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WJGS

# World Journal of Gastrointestinal Surgery

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#### **AIMS AND SCOPE**

The primary aim of World Journal of Gastrointestinal Surgery (WJGS, World J Gastrointest Surg) is to provide scholars and readers from various fields of gastrointestinal surgery with a platform to publish high-quality basic and clinical research articles and communicate their research findings online.

WJGS mainly publishes articles reporting research results and findings obtained in the field of gastrointestinal surgery and covering a wide range of topics including biliary tract surgical procedures, biliopancreatic diversion, colectomy, esophagectomy, esophagostomy, pancreas transplantation, and pancreatectomy, etc.

#### **INDEXING/ABSTRACTING**

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**Observational Study** 

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ORIGINAL ARTICLE

# Observation of therapeutic effect of lamp irradiation combined with purple gromwell oil gauze on alleviating intestinal colic in patients

Bi-Zhi Cen, Yin-Song Chen, Li-Ping Li, Jing-Wen Wu, Yan-Fen Xie

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# Abstract

#### BACKGROUND

Intestinal colic is a common complication in patients who have undergone radical surgery for colorectal cancer. Traditional Chinese medicine has advantages, including safety and stability, for the treatment of intestinal colic. Lamp irradiation for abdominal ironing has been applied in the treatment of many gastrointestinal diseases. Purple gromwell oil has the effects of clearing heat, cooling blood, reducing swelling, and relieving pain.

#### AIM

To investigate the impact of lamp irradiation combined with purple gromwell oil gauze on ameliorating intestinal colic in patients after radical surgery for colorectal cancer.

#### **METHODS**

A total of 120 patients who experienced postoperative intestinal colic complications after radical surgery for colorectal cancer and who were admitted to Foshan Traditional Chinese Medicine Hospital between June 2019 and March 2023 were enrolled as study subjects. The patients were divided into a control group (60 patients) and an observation group (60 patients) based on treatment method. The control group was treated with lamp irradiation, while the observation group was treated with lamp irradiation and external application of purple gromwell oil gauze. The clinical efficacy, Numeric Rating Scale (NRS) score, duration of symptoms, and rate of adverse reaction occurrence were further compared between the two groups.

#### RESULTS

The general effective rate in the observation group was 95.00%, which was significantly higher than that in the control group (86.67%, P < 0.05). Before treatment, there was no significant difference in the duration of symptoms between the groups (P > 0.05). After 1, 2, 3, and 4 d of treatment, the duration of



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symptoms in both groups were decreased, and the duration in the observation group was significantly lower than that in the control group  $(96.54 \pm 9.57 vs 110.45 \pm 11.23, 87.26 \pm 12.07 vs 104.44 \pm 11.68, 80.45 \pm 16.21 vs 99.44 \pm 14.95, 80.45 \pm 10.21 vs 104.44 \pm 11.68, 80.45 \pm 10.21 vs 104.44 \pm 14.95, 80.45 \pm 10.21 vs 104.44 ts 104$  $73.18 \pm 15.58 \text{ vs} 92.17 \pm 14.20; P < 0.05$ ). After 1, 3, 5, and 7 d of treatment, the NRS scores in both groups were decreased, and the NRS scores in the observation group were significantly lower than those in the control group  $(3.56 \pm 0.41 vs 4.04 \pm 0.58, 3.07 \pm 0.67 vs 3.74 \pm 1.02, 2.52 \pm 0.76 vs 3.43 \pm 0.85, 2.03 \pm 0.58 vs 3.03 \pm 0.82; P < 0.05).$ There was no significant difference in the rate of adverse reaction occurrence between the groups (P > 0.05).

#### CONCLUSION

The use of lamp irradiation combined with purple gromwell oil gauze in patients with intestinal colic after radical surgery for colorectal cancer can reduce symptom duration, alleviate intestinal colic, and improve treatment efficacy, and this approach is safe. It is worth promoting the use of this treatment in clinical practice.

Key Words: Lamp irradiation; Purple gromwell oil gauze; Intestinal colic; Radical surgery for colorectal cancer; Therapeutic effect

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Core Tip: One hundred and twenty patients with colic were divided into a control group (treated with divine lamp irradiation) and an observation group (treated with divine lamp irradiation combined with purple grass oil gauze external application). The total effective rate of the observation group was higher than that of the control group, and the duration of symptoms and the Numeric Rating Scale score were lower than those of the control group; there was no significant difference in adverse reactions between the two groups. The combination of divine lamp irradiation and purple grass oil gauze is effective and safe for patients with intestinal colic.

