

ORIGINAL RESEARCH



Clinical efficacy of warm acupuncture on wind-cold-dampness rheumatoid arthritis in lung adenocarcinoma

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Abstract

Objective

The current study aimed to explore the clinical efficacy of warm acupuncture in the management of wind-cold-dampness rheumatoid arthritis (RA).

Methods

Eighty patients diagnosed with wind-cold-dampness RA and admitted to our hospital between January 2024 and December 2024 enrolled in this study. Patients were randomly allocated into two groups: a control group (methotrexate tablets) and a study group (warm acupuncture + methotrexate tablets). Comparative analyses were conducted between the two groups regarding the primary outcomes (clinical symptoms, levels of inflammatory factors, serum RF and ESR levels, and degree of pain) and secondary outcomes (TCM syndrome score, total incidence of adverse reactions and quality of life).

Results

Two months post-treatment, the study group demonstrated significant improvements relative to the control group, including a shorter duration of morning stiffness ($P < 0.01$), a reduced number of painful and swollen joints ($P < 0.01$), lower levels of TNF- α , IL-6 and CRP ($P < 0.01$), lower serum RF and ESR levels ($P < 0.01$), lower VAS scores ($P < 0.01$), lower TCM syndrome scores of joint deformity, joint functional impairment, pain and fear of cold ($P < 0.01$), lower total incidence rate of adverse reactions ($P < 0.05$) and higher WHOQOL-BREF scores of physiology, psychology, society and environment ($P < 0.01$).

Conclusion

Warm acupuncture, when used as an adjunct therapy, effectively ameliorates symptoms, alleviates pain, mitigates inflammatory responses, enhances quality of life, and exhibits a high safety profile in the treatment of RA.

Keywords: rheumatoid arthritis, warm acupuncture, pain, inflammation

Introduction

Rheumatoid arthritis (RA) represents a frequently encountered chronic inflammatory autoimmune condition within clinical settings¹. It is characterized by a notably high incidence rate, with a prevailing trend of higher occurrence in women compared to men². RA is mainly characterized by autoimmune dysfunction, systemic vasculitis, and chronic inflammation of the joint synovium³. The cause of this disease is still unclear, and it can lead to invasive arthritis, decline in joint function, and in severe cases, joint deformity or loss of joint function, causing harm to the patient's body and resulting in daily life impairments⁴.

The main methods of Western medicine for treating RA include drug therapy and surgical treatment⁵. Western medicine for RA mainly focuses on anti-inflammatory and de-swelling measures, but it is prone to drug resistance and side effects⁶. Surgical treatment has a short course and quick recovery. However, it also has higher risks and costs, and strict requirements for the patient's physical condition, with strict surgical indications. Moreover, there is a possibility of synovial regeneration after the operation^{7,8}.

Recently, notable advancements have been achieved in

the application of traditional Chinese medicine (TCM) for the treatment of RA⁹. TCM treatment includes oral administration of Chinese medicine, acupuncture, massage, cupping therapy, as well as external application of Chinese medicine¹⁰. Among these, acupuncture is particularly effective for RA as it is simple and convenient to operate, can effectively relieve patients' pain, alleviate TCM syndromes, and has remarkable therapeutic effects¹¹. Warm acupuncture is a commonly used external treatment method in TCM. It combines needle insertion and moxibustion into one, which can not only achieve the effect of acupuncture in relaxing muscles and promoting circulation, but also achieve the effect of moxibustion in warming yang and dispelling cold¹². In TCM, RA falls under the category of "arthralgia syndrome". Its causes are complex and the types of syndromes are diverse. Wind-cold-dampness RA is one of the common types¹³. When wind, cold, and dampness pathogens invade the body, they tend to accumulate in the joints, obstructing the meridians and disrupting the normal flow of qi and blood. This constitutes the primary pathogenic mechanism underlying wind-cold-dampness RA¹⁴. Therefore, the treatment should follow the principle of eliminating dampness, dispelling cold, eliminating pathogenic

factors, and unblocking the meridians¹⁵.

