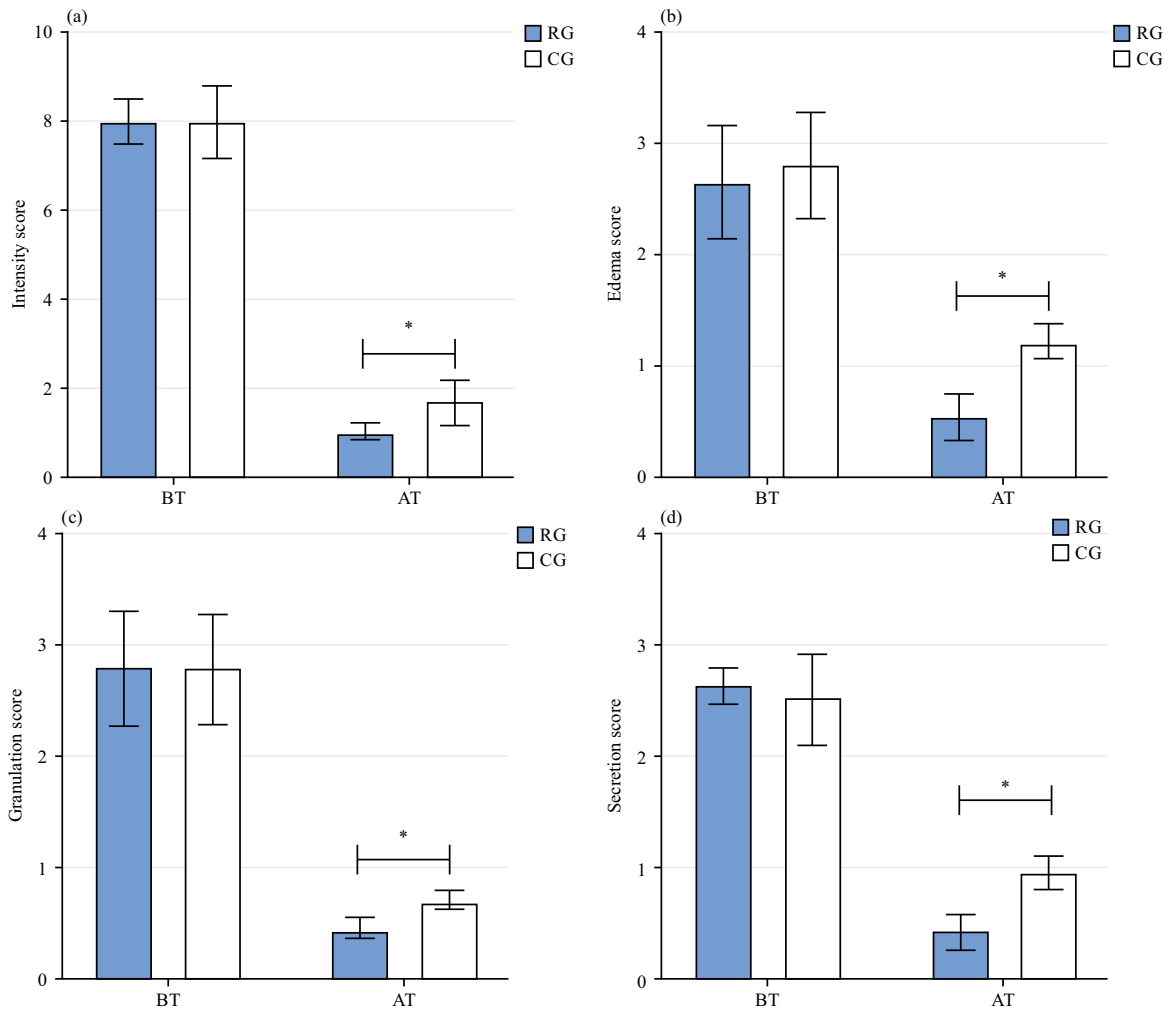


Fig.2(a-d): Improvement of clinical symptoms before and after treatment in both groups, (a) Before treatment, there was no statistically significant difference between the two groups in terms of pain intensity score, (b) Edema score, (c) Granulation tissue growth score and (d) Secretion score ($p > 0.05$), while after treatment, the patients in the research group had lower scores in the above indices than those in the control group ($p < 0.05$)