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# INTRODUCTION

Colorectal cancer is a common malignant tumor and is primarily treated with surgery. However, patients often experience intestinal colic pain after surgery, possibly related to postoperative damage to the digestive tract mucosa, abnormal gastrointestinal motility, intestinal flora imbalance, and dysfunction of the autonomic nervous system [1,2]. Intestinal colic pain significantly affects patients' quality of life, prolongs the recovery period, and increases hospitalization time. Therefore, effectively ameliorating postoperative colic pain in patients who have undergone radical colorectal cancer surgery has become a clinical focus[3]. Patients with tumors often experience physical weakness and insufficient functional recovery after surgery. Abdominal fumigation therapy, which is a treatment method in traditional Chinese medicine, has been widely used in treating gastrointestinal diseases and has been demonstrated to be a safe and stable approach for the treatment of intestinal colic pain[4].

In recent years, lamps, which are specific electromagnetic therapy devices, have been widely used as an adjunctive treatment method in clinical practice. Lamp irradiation can penetrate the epidermal tissue and reach deep tissues, acting on the patient's abdomen to promote the circulation of blood, harmonize organ functions, relieve pain, and improve abdominal discomfort through the application of heat[5]. Zi Cao (purple grass) has the effects of clearing heat, reducing swelling, cooling blood and relieving pain. The application of lamp irradiation therapy in patients who have undergone radical colorectal cancer surgery and its effect on relieving intestinal colic pain have not been sufficiently studied or explored. This study aimed to explore whether lamp irradiation combined with purple grass oil gauze could alleviate postoperative intestinal colic pain in patients who underwent radical colorectal cancer surgery, with the goal of providing strong clinical evidence to improve the quality of postoperative recovery of colorectal cancer patients as well as providing evidence-based support for the application of traditional Chinese medicine in modern medicine.

# MATERIALS AND METHODS

#### Subject selection

A retrospective analysis of the clinical records of 120 patients who experienced postoperative intestinal colic pain after radical colorectal cancer surgery and who were admitted to Foshan Hospital of Traditional Chinese Medicine from June 2019 to March 2023 was conducted. The patients were divided into a control group (60 patients) and an observation group (60 patients) based on treatment method.



The inclusion criteria were as follows: (1) met the diagnostic criteria for colorectal cancer defined by the "Chinese Diagnosis and Treatment Guidelines for Colorectal Cancer (2020 Edition)"[6], confirmed by pathological examination, with indications for open, laparoscopic, and colonoscopic surgery for radical treatment of colorectal cancer; (2) postoperative occurrence of intestinal colic pain; (3) duration of illness  $\leq 4$  wk, regardless of sex; and (4) complete clinical data and ability to cooperate with the researchers.

The exclusion criteria were as follows: (1) other concomitant gastrointestinal diseases; (2) a history of allergic reactions to Chinese herbal medicine, local skin burns, scalds, or abrasions; (3) a tendency to form scars or allergies to the components of fumigant drugs or dressings; (4) significant deterioration of the condition before treatment, requiring immediate surgery, or withdrawal from the study deemed necessary by the physician; (5) poor patient compliance; and (6) serious adverse events, complications, or physiological changes that were unsuitable for continued participation in the trial, leading to self-withdrawal.

#### Methods

Control group: Patients in the control group were treated with lamp irradiation. Patients lay flat in a comfortable position and were treated with infrared thermal radiation therapy using the YSHT-IIA infrared heat radiation therapy device (produced by Shanghai Yuejin Medical Optical Instrument Factory, model: YSHT-IIA). The device was plugged in, the timer was set, the indicator light was illuminated, and preheating was conducted for 5 to 10 min. The device was placed 20 to 30 cm away from the lumbar and abdominal areas (adjusted based on the patient's self-perception to ensure heat without scalding). The skin surface temperature was maintained at 38-46 °C. After 30 min of irradiation, the lamp was removed. Close monitoring was conducted during lamp irradiation treatment, with particular attention given to the patient's sensations, especially for elderly people and patients who were insensitive to heat, to prevent skin burns or scalds during the irradiation process[7].