In this study, we aimed to explore the clinical effect of warm acupuncture for patients with wind-cold-dampness RA.

Material and Methods

Patients

Eighty patients diagnosed with wind-cold-dampness RA and admitted to our hospital between January 2024 and December 2024 enrolled in this study.

Patients were randomly allocated into two groups, namely a control group and a study group, with 40 cases in each group. Regarding the randomization process, we utilized a computer-generated random number sequence to assign patients to either the control or the study group. This method ensured an unbiased and equal chance for each patient to be placed in either group, thereby minimizing selection bias.

To enhance the scientific rigor and minimize potential bias, this study adopted a blinding strategy. The patients were blinded to their group assignments; that is, they were unaware of whether they were receiving the standard treatment (methotrexate tablets only) or the combined treatment (warm acupuncture plus methotrexate tablets). Moreover, the researchers responsible for evaluating the outcomes were also blinded to the group allocations. This double-blinding approach helps to prevent any conscious or unconscious bias in the data collection and analysis processes.

Diagnostic criteria

The diagnostic criteria of Western medicine followed the classification criteria and scoring system for RA jointly formulated by the American College of Rheumatology (ACR) (16) as well as the European League Against Rheumatism (EULAR) in 2010 (17). Those with a score of 6 or above were diagnosed with RA.

The diagnostic criteria of TCM followed the diagnostic standards for the wind-cold-dampness RA proposed by the Rheumatism Branch of the Chinese Materia Medica Society (2018). Main symptoms: (1) Cold pain in the joints, with the area not feeling warm upon touch, and the skin not being red; (2) The pain intensifies upon exposure to cold and eases when warm. Secondary symptoms: (1) Joint stiffness, difficulty in flexion and extension; (2) Cold limbs, or fear of cold and fond of warmth; (3) Tasteless mouth, no thirst. Tongue and pulse: The tongue was enlarged and plump, the tongue was pale, the tongue coating was white or greasy, and the pulse was tense or tight. If the main symptom was accompanied by two or more secondary symptoms, and when combined with the tongue and pulse, a diagnosis could be made.

Inclusion and exclusion criteria

Inclusion criteria: (1) Patients simultaneously met the above diagnostic criteria of both TCM and Western medicine; (2) Not receiving any related treatment within the past 1 month. Exclusion criteria: (1) Patients with other autoimmune diseases; (2) Breastfeeding or pregnant women; (3) Patients with mental disorders; (4) Patients with allergic constitutions or those who are intolerant to the tested drugs; (5) Patients who dropped out during the study; (6) Patients with severe defects in liver, heart and kidney functions.

Methods

The control group received methotrexate tablets for treatment. Patients took methotrexate tablets (Sine Laboratory, Shanghai, China) orally, 5 mg each time, twice a week, for a continuous treatment period of 2 months.

The study group adopted warm acupuncture based on methotrexate tablets same as the control group. Acupoints: Taichong, Xuanzhong, Yanglingquan, Sanyingjiao, Zusanli, Guanyuan, Qihai, Waiguan, Quchi, Fengchi, Shenshu, Pishu, Dazhui. Except for Dazhui and Qihai acupoints, all the other acupoints were to be treated on both sides. In addition, local acupoints of the affected joints were selected. A disposable sterile acupuncture needle (used once only) of 0.30 mm in diameter and 40 mm in length, produced by Gushi Gongyuan medical device Co, Ltd was used. The needles at the acupuncture points and the skin surface were disinfected. Routine acupuncture procedures were carried out at the aforementioned acupoints. The needle was directly inserted into the body and the twisting technique was applied. When the qi reached the acupoint, a thin sheet of paper was placed and a 3 cm long moxa stick was inserted into the needle handle. The moxa stick was ignited and moxibustion was performed. Each acupoint was moxibustion twice, and the needle remained in the body for 30 minutes. The needle was moved once every 15 minutes. One treatment was conducted daily, 5 days a week, for a total of 2 months.