RG: Research group, CG: Control group, BT: Before treatment and AT: After treatment

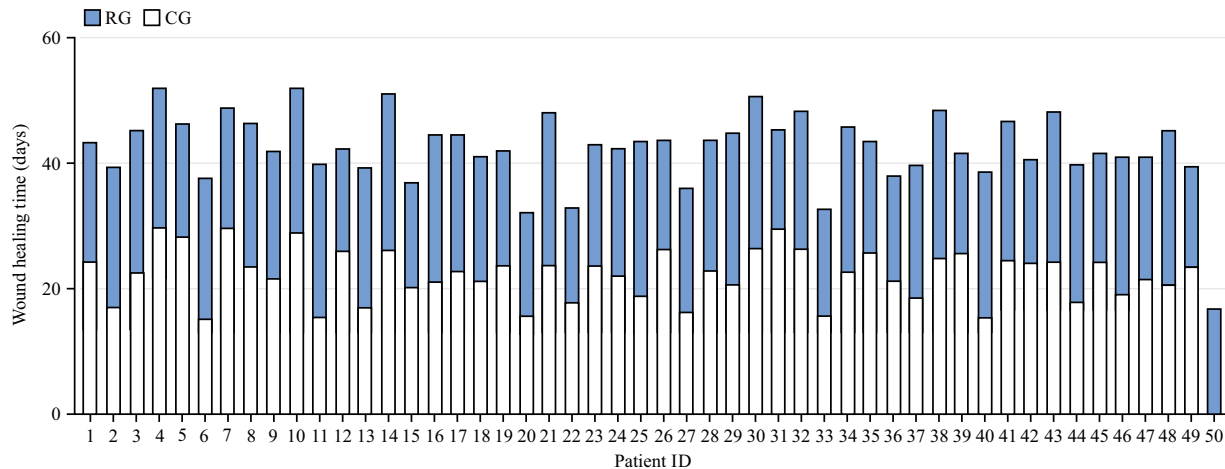


Fig. 3: Comparison of wound healing time between two groups of patients

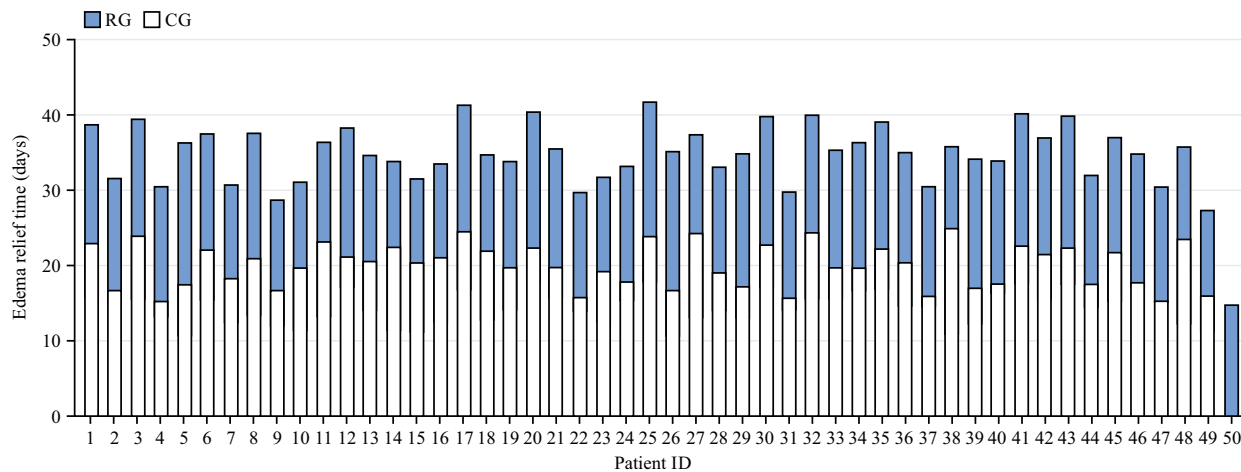


Fig. 4: Comparison of edema relief time between two groups of patients

Table 2: Comparison of wound healing indices in the treatment of two groups of patients ($\bar{x} \pm \text{sec}$, day)