**Observation group:** In the observation group, the combined treatment involved the external application of purple grass oil gauze in addition to the procedures used in the control group. A single-species purple grass ointment (produced internally at Foshan Hospital of Traditional Chinese Medicine) was applied to a 4-layer sterile long strip of gauze, which was then applied to the lumbar and abdominal areas of the patient, covered with sterile gauze, and secured with adhesive tape. For individuals who were allergic to adhesive tape, bandages were used to secure the application of the medication. After 30 min of simultaneous lamp irradiation and purple grass oil gauze application, the lamp was removed. The purple grass oil gauze was left in place for 4 to 6 h, after which it was removed, any purple-red oil marks were removed with a warm, moist towel, and the clothing was tidied. During the application of the purple grass oil gauze, the nursing staff closely observed the application to promptly detect any allergic reactions on the patient's skin. If an allergic reaction occurred, the application was promptly discontinued, and appropriate treatment was administered. Patients were advised to avoid contact with cold water on the treated skin within 2 h.

#### Indicators for observation and criteria for evaluation of the therapeutic effect

Comparison of the recent clinical efficacy of the two groups of patients was performed according to the "Guiding Principles for Clinical Research of New Chinese Medicines"[8] for determining therapeutic efficacy. Complete remission was defined as complete disappearance of intestinal colic pain symptoms, restoration of normal gas and stool passage, and restoration of normal bowel sounds; significant effect was defined as significant reduction in abdominal pain and distension, restoration of normal gas and stool passage, absence of nausea and vomiting, and normal or slightly increased bowel sounds; effective was defined as alleviation of abdominal pain and distension, passage of gas and stool, absence of nausea and vomiting, and slight increase in bowel sounds; ineffective was defined as no improvement or exacerbation of abdominal pain and distension, no significant relief in gas and stool passage, continued presence of nausea and vomiting, and increased bowel sounds. Total effective rate = (complete remission + significant effect + effective) / total number of patients × 100%.

Pain assessment: the Numeric Rating Scale (NRS) in combination with the Weng-Baker Facial Expression Scale (facial scale) was used as a pain assessment tool. The NRS is a 100 mm line divided into ten equal parts, with numbers from 0 to 10 marked from left to right, where 0 represents no pain and 10 represents the most intense pain the patient can imagine. The patients marked a number on the line according to their pain experience to indicate the degree of pain. The facial scale consists of five facial expressions and has no age, cultural, or gender requirements, making it suitable for assessing pain in elderly individuals, children, patients with acute pain, and patients with impaired expression ability. Five facial expressions corresponding to the NRS are drawn, creating the pain assessment tool for this group, allowing patients to select their level of pain based on the facial expressions. Specifically, on the first, second, third, and fourth days after treatment, the NRS was presented to the patient, and the meaning of the numbers and facial expressions was explained in detail. Patients were instructed to accurately indicate the degree of pain at different sites on the NRS scale with their fingers, and the numbers were recorded by the nurse.

The duration of symptoms after treatment in the two groups of patients was compared, with the timing starting from the onset of abdominal pain.

The occurrence rate of adverse reactions during treatment in the two groups of patients was compared.

#### Statistical analysis

Statistical analysis was conducted using SPSS 26.0 software. Normally distributed quantitative data are presented as the mean ± SD, and between-group comparisons were made using independent sample *t* tests. Nonnormally distributed data are presented as medians (interquartile ranges), and between-group comparisons were conducted using the Mann-Whitney U test. Count data are presented as n (%), and between-group comparisons were conducted using the  $\chi^2$  test. A P



value less than 0.05 was considered to indicate statistical significance.

#### RESULTS

#### Baseline characteristics of the two groups of patients

No statistically significant differences were observed (P > 0.05) in baseline clinical data, including age, sex, body mass index, preoperative clinical stage, or lesion site, between the two groups. For specific data, please refer to Table 1.

#### Clinical efficacy

The general effective rate in the control group after treatment was 86.67%, while in the observation group, it was 95.00%. The comparison of the total effective rates between groups showed that the general effective rate in the control group was significantly lower than that in the observation group ( $\chi^2 = 4.383$ , P = 0.035). For specific data, please refer to Table 2 and Figure 1.