Primary outcomes

(1) Before and 2 months after the treatment, the duration of morning stiffness, the number of painful joints as well as the number of swollen joints of patients were recorded.

(2) Before and 2 months after the treatment, three mL of fasting venous blood was obtained from patients. The blood was centrifuged, and the serum was separated. Then, the levels of C-reactive protein (CRP), tumor necrosis factor- α (TNF- α), as well as interleukin-6 (IL-6) were detected by means of the enzyme-linked immunosorbent assay method.

(3) Before and 2 months after the treatment, three mL of fasting venous blood was obtained from patients. The blood was centrifuged, and the serum was separated. Then, the levels of rheumatoid factor (RF) were measured by means of the enzyme-linked immunosorbent assay method. Besides, three ml of peripheral venous blood from the patient was collected. Anticoagulant measures were taken and the blood was left to stand for 1 hour. The erythrocyte sedimentation rate (ESR) was then calculated.

(4) Utilizing the visual analogue scale (VAS), the pain conditions of patients were compared before and 2 months after treatment. A 0-100 mm line was drawn on the paper, with 0 mm representing no pain and 100 mm representing severe pain, and the middle part representing different degrees of pain. The patients were asked to mark their own pain level on the line according to their own feelings: 0 points meant no pain; less than 3 points meant mild pain; 4-6 points meant pain that would affect sleep and was tolerable; 7-10 points meant gradually increasing pain that was unbearable.

Secondary outcomes

(1) Before and 2 months after the treatment, in accordance with the "Guidelines for Clinical Research of New Chinese Medicines", the patients' joint deformity, joint functional impairment, and pain were scored from 0 to 6 points respectively, and the fear of cold was scored from 0 to 3 points. The higher the score, the more severe the patient's

symptoms were.

(2) The total incidence rate of adverse reactions containing rash, nausea, and gastrointestinal discomfort in the two groups during the 2-month treatment period was compared.

(3) Before and 2 months after the treatment, the World Health Organization Quality of Life Assessment Scale Short Form (WHOQOL-BREF) was employed to evaluate the quality of life in patients. It included four areas, namely physiology, psychology, society and environment. The score ranged from 0 to 100, with a higher score representing a better quality of life for the patients.

Statistical analysis

Data analysis was performed using GraphPad Prism 10.0 statistical software. Measurement data were presented as mean \pm standard deviation ($x \pm s$), and comparisons were made by means of the t-test. For counting data, results were expressed as numbers and percentages (%), and the χ^2 test was utilized for comparisons. A P-value of less than 0.05 was considered statistically significant.

Results

General data

As displayed in Table 1, there were no differences in general data between the 2 groups ($P > 0.05$).

Clinical symptoms

Prior to the initiation of treatment, no differences were observed between both groups in terms of the duration of morning stiffness, as well as the number of painful and swollen joints among patients ($P > 0.05$). Following two months of treatment, both groups exhibited a notable reduction in the duration of morning stiffness and a decrease in the number of painful and swollen joints ($P < 0.01$). However, when compared to the control group, the study group demonstrated a more pronounced improvement, with a significantly shorter duration of morning stiffness and a lower number of painful and swollen joints ($P < 0.01$, Figure 1).

Levels of inflammatory factors

Before treatment commenced, no significant disparities were evident in the serum levels of TNF- α , IL-6 as well as CRP between both groups ($P > 0.05$). Following two months of treatment, both groups exhibited a marked decrease in these inflammatory markers ($P < 0.01$). However, when comparing the results between the groups, the study group demonstrated a more substantial reduction, with significantly lower levels of TNF- α , IL-6, as well as CRP than the control group ($P < 0.01$, Figure 2).

Serum RF and ESR levels

Prior to treatment, the serum levels of RF and ESR levels did not differ significantly between both groups ($P > 0.05$). Following two months of treatment, both groups showed a notable decrease in serum RF and ESR levels ($P < 0.01$). However, when comparing the two groups, the study group exhibited a more pronounced reduction, with significantly lower serum RF and ESR levels than those observed in the control group ($P < 0.01$, Figure 3).

