

Analyzing the Efficacy of Combining Meridian Flow Low-Frequency Therapy Instrument with Chinese Herbal Enema for the Treatment of Acute and Chronic Pelvic Inflammatory Disease

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Abstract: *Objective:* To study the clinical efficacy of applying the Meridian Flow Low-Frequency Therapy Device combined with Chinese herbal enema for patients with acute and chronic pelvic inflammatory disease (PID). *Methods:* Sixty-two patients with acute and chronic PID admitted from January 2024 to October 2025 were selected and randomly divided into a standard group ($n = 31$) and an experimental group ($n = 31$). The standard group received conventional medication + Chinese herbal enema treatment. The experimental group received the Meridian Flow Low-Frequency Therapy Device in addition to the standard group's treatment. The clinical efficacy, changes in inflammatory markers, and pelvic improvement were compared between the two groups. *Results:* The excellent-good rate of treatment in the experimental group was higher than that in the standard group ($p < 0.05$). The levels of various inflammatory factors in the experimental group were lower than those in the standard group (all $p < 0.05$). The improvement in pelvic mass diameter and pelvic effusion depth in the experimental group was superior to that in the standard group (both $p < 0.05$). *Conclusion:* The Meridian Flow Low-Frequency Therapy Device combined with Chinese herbal enema has a definite curative effect in treating pelvic inflammatory disease. It can effectively alleviate clinical symptoms, reduce inflammatory response, and promote the improvement of the pelvic environment.

Keywords: Acute and chronic pelvic inflammatory disease; Meridian flow low-frequency therapy device; Chinese herbal enema

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1. Introduction

Pelvic inflammatory disease (PID) is an infectious disease of the female upper reproductive tract. If not completely cured during the acute phase, it can progress to a chronic state, leading to sequelae such as chronic pelvic pain, fallopian tube adhesions, and infertility^[1]. Conventional symptomatic treatment primarily involves broad-spectrum

antibiotics, but it carries risks such as drug resistance, high recurrence rates, and numerous sequelae^[2]. Traditional Chinese Medicine (TCM) demonstrates unique advantages through comprehensive approaches like “clearing heat and detoxifying, promoting blood circulation and removing stasis, promoting diuresis and dispersing nodules”. In recent years, the Meridian Flow Low-Frequency Therapy Device, which combines the TCM time medicine concept of “Zi Wu Liu Zhu” (Midnight-noon Ebb-Flow) with modern electrostimulation technology, aims to “unblock meridians, regulate Qi, remove stasis, and relieve pain” by selecting acupoints according to the time of day and applying low-frequency electrical pulse stimulation. Chinese herbal enema allows drugs to act directly on the affected area, increases local drug concentration, and synergistically enhances efficacy. Currently, research on the combination of the Meridian Flow Low-Frequency Therapy Device and Chinese herbal enema therapy for treating PID remains relatively limited. This study aims to explore the application effect of this combined regimen in the clinical treatment of acute and chronic PID, with the goal of providing evidence-based support for optimizing comprehensive treatment plans.

2. Materials and methods

2.1. General information

A total of 62 patients with acute and chronic pelvic inflammatory disease admitted from January 2024 to October 2025 were selected and randomly divided into a standard group (n = 31 cases) and an experimental group (n = 31 cases).

2.1.1. Inclusion criteria

- (1) Meeting the diagnostic criteria for acute and chronic pelvic inflammatory disease in “Gynecology”^[3]
- (2) Patients providing informed consent for this study
- (3) The research having been approved by the hospital’s ethics review department

2.1.2. Exclusion criteria

- (1) Pregnancy or lactation
- (2) Concomitant gynecological malignancies or tuberculous pelvic inflammatory disease
- (3) Allergy to electrode patches or enema medications

2.2. Methods

The standard group received conventional medication combined with traditional Chinese medicine enema therapy.