#### Duration of symptoms

Before treatment, no significant difference was observed in symptom duration between the groups (P > 0.05). However, after 1 d, 2 d, 3 d, and 4 d of treatment, the duration of symptoms was significantly different between the groups (P < 0.001, P < 0.001, P = 0.007, P < 0.001, respectively), with the observation group having a shorter duration of symptoms than did the control group. For specific data, please refer to Table 3 and Figure 2A.

#### NRS scores

After 1, 2, 3, and 4 d of treatment, there were significant differences in NRS scores between the groups (P < 0.001, P = 0.001, P < 0.001, P < 0.001, respectively), with the observation group having lower NRS scores than did the control group. For specific data, please refer to Table 4 and Figure 2B.

#### Adverse reactions

Two cases of skin irritation were observed in the observation group; however, no adverse reactions were reported in the control group. The difference in the occurrence rate of adverse reactions between the groups was not statistically significant ( $\chi^2 = 2.0234$ , *P* = 0.154).

#### DISCUSSION

Postoperative intestinal colic in colorectal cancer patients refers to symptoms such as abdominal pain, distension, and colic caused by incisional pain, intestinal mucosal injury, and tissue adhesions after colorectal cancer surgery. Patients experience restlessness due to abdominal pain, which significantly affects their postoperative recovery. According to traditional Chinese medicine, intestinal colic falls under the category of "abdominal pain." Postoperatively, the abdominal viscera of colorectal cancer patients are delicate and not fully recovered. Improper care may lead to the invasion of pathogenic cold, causing stagnation of cold, leading to obstruction in the meridians and stagnation of blood flow, thus resulting in abdominal pain. Thus, treatments need to focus on promoting smooth blood flow, warming the meridians, and promoting blood circulation. Traditional Chinese medicine preparations can regulate the functions of internal organs, achieving systemic efficacy.

Zicao oil, which is a topical medicine that is commonly used in clinical practice, is a single-component Zicao ointment developed internally in our hospital; it has been used in our department for more than 20 years and has shown remarkable efficacy. Zicao oil has the effects of detoxification, clearing heat, drying dampness, reducing swelling, cooling blood, and relieving pain[9]. The main chemical components of Zicao are Zicao naphthoquinones, phenolic acids, and monoterpenoid naphthoquinones, which exhibit various properties, such as anti-inflammatory and analgesic, antipyretic and pain-relieving, hepatoprotection, and transdermal absorption properties[10].

Zhou and Gao[11] reported that the modern pharmacological effects of Zicao mainly include anti-inflammatory and analgesic effects, inhibition of pathogenic microorganism growth, hemostasis, and promotion of wound healing. Lamp irradiation is a nonpharmacological treatment method. Its core component consists of coatings with dozens of elements. Following the application of electric power, specific electromagnetic waves containing various elements can be produced, covering the range of the electromagnetic wave spectrum that is emitted and absorbed by organisms. Through its electromagnetic wave effect and thermal effect, this approach can improve microcirculation, enhance the self-repair ability of tissues, strengthen immune function, and effectively increase the activity of various enzymes in the body, thereby exerting anti-inflammatory, anti-swelling, and microcirculation unblocking effects. By enhancing the secretion of endorphins and relieving muscle tension, this approach achieves analgesic effects[12,13]. Additionally, lamp irradiation can promote local blood circulation, allowing drugs to penetrate acupuncture points and meridians to the greatest extent, enabling traditional Chinese medicine to penetrate the skin and subcutaneous tissues, promote local blood circulation, unblock meridians, dispel cold and dampness, stimulate the body's self-healing power, accelerate the repair of damaged tissues, and regulate the body, thereby significantly enhancing the absorption of traditional Chinese medicine[14,15].

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Table 1 Comparison of basic characteristics between groups						
Item		Control group	Observation group	<i>tlχ</i> ² value	P value	
Age (yr, mean ± SD)		62.39 ± 9.51	$63.13 \pm 10.69$	0.464	0.644	
Gender [ <i>n</i> (%)]	Male	33 (55.00)	31 (51.67)	0.134	0.714	
	Female	27 (45.00)	29 (48.33)			
$BMI/kg \text{ cm}^2$ (mean ± SD)		$23.71 \pm 1.83$	$23.45 \pm 1.64$	1.018	0.312	
TNM staging $[n (\%)]$	Ι	11 (18.33)	13 (21.67)	0.346	0.841	
	II	31 (51.67)	28 (46.67)			
	III	18 (30.00)	19 (31.67)			
Lesion site $[n (\%)]$	Sigmoid colon	14 (23.33)	12 (20.00)	0.587	0.899	
	Transverse colon	10 (16.67)	8 (13.33)			
	Ascending colon	19 (31.67)	21 (35.00)			
	Descending colon	17 (28.33)	19 (31.67)			