Degree of pain

Before initiating the treatment, no differences were seen in the VAS scores between both groups ($P > 0.05$). Following two months of treatment, both groups experienced a notable

decrease in their VAS scores ($P < 0.01$). However, upon comparison, the study group demonstrated significantly lower VAS scores than the control group ($P < 0.01$, Figure 4).

TCM syndrome score

Prior to treatment, no differences were seen between both groups in TCM syndrome scores related to joint deformity, joint functional impairment, pain and fear of cold between the 2 groups ($P > 0.05$). Following two months of treatment, both groups exhibited a marked decline in these TCM syndrome scores ($P < 0.01$). However, when comparing both groups, the study group demonstrated notably lower scores than the control group in the TCM syndrome scores of joint deformity, joint functional impairment, pain and fear of cold ($P < 0.01$, Figure 5).

Total incidence rate of adverse reactions

As displayed in Table 2, the total incidence rate of adverse reactions was found to be lower in the study group compared to the control group ($P < 0.05$).

Quality of life

Before treatment commenced, no differences were observed in the WHOQOL-BREF scores across the domains of physiology, psychology, society and environment between the 2 groups ($P > 0.05$). Two months following the treatment, both groups exhibited a notable increase in their WHOQOL-BREF scores in these four domains ($P < 0.01$). However, when comparing both groups, the study group demonstrated significantly higher scores than the control group in the areas of physiology, psychology, society, and environment ($P < 0.01$, Figure 6).

Discussion

The precise causes and underlying pathogenic mechanisms of RA remain incompletely understood to date¹⁸. As an autoimmune disease, Western medicine mainly uses immunosuppressants and anti-inflammatory drugs for treatment. However, the application of Western medicine often in RA treatment frequently leads to toxic side effects, including bone marrow suppression, gastrointestinal reactions, as well as liver and kidney function impairment, all of which can adversely affect the clinical therapeutic outcomes¹⁹. As research on TCM therapy continues to advance, warm acupuncture has demonstrated promising therapeutic effects in the treatment of RA. Due to its favorable outcomes, this TCM approach has gradually garnered widespread attention and recognition in clinical practice²⁰. Warm acupuncture has an overall regulatory effect on RA. On the one hand, through warm acupuncture, it can promote blood circulation and improve conditions, stimulating the release of endogenous 5-hydroxytryptamine and other factors, exerting analgesic and symptom-improving effects²¹. On the other hand, the burning of the moxa stick produces antioxidant substances and through the heat transmission, it can not only further enhance the analgesic effect but also help to relieve joint mobility²².

In our study, the results indicated that two months post-treatment, the study group demonstrated significant improvements compared to the control group, including a shorter duration of morning stiffness, a reduced number of painful and swollen joints, lower levels of TNF- α , IL-6 and CRP, lower serum RF and ESR levels, lower VAS scores, lower TCM syndrome scores of joint deformity, joint functional impairment, pain and fear of cold, lower total incidence rate