- (1) Conventional medication
 - Cefuroxime sodium for injection (approval number: National Medical Products Administration Approval No. H20063772; manufacturer: Shijiazhuang Zhongnuo Pharmaceutical Co., Ltd., a subsidiary of CSPC Pharmaceutical Group) 1.5 g was added to 100 mL of normal saline for intravenous drip, twice daily.
- (2) Traditional Chinese medicine enema
 - A self-formulated heat-clearing and blood-stasis-resolving enema prescription was used, consisting of *Sargentodoxae Caulis*, *Patriniae Herba*, *Commeliniae Herba*, *Violae Herba*, and *Taraxaci Herba*, each at 30 g.
- (3) Preparation method

The above herbs were added with 500 mL of water and boiled down to 100 mL, then packaged for later use. Enema procedure: Before treatment, the patient was instructed to empty their bladder and bowels and assume a left lateral position. A disposable rectal tube was inserted into the anus to a depth of 15–20 cm, and 100 mL of the herbal decoction was slowly injected. After the enema, the patient was instructed to maintain the position for more than 1 hour. The enema time was chosen to be during the Mao hour (5:00–7:00, when the Large Intestine Meridian is dominant) according to the theory of the circadian flow of Qi and blood, once daily.

The experimental group was additionally treated with a Ziwu Liuzhu low-frequency therapeutic device on the basis of the standard group: the SM-021 low-frequency therapeutic device (manufacturer: Shenzhen Ximentec Biomedical Technology Co., Ltd.) was used, and treatment was administered during two time periods, namely the Chen period (7:00–9:00, when the Stomach Meridian is in charge) and the You period (17:00–19:00, when the Kidney Meridian is in charge), in accordance with the Ziwu Liuzhu theory. Treatment method: Patients were placed in a comfortable lying position, and electrode pads were fixed at the Guanyuan, Zigong, and Sanyinjiao acupoint locations. A specialized prescription for pelvic inflammatory disease was selected, with the frequency set at 50 Hz and the intensity adjusted to the patient's tolerance level. Each treatment session lasted for 30 minutes and was administered twice daily. Both groups received continuous treatment for 14 days.

2.3. Observation indicators

2.3.1. Clinical efficacy

Assessed after 14 days of treatment, with the following evaluation criteria: “Excellent” efficacy refers to the complete disappearance of discomfort such as lower abdominal pain and lumbosacral distension, normalization of vaginal discharge, and the absence of uterine appendage tenderness or pelvic masses as confirmed by gynecological and B-ultrasound examinations; “Good” efficacy indicates varying degrees of improvement in clinical symptoms, signs, and examination results; “Poor” efficacy denotes no improvement or worsening of the condition. For statistical purposes, both “excellent” and “good” cases were counted as effective, and the overall excellent and good rate was calculated.

2.3.2. Inflammatory indicators

Fasting venous blood samples were collected before treatment and 14 days after treatment. After centrifugation, TNF- α , CRP, and IL-6 levels were detected using the enzyme-linked immunosorbent assay.

2.3.3. Pelvic conditions

The diameters of pelvic masses and the depths of pelvic effusion were examined via B-ultrasound before and after treatment.

2.4. Statistical methods

Data processing and analysis were conducted using SPSS 23.0 statistical software. Count data were presented in the form of frequency (composition ratio), and differences between groups were determined using the chi-square test. If measurement data conformed to the characteristics of a normal distribution, they were expressed as mean \pm standard deviation, and independent sample *t*-tests were applied for inter-group comparisons. When the *p*-value was below 0.05, the difference was considered statistically significant.

3. Results

3.1. Comparison of data between the two groups

All data in the two groups were comparable (all $p > 0.05$). See **Table 1**.

Table 1. General baseline data of patients in the two groups

Group	n	Reproductive history (n)		Mean age ($\bar{x} \pm s$, years)	Mean duration ($\bar{x} \pm s$, years)
		None	Previous		
Standard	31	5	26	45.29 ± 5.50	1.45 ± 0.57
Test	31	4	27	45.12 ± 5.61	1.42 ± 0.45
Statistic (χ^2/t)	-		0.130	0.120	0.230
p-value	-		0.718	0.905	0.819

3.2. Comparison of clinical efficacy between the two groups

The excellent and good treatment rate in the experimental group was higher than that in the standard group ($p < 0.05$). See **Table 2**.

Table 2. Comparison of clinical efficacy between the two groups [n(%)]

Group	n	Excellent	Good	Poor	Excellent-good rate
Standard group (n = 31)	31	15 (48.39)	12 (38.71)	4 (12.90)	27 (87.10)
Test group (n = 31)	31	18 (58.06)	13 (41.94)	0 (0.00)	31 (100.00)
χ^2 -value	-	-	-	-	4.276
p-value	-	-	-	-	0.039

3.3. Comparison of inflammatory indicators between the two groups

After treatment, the levels of various inflammatory factors in the experimental group were lower than those in the standard group (all $p < 0.05$). See **Table 3**.