Table 2 Comparison of clinical efficacy between groups [n (%)]						
Group	Complete remission	Significant effect	Effective	Ineffective	Total effective rate	
Control group	13 (21.67)	20 (33.33)	19 (31.67)	8 (13.33)	52 (86.67)	
Observation group	16 (26.67)	27 (45.00)	14 (23.33)	3 (5.00)	57 (95.00) <sup>a</sup>	

 $^{a}P < 0.05$  compared with the control group.

Table 3 Comparison of symptom duration between groups (mean ± SD, min)						
Group	Pretreatment	Posttreatment				
Group		1 d	2 d	3 d	4 d	
Control group	119.26 ± 9.37	$110.45 \pm 11.23$	$104.44 \pm 11.68$	99.44 ± 14.95	$92.17 \pm 14.20$	
Observation group	$117.89 \pm 9.74$	96.54 ± 9.57	87.26 ± 12.07	$80.45 \pm 16.21$	73.18 ± 15.58	
<i>t</i> value	0.706	4.195	6.635	2.787	6.613	
<i>P</i> value	0.482	< 0.001	< 0.001	0.007	< 0.001	

#### Table 4 Comparison of NRS scores between groups (mean ± SD)

Group	Posttreatment					
Group	1 d	2 d	3 d	4 d		
Control group	$4.04 \pm 0.58$	$3.74 \pm 1.02$	3.43 ± 0.85	3.03 ± 0.82		
observation group	$3.56 \pm 0.41$	$3.07 \pm 0.67$	$2.52 \pm 0.76$	2.03 ± 0.58		
<i>t</i> value	3.920	3.397	4.728	5.979		
<i>P</i> value	< 0.001	0.001	< 0.001	< 0.001		

In the present study, the combined use of lamp irradiation and Zicao oil gauze resulted in a higher general effective rate in the observation group than in the control group (P < 0.05). Before treatment, no significant difference was observed in symptom duration between the groups (P > 0.05). However, after 1, 2, 3, and 4 d of treatment, the duration of symptoms and NRS scores in the observation group were lower than those in the control group (P < 0.05). The results indicate that a lamp, through the thermal effect of electromagnetic waves, can increase blood flow, dilate local blood vessels, and enhance the permeability and absorption of the traditional Chinese medicine in Zicao oil gauze, thereby improving the treatment of postoperative intestinal colic in colorectal cancer patients, reducing the duration of

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symptoms, and alleviating patient pain. Zicao oil is a long-standing traditional Chinese medicine therapy. In this study, the internally developed Zicao ointment, when applied externally and then irradiated with a lamp, accelerated drug absorption, enhanced efficacy, rapidly regulated local blood circulation, and enhanced analgesic and anti-inflammatory effects.

Both groups of patients in this study experienced severe adverse reactions (P > 0.05). This indicates that the application of Zicao oil gauze and lamp irradiation in postoperative intestinal colic patients after radical colorectal cancer surgery is a safe and reliable therapy. However, due to time constraints, the scope of observation in this study was relatively limited, and support from large data and samples was lacking, resulting in potential bias in the study conclusions. Therefore, it is necessary to conduct further high-level clinical studies, such as randomized, double-blind, multicenter, and large-sample studies, to further validate the findings of this study.

# CONCLUSION

In summary, the combined application of lamp irradiation and Zicao oil gauze in postoperative intestinal colic patients who have undergone radical colorectal cancer surgery can significantly improve NRS scores for intestinal colic, reduce the duration of symptoms, and enhance treatment efficacy, and it is very safe. This approach is worthy of further clinical promotion and use.

#### FOOTNOTES

**Author contributions:** Cen BZ and Xie YF initiated the project; Chen YS and Li LP designed the experiment and conducted clinical data collection; Wu JW performed postoperative follow-up and recorded data; Cen BZ and Xie YF conducted a number of collation and statistical analysis, and wrote the original manuscript; all authors have read and approved the final manuscript.



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