Group	Number of cases	Wound healing time	Edema relief time	Bleeding remission time
Research group	50	20.58 ± 3.02	15.23 ± 2.20	6.40 ± 1.31
Control group	49	22.34 ± 4.05	17.77 ± 2.96	8.64 ± 1.91
t-value	-	5.236	8.111	4.596
p-value	-	<0.001	<0.001	<0.001

Improvement of clinical symptoms before and after treatment in both groups: Symptoms were scored in-hospital using a scale to assess the condition of the enrolled patients before and after 4 weeks of treatment and the results were collected and compared. It was found that before treatment, there was no statistically significant difference between the two groups in terms of pain intensity score (Fig. 2a), edema score (Fig. 2b), granulation tissue growth score (Fig. 2c) and secretion score (Fig. 2d) ($p > 0.05$), while after treatment, the patients in the research group had lower scores in the above indices than those in the control group ($p < 0.05$) (Fig. 2).

Comparison of wound healing indices in the treatment of two groups of patients: Wound healing time, edema relief time and bleeding remission time of the two groups of patients were collected by means of the hospital information system and the comparison showed that the above indices of patients in the research group were all lower than those in the control group ($p < 0.05$) (Table 2, Fig. 3-5).

Comparison of serum inflammatory factor levels before and after treatment between two groups of patients: There was no statistically significant difference in serum levels of the

