Study protocol of "Our Choice": a randomized controlled trial for optimal implementation of psoriasis treatment by the integration of Chinese and western medicine

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Abstract

Background Plaque psoriasis is a refractory inflammatory skin disease. Traditional Chinese medicine (TCM) and Western medicine (WM) therapies commonly used to treat plaque psoriasis have distinct characteristics and advantages. Although a combination of TCM and WM therapies adjusted to the clinical situation is widely used, there have been no systematic studies on the hierarchical selection of treatment combinations according to the severity of skin lesions. We therefore designed a randomized clinical trial to focus on the sequence of internal and external treatments in patients with mild-to-moderate plaque psoriasis and sought to optimize the integrated Chinese and Western medicine for treatment of patients with severe plaque psoriasis, so as to achieve high-level clinical evidence and establish treatment norms for the integrated use of Chinese and Western medicines.

Methods In the proposed multi-center, single-blinded, randomized, controlled trial, 108 patients with mild-to-moderate plaque psoriasis will be randomly assigned to two groups in a 1:1 ratio to receive internal and external TCM treatments, respectively, and 270 patients with severe plaque psoriasis will be randomly assigned to three groups in a 1:1:1 ratio to receive treatment with TCM, WM, and integrated Chinese and Western medicine, respectively. All enrolled patients will receive 8 weeks of treatment and 8 weeks of follow-up. The primary outcome will be an evaluation of efficacy and relapse rate based on the Psoriasis Area and Severity Index. Secondary outcome measures will include a determination of affected body surface area, physician’s global assessment, pruritus scores determined using a visual analogue scale, TCM symptom score, dermatology life quality Index, patient-reported quality of life score, and incidence of serious adverse events. Discussion This study will provide a high level of clinical evidence for internal and external TCM treatment optimization and will contribute to establishing norms for the
integration of Chinese and Western medicines.

Background

Psoriasis is a common chronic relapsing inflammatory skin disease with a prevalence of 2% to 4% [1]. Although the underlying cause of psoriasis is not fully understood, it is generally believed that the disease is associated with genetic, metabolic, immunological, endocrinal, and infective etiologies [2]. Psoriasis, particularly the refractory plaque psoriasis, can have considerable detrimental effects on patient quality of life. In Western medicine (WM), treatments for psoriasis, including the use of topical corticosteroids, vitamin D derivatives, calcineurin inhibitors, systemic phototherapy, acitretin, cyclosporine A, immunosuppressants, and biological agents [3], can alleviate the clinical symptoms to varying degrees; however, potential safety problems and high costs can often limit clinical application.

The treatment of psoriasis using traditional Chinese medicine (TCM) has a long history, with earliest records being traced back to more than 1400 years ago. This treatment is based on a complete theoretical system, which has evolved progressively in response to developments in science and technology and the considerable changes in lifestyle. A series of systematic reviews of TCM in clinical practice have indicated that this approach is effective in the treatment of psoriasis [4–10], and clinical and experimental data indicate that TCM can modify psoriasis by antagonizing or regulating interleukin and the IL-23/IL-17 axis to inhibit the main causal pathways [11].

In a clinical trial conducted by our research team, we found that treatment with Jueyin prescription (JYP), a compound Chinese herbal preparation containing seven constituents (i.e., abalone shell, honeysuckle, tree peony bark, dried Rehmannia root, Hedyotis diffusa, folium, and turmeric root-tuber; see Table 1 for details), is safe and effective in patients with early-stage psoriasis [12]. The mechanism of action of this preparation is believed to
be related to the inhibition of keratinocyte proliferation, enhancement of epidermal parakeratosis, and a reduction in the expression of nitric oxide and malondialdehyde[13]. These assumptions have accordingly been verified in in vitro studies, in which a 5% JYP was observed to have a significant inhibitory effect on the proliferation of HaCaT cells, with primary effects on the G1 phase of the cell cycle [14].