of adverse reactions and higher WHOQOL-BREF scores of physiology, psychology, society and environment. These findings indicated that for RA patients, the combination of warm acupuncture and Western medicine could improve symptoms, diminish pain, alleviate inflammatory responses, enhance quality of life, and is highly safe. This is because warm acupuncture is a TCM therapy that combines moxibustion and acupuncture. It can dissolve blood stasis and relieve pain through the needle insertion effect, unblock the meridians, nourish the liver and kidneys. Moreover, it also utilizes the warming effect of moxibustion to promote the nourishment of the kidneys, dispel cold and eliminate dampness²³. In this study, Dazhui point is located on the Du meridian. It can regulate the Du Meridian, invigorate yang energy, dispel cold and relieve wind²⁴. Quchi point is the confluence point of the hand-yangming meridian of the large intestine. It can relieve rheumatism, unblock meridians, promote blood circulation, and benefit joints²⁵. Guanyuan and Qihai points dispel can cold and promote the circulation of yang qi^{26,27}. Zusanli point is a meridian point on the stomach meridian of foot-yangming. It can replenish qi and strengthen the body's energy, as well as regulate the spleen and stomach²⁸. Sanyinjiao point belongs to the convergence point of the Jueyin liver meridian of foot, the kidney channel of foot Shaoyin, and the spleen meridian of foot-Taiyin. It can nourish blood, activate blood circulation, and tonify the kidneys and regulate the liver²⁹. Taichong point belongs to the main acupoint of the Jueyin liver meridian of foot. It can regulate blood circulation, relieve pain, nourish the liver, and eliminate dampness and toxins³⁰. Yanglingquan point belongs to one of the eight meridian points and is the point of the meridian system. It can relax the tendons and ligaments³¹. Fengchi point is an important acupoint for dispelling wind and relieving wind symptoms³². Waiguan point regulates the meridians and relieves stiffness³³. Shenshu and Pishu points can nourish the spleen and kidneys³⁴. When these acupoints are used together, they can address both symptoms and root causes. Our findings are in line with those of previous studies. Jin et al. conducted a systematic review and meta-analysis, which revealed that warm acupuncture exhibited superior therapeutic efficacy in treating knee osteoarthritis when compared to other TCM modalities³⁵. Similarly, Si et al. reported that Mongolian medical warm acupuncture effectively alleviated leg and waist pain, enhanced overall treatment outcomes, and improved the daily life quality of patients suffering from sciatica due to lumbar disc herniation, demonstrating notable long-term benefits³⁶. Furthermore, Sun et al. found that the combination of warm acupuncture, meloxicam, and comprehensive nursing care could effectively reduce knee swelling and pain in patients with knee osteoarthritis, with the underlying mechanism potentially linked to a reduction in inflammatory mediator levels³⁷.

In conclusion, our study demonstrates that warm acupuncture can improve symptoms, relieve pain, alleviate inflammatory responses, enhance quality of life, and is highly safe in the treatment of RA.

Declarations

Ethics approval and consent to participate

This study involving human participants was reviewed and approved by the Ethics Committee of Zhangjiagang Hospital of Traditional Chinese Medicine. Written informed consent was obtained from all participants prior to enrolment, in line Integrative Therapies and Translational Insights Special Issue

with institutional and Helsinki principles.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

QZ: study conception, patient recruitment, data curation, draft writing.

YS: study design, methodology, supervision, critical revision, corresponding author responsibilities.

JH: intervention administration, outcome assessment, data validation, manuscript editing.

LL: statistical analysis, figures/tables preparation, literature review, manuscript editing.

All authors read and approved the final manuscript and agree to be accountable for all aspects of the work.

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Table 5. Comparison of the mean scores the pregnant women obtained from the PIKQ and UIAS in terms of some variables (n= 255)

Variables	PIKQ		UIAS	
	Mean±SD	p-value	Mean±SD	p-value
Age				
<30	8.12±2.79	0.73	42.34±3.33	0.96
≥30	8.01±2.45		42.32±3.66	
Education Status				
Primary school	6.86±2.84	0.00 ^b	41.37±3.15	0.00 ^b
High school	8.16±2.67		42.31±3.48	
University and above	8.90±2.10		43.05±3.57	
Gravida				
Primigravida	8.14±2.78	0.47	43.18±3.26	0.94
Multigravida	8.03±2.55		41.80±3.33	
Parity				
Nulliparous	8.01±2.74	0.24	43.19±3.21	0.00 ^b
Primiparous	8.38±2.51		41.97±3.39	
Multiparous	7.62±2.66		41.21±3.80	
UI during pregnancy (n=130)				
Yes	8.24±2.27	0.305	42.16±3.13	0.414
No	7.90±2.98		42.52±3.81	
Pregnant women presenting to healthcare services with a complaint of UI (n=130)				
Yes	8.20±2.38	0.882	42.88±3.94	0.059
No	8.26±2.22		41.79±2.57	