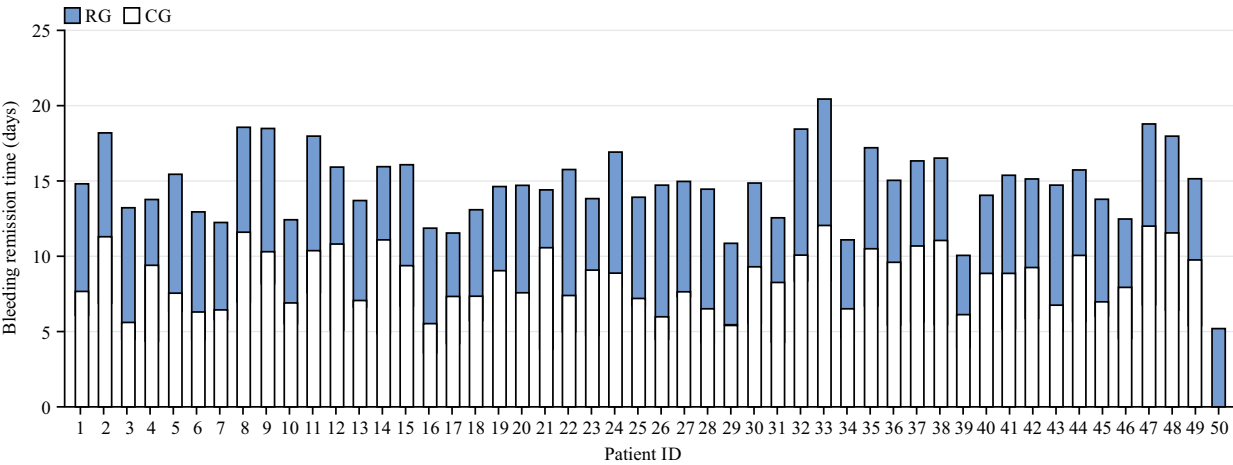


Fig. 5: Comparison of bleeding remission time between two groups of patients

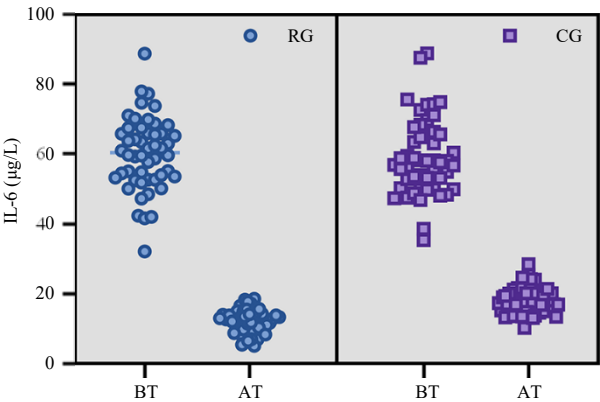


Fig. 6: Comparison of serum IL-6 levels before and after treatment between two groups of patients
Before treatment, there was no statistically significant difference in IL-6 levels between the two groups ($p>0.05$). After treatment, the research group showed lower IL-6 levels compared with the control group ($p<0.05$)

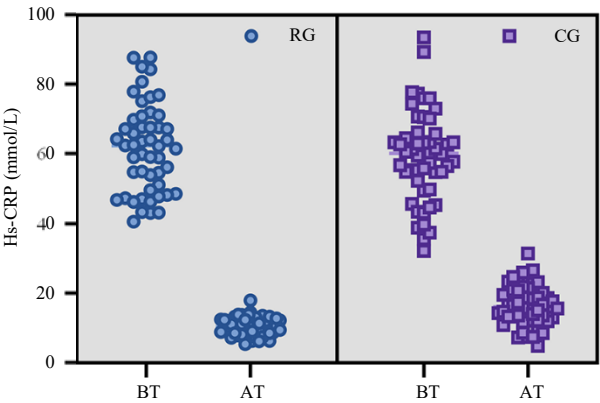


Fig. 7: Comparison of serum hs-CRP levels before and after treatment between two groups of patients
Before treatment, there was no statistically significant difference in hs-CRP levels between the two groups ($p>0.05$). After treatment, the research group showed lower hs-CRP levels compared with the control group ($p<0.05$)

inflammatory factors IL-6 and hs-CRP between the two groups of patients before treatment ($p>0.05$), while after treatment, the levels of IL-6 and hs-CRP in the research group were lower than those in the control group ($p<0.05$) (Fig. 6 and 7).

DISCUSSION

This study analyzed the clinical value of ultrasound-guided irrigation with Kangfuxin liquid in the treatment of perianal abscesses by grouping antitheses. The results revealed that, compared to patients in the control group who received conventional wound irrigation with Kangfuxin liquid, patients in the research group who received ultrasound-guided irrigation with Kangfuxin liquid demonstrated significantly higher clinical efficacy in wound irrigation and dressing changes, achieving an overall effective rate of 96.00%. The findings of this study suggested that ultrasound-guided irrigation with Kangfuxin liquid during surgical treatment for perianal abscesses yielded definite effects, which significantly enhanced treatment efficacy, expedited clinical symptom outcome and wound healing and reduced postoperative serum inflammatory marker levels. These indicate the utility of ultrasound-guided irrigation with Kangfuxin liquid in expediting the perioperative rehabilitation process for patients undergoing surgical treatment for perianal abscesses.

Perianorectal abscess is briefly named as perianal abscess, which refers to the abscess caused by purulent infection in the perianal and perirectal spaces. Perianal abscesses are common in the anal region and can occur in individuals of any age, with a higher incidence in males compared to females¹². The majority of perianal abscesses arise from nonspecific infections of the anal glands. However, failure to promptly or adequately manage them still poses the risk of developing high perianal abscess and deep abscess and in some cases, patients might even experience sepsis, jeopardizing their safety^{13,14}. The incision and drainage procedure is a simple and effective measure for managing perianal abscess, which can significantly alleviate patient's clinical symptoms by timely expelling pus and adequate drainage¹⁵. However, many studies have suggested that open wounds left after incision and drainage procedures can lead to prolonged wound healing, impeding tissue growth and posing a risk of recurrent perianal abscess formation due to the vulnerability of fecal bacteria to invade and irritate the open wound site¹⁶. The reason may be attributed to the fact that the presence of separated abscess cavities of perianal abscess often leads to incomplete irrigation and inadequate