In TCM, moving cupping therapy is a type of acupuncture therapy that is often used in China and other Asian countries, and is gradually being accepted worldwide, owing to its simplicity, convenience, and effectiveness [15]. Compared with oral Chinese medicine alone, a more pronounced decrease in psoriasis area and severity index (PASI) score has been recorded in psoriasis patients treated with moving cupping therapy combined with TCM [16]. In this type of therapy, a vacuum is generated by heating the air in a tank with a flame, and cupping produces a mild attraction in the skin, which is characterized by a strong adsorptive force and a deep action on skin lesions. Coupled with the rapid push and pull of the can body at the site of skin damage, moving cupping can activate qi and blood circulation, dissipate blood stasis, regulate meridians and collaterals, and stimulate the vitality of the body to strengthen resistance and eliminate pathogenic factors. Previous studies have shown that moving cupping therapy combined with TCM ointment is effective in the treatment of plaque psoriasis, with an effect equivalent to that obtained following exposure to narrow-band ultraviolet B radiation (NB-UVB) combined with externally applied capotriol ointment [17].

NB-UVB phototherapy is a common and effective method for the treatment of plaque psoriasis, for which an optimal wavelength of 313 nm has been demonstrated to have high efficacy and a low side-effect profile [18, 19]. UV light has been shown to have effects on various components of the natural and acquired immune responses and is related to a depletion of Langerhans cells and T cells in the epidermis [20-22]. Previous studies have
indicated that in patients with psoriasis, the serum levels of 25-hydroxyvitamin D increase in response to NB-UVB treatment, and that there is a correlation between this increase and the number of therapy sessions [23]. Moreover, changes in the skin microflora following UVB treatment may be related to treatment response [24]. These findings thus indicate that the effectiveness and safety of phototherapy on psoriasis may depend on a complex interaction of immunological and metabolic mechanisms. In addition, according to clinical reports, compared with exposure to NB-UVB alone, NB-UVB combined with a TCM medicated bath can improve the curative effect, reduce the cumulative dose, and lessen the adverse reactions of UV radiation [25].

Whereas TCM and WM are both commonly used in the treatment of psoriasis, and each has associated advantages and characteristics, the combined application of these two approaches can enhance the curative effect and reduce side effects and the rate of recurrence. Accordingly, it is not surprising that the combination of TCM and WM therapies, adjusted according to the situation, is widely used in clinical practice. However, to the best of our knowledge, there have been no previous clinical studies that have examined the hierarchical selection of treatment combinations according to the severity of skin lesions. To date, only pairwise combinations of Chinese herbal medicine, cupping therapy, and NB-UVB phototherapy for plaque psoriasis have been reported, and the curative effects have been found to differ. In the multi-center, randomized, controlled, single-blinded clinical trial proposed herein, we intend to combine Jueyin granules (JYG) and moving cupping therapy in patients with mild-to-moderate plaque psoriasis, and combine JYG, moving cupping therapy, and NB-UVB phototherapy in patients with severe plaque psoriasis, with the aim of optimizing internal and external TCM treatments and establishing a high level of clinical evidence and treatment norms for the integration of Chinese and Western medicines.
Methods

Design

This is a multi-center, single-blinded, randomized, controlled trial that will be conducted to determine the appropriate time for intervention with TCM and will involve a sequential treatment plan for severe psoriasis combining TCM and WM. The study will be conducted at the following six centers in China: the Shanghai Yueyang Integrated Medicine Hospital, the Shanghai Dermatology Hospital, the Chinese Medicine Hospital Affiliated to the Southwest Medical University, Wuhan No. 1 Hospital, The Second Affiliated Hospital of Fujian Traditional Chinese Medical University, and the Affiliated Hospital of the Nanjing University of Chinese Medicine.