Table 3. Comparison of inflammatory indicators between the two groups ($\bar{x} \pm s$)

Group	n	TNF- α (ng/L)		CRP (mg/L)		IL-6 (ng/L)	
		Before	After	Before	After	Before	After
Standard	31	55.34 ± 6.45	$38.45 \pm 5.32^*$	15.23 ± 3.25	$7.85 \pm 1.67^*$	30.67 ± 5.04	$17.78 \pm 3.42^*$
Test	31	54.87 ± 6.72	$30.16 \pm 5.23^*$	15.56 ± 3.47	$5.12 \pm 1.25^*$	30.12 ± 5.58	$13.23 \pm 3.45^*$
t-value	-	0.281	6.187	0.386	7.287	0.407	5.215
p-value	-	0.780	< 0.001	0.701	< 0.001	0.685	< 0.001

Note: Compared with the same group before treatment, * $p < 0.05$.

3.4. Comparison of pelvic conditions between the two groups

After treatment, the improvement in the diameter of pelvic masses and the depth of pelvic effusion in the experimental group was superior to that in the standard group (both $p < 0.05$). See **Table 4**.

Table 4. Comparison of pelvic conditions between the two groups [($\bar{x} \pm s$), cm]

Group	n	TNF- α (ng/L)		CRP (mg/L)	
		Before	After	Before	After
Standard	31	55.34 \pm 6.45	38.45 \pm 5.32*	15.23 \pm 3.25	7.85 \pm 1.67*
Test	31	54.87 \pm 6.72	30.16 \pm 5.23*	15.56 \pm 3.47	5.12 \pm 1.25*
t-value	-	0.281	6.187	0.386	7.287
p-value	-	0.780	< 0.001	0.701	< 0.001

Note: Compared with the same group before treatment, * $p < 0.05$.

4. Discussion

If pelvic inflammatory disease is not treated promptly and properly, prolonged illness can lead to various long-term complications, such as chronic pelvic pain, tubal infertility, and ectopic pregnancy, seriously impairing the reproductive health and quality of life of women of childbearing age ^[4]. Antibiotic therapy is primarily used clinically to treat pelvic inflammatory disease. While it can effectively control acute infections, its efficacy in treating chronic pelvic inflammatory disease and its sequelae is limited, and long-term use can easily lead to issues such as dysbacteriosis and increased drug resistance ^[5]. In recent years, traditional Chinese medicine (TCM) has demonstrated unique advantages in the treatment of pelvic inflammatory disease (PID), particularly herbal enema therapy, which allows drugs to be directly absorbed through the rectal mucosa, reaching the affected area directly, bypassing the first-pass effect of the liver, and increasing local drug concentration. The Ziwu Lizhu theory, a precious concept of chronomedicine in TCM, originates from the “Huangdi Neijing” (The Yellow Emperor’s Classic of Internal Medicine). Based on the theory of “harmony between humans and nature”, it posits that the flow of Qi and blood in the human body follows a certain rhythm in the meridians over time, exhibiting patterns of waxing and waning ^[6]. As a physical therapy modality, low-frequency therapeutic devices can improve local pelvic blood circulation through low-frequency pulsed electrical stimulation, promote inflammation absorption, and alleviate pain symptoms. Their adjuvant role in PID treatment has been clinically validated ^[7]. Utilizing low-frequency therapy for chronic PID under the guidance of the Ziwu Lizhu theory allows for selecting the most appropriate timing for treatment based on the patterns of Qi and blood flow and the opening and closing of acupoint meridians, thereby enhancing therapeutic efficacy. The combined therapy of the Ziwu Lizhu low-frequency therapeutic device and herbal enema fully leverages the advantages of TCM chronomedicine and the integration of internal and external treatments, providing new insights and methods for PID treatment.