postoperative drainage during the subsequent use of Kangfuxin liquid, despite disrupting intra-cavity fibrous separation and expelling the pus during the surgery, which contributes significantly to the recurrence of postoperative perianal abscesses^{17,18}. The utilization of ultrasonic-guided irrigation with Kangfuxin liquid helps physicians to precisely discern the position, depth, size and internal structure of abscesses on the one hand and provides clear directional guidance for the irrigation of Kangfuxin liquid on the other hand, resulting in a notable enhancement of the irrigation efficiency and a marked reduction in residual rate of dead spaces, consequently significantly elevating the therapeutic effect^{19,20}.

The results of this study also suggested that patients in the research group had better post-treatment clinical symptom scores and wound healing compared with the control group. van Oostendorp *et al.*²¹ analyzed that the reasons for the above phenomenon may be summarized as follows: (1) Compared to conventional irrigation methods, ultrasound-guided irrigation with Kangfuxin liquid effectively improves irrigation efficiency, avoiding the possible retention of pus in the cavity, thus accelerating the postoperative recovery process for patients and reducing the likelihood of recurrence, (2) Under ultrasound guidance, for patients in the research group, a puncture needle was initially used to aspirate pus from the cavity, followed by using Kangfuxin liquid for cavity irrigation. This method effectively reduces the wound to patients compared to conventional irrigation methods, laying a good foundation for postoperative recovery²² and (3) Kangfuxin liquid has the functions of promoting blood circulation, nourishing yin and promoting granulation and reducing swelling and inflammation. This drug promotes granulation tissue growth and neovascularization, directly affecting the wound surface, improving microcirculation and accelerating wound healing²³. In the research group, ultrasound-guided irrigation was used in the subsequent dressing changes. The energy of ultrasound waves stimulates the wound surface, causing necrotic tissue to shed and facilitates the elimination of residual bacteria and pus, which is also conducive to wound healing²⁴.

Regarding the comparison of inflammatory factor levels between the two groups of patients, the authors of this study analyzed that the excessive release of inflammatory factors is also an important cause of delayed wound healing. The excessive activation of inflammatory factors amplifies the cascade reaction of the body, leading to microvascular lesions and increased vascular permeability, which results in local wound manifestations such as exudation and swelling, providing conditions conducive for bacterial proliferation²⁵.

The important reason that the inflammatory factor levels of patients in the research group in this study was lower than those of the control group was analyzed to be related to the fact that ultrasound-guided cleansing with Kangfuxin liquid effectively reduced the residual pus on the wound surface, maintaining the wound in a relatively clean state²⁶. This study analyzed the clinical value of ultrasound-guided irrigation with Kangfuxin liquid in improving the perioperative experience of patients undergoing surgical treatment for perianal abscesses through grouping antitheses. Although the results of this study were definitive, it also has the following limitations: Firstly, it is a retrospective study, secondly, the sample size for the study is relatively small and thirdly, the follow-up period for patients is short. These limitations could potentially lead to bias to the study results. Subsequent large-sample, multicenter, randomized controlled trials will be conducted to help rectify these limitations and provide more comprehensive data for the clinical treatment of perianal abscess patients.

CONCLUSION

The application of Kangfuxin liquid under ultrasound guidance demonstrates affirmative therapeutic value in the treatment of patients with perianal abscesses, which contributes to accelerating wound recovery and alleviating local pain symptoms. The reason may be related to the potential of the drug in mitigating the inflammatory state in patients.

SIGNIFICANCE STATEMENT

Perianal abscess is a common type of anal ailment. If left untreated, it can significantly impact the quality of life for patients. During surgical procedures for perianal abscess, there is a risk of contamination at the incision site. Kangfuxin liquid promotes blood circulation, nourishes yin and promotes granulation. The findings of this study reveal that irrigating the incision of perianal abscess patients undergoing surgical treatment with Kangfuxin liquid under ultrasound guidance helps accelerate postoperative wound healing, ameliorate patients' inflammatory status and enhance surgical treatment efficacy, thus possessing certain potential for wider application.

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