The Ziwu Lizhu low-frequency therapeutic device regulates meridian Qi and blood and improves local pelvic microcirculation through acupoint electrical stimulation at specific times. Modern research indicates that low-frequency electrical stimulation can promote tissue metabolism, accelerate inflammation absorption, relieve muscle spasms, and alleviate pain ^[8]. In this study, the Chensi period (when the Stomach Meridian is in command) and the Youshi period (when the Kidney Meridian is in command) were selected for treatment. During the Chensi period, Qi and blood flow into the Stomach Meridian, and treatment at this time can strengthen the spleen and stomach and resolve phlegm-dampness; during the Youshi period, Qi and blood flow into the Kidney Meridian, and treatment at this time can nourish kidney Qi and regulate the Chong and Ren Meridians. The combined application of these two periods can synergistically regulate the functions of the Zang-fu organs and

enhance the therapeutic effect. Herbal enema is an important external treatment method in traditional Chinese medicine for pelvic inflammatory disease. In this study, a self-formulated herbal enema prescription for clearing heat and resolving blood stasis was used. In this prescription, *Sargentodoxae Caulis* acts as the vanguard, guiding the herbs downward and promoting blood circulation; *Patriniae Herba*, *Taraxaci Herba*, and *Violae Herba* are used to attack the core issues, focusing on clearing heat, detoxifying, and resolving abscesses and dispersing masses; *Commelinaceae Herba* is used as a supporting herb to promote diuresis and allow the pathogenic factors to exit the body. The five herbs in the entire prescription have specific and powerful effects and are precisely combined to collectively exert comprehensive effects of clearing heat, detoxifying, promoting blood circulation to resolve blood stasis, and promoting diuresis to drain pus, highly aligning with the core pathogenesis of “damp-heat and blood stasis” in pelvic inflammatory disease. Modern pharmacological studies have shown that both *Sargentodoxae Caulis* and *Patriniae Herba* have broad-spectrum antibacterial effects, effectively inhibiting the growth of various Gram-positive and Gram-negative bacteria and significantly reducing the levels of inflammatory factors such as TNF- α and IL-6; *Commelinaceae Herba*, *Violae Herba*, and *Taraxaci Herba* also possess broad-spectrum antibacterial and anti-inflammatory activities. When used in combination, these herbs can inhibit pathogens and alleviate inflammatory responses through multiple pathways, thereby promoting the repair of pelvic tissues. The combination of the Ziwu Liuzhu theory and traditional Chinese medicine enema therapy, with enema treatment administered during the Mao time period (when the Large Intestine Meridian is dominant), is employed because, at this time, Qi and blood flow through the Large Intestine Meridian, the conduction function of the large intestine is robust, and the absorption capacity of the rectal mucosa is enhanced, facilitating the full expression of the medicinal effects. Consequently, the results of this study show that the excellent and good treatment rate in the experimental group was higher than that in the standard group ($p < 0.05$). After treatment, the levels of various inflammatory factors in the experimental group were all lower than those in the standard group (all $p < 0.05$). Analysis of the reasons may be related to the following mechanisms:

- (1) The Ziwu Liuzhu low-frequency therapeutic instrument stimulates and improves pelvic blood circulation, promoting drug distribution and absorption;
- (2) Traditional Chinese medicine enema directly acts on pelvic tissues, inhibiting pathogen growth and reducing inflammatory exudation;
- (3) Timed treatment with the Ziwu Liuzhu theory enhances the body's sensitivity to drugs and physical therapy, creating a synergistic effect. Additionally, after treatment, the improvement in pelvic mass diameter and pelvic effusion depth in the experimental group was superior to that in the standard group (both $p < 0.05$), suggesting that the combined treatment can more effectively promote the recovery of pelvic pathological changes.

Research by Yang Liqing et al. has shown that pelvic floor therapeutic devices combined with traditional Chinese medicine can improve pelvic hemodynamics, promote inflammation absorption, and facilitate tissue repair ^[9]. Zheng Yongxia's study indicated that the Ziwu Liuzhu low-frequency therapeutic instrument can significantly alleviate pain and improve the pelvic environment in patients with chronic pelvic inflammatory disease ^[10]. These reports collectively support the conclusions of this study.

5. Conclusion

In summary, the combination of the Ziwu Liuzhu theory-based low-frequency therapeutic instrument and

traditional Chinese medicine enema therapy for treating pelvic inflammatory disease has proven effective, effectively alleviating clinical symptoms, reducing inflammatory responses, and promoting improvement in the pelvic environment.

Disclosure statement

The authors declare no conflict of interest.

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