The study consists of three phases, namely, the periods of screening, treatment, and follow-up. During the initial screening period, patients will be recruited to dermatological clinics for body surface area (BSA) assessments and laboratory tests (including pregnancy tests for women of child-bearing age), and will assessed on the basis of the designated inclusion and exclusion criteria. Eligible participants will be required to sign a written informed consent form. The signature page of the informed consent form shows whether the patient agrees to participate in the biobank initiative. The investigator will clearly explain to the participants all the details of the informed consent form to ensure that they are fully aware of their rights and are able to cooperate with researchers to complete the entire treatment and follow-up process. Participants who provide their informed consent and meet the laboratory test criteria will undergo the medical procedure based on their BSA score. Patients with mild-to-moderate plaque psoriasis will be randomly assigned to one of two groups in a 1:1 ratio, with the patients in one group receiving JYG and moving cupping placebo therapy, and those in the other group receiving Jueyin placebo granules.
(JYPG) and moving cupping therapy. The patients in these two groups will be evaluated after 4 weeks of treatment, and if a 75% reduction in the PASI (PASI 75) is achieved, the medical procedure will be continued until the end of the 8-week study. If a PASI 75 score is not achieved, the moving cupping placebo therapy will be switched to moving cupping therapy and JYPG will be switched to JYG in the subsequent 4 weeks of treatment. Patients with severe plaque psoriasis will be randomly assigned to one of three groups in a 1:1:1 ratio to receive JYG, moving cupping therapy, and NB-UVB placebo therapy; JYPG, moving cupping placebo therapy, and NB-UVB therapy; and JYG, moving cupping therapy, and NB-UVB therapy, respectively (Fig. 1). At each visit, we will evaluate and record relevant patient efficacy indicators and TCM symptom information, and obtain images of target lesions. This manuscript has been written in accordance with the Standard Protocol Items: Recommendations for Interventional Trials (SPIRIT) 2013 Checklist (see Additional file 1). The results of the study will be disseminated to the public through conference reports and open-access journals.

**Eligibility criteria**

**Inclusion criteria**

To be eligible for recruitment, patients must meet all of the following criteria:

1. Plaque psoriasis; the course of the disease is not limited.

2. Skin lesions covering ≤15% of BSA (the lesions should be mainly located on the trunk and/or limbs, palms/soles, face/scalp; the vulva area should not be included).

3. Male or female patients aged 18 to 65 years.

4. Provision of informed consent.

**Exclusion criteria**

Patients who meet any of the following criteria will not be eligible for recruitment:

1. Patients with other active skin diseases that may affect condition assessment.
2. Patients who have received systematic treatment with research drugs, biological agents, or immunosuppressive agents within 2 months prior to screening.

3. Patients who have received treatment with topical glucocorticoids, retinoic acid, or phototherapy within 2 weeks prior to screening.

4. Patients with severe, uncontrollable local or systemic acute or chronic infections.

5. Patients with severe systemic diseases, or the following clinical test indicators: an increase in alanine transferase or glutamate transferase level of >1.5 times the upper limit of normal or an increase in serum creatinine level of >1.5 times the upper limit of normal. Patients with any of the main standard blood indicators (white blood cell count, red blood cell count, hemoglobin level, and platelet count) below the lower limit of normal, or those with other laboratory abnormalities judged by the investigators to be unsuitable for inclusion in the study.

6. Patients with a history of malignant tumors and patients with primary or secondary immunodeficiency and hypersensitivity.

7. Patients who have undergone major surgery within 8 weeks or will require such surgery during the study period.

8. Patients who are pregnant or lactating.

9. Patients with a history of either alcohol or drug abuse.

10. Patients with a history or family history of a serious mental illness.

11. Patients with a family history of cancer.

12. Patients who were judged by the investigators to be unsuitable for inclusion in the study for other reasons.

Interventions

**TCM internal treatment group (Group A)**

Participants in the TCM internal treatment group will receive JYG two times daily after
meals and moving cupping placebo therapy three times weekly for 8 weeks.

**TCM external treatment group (Group B)**

Participants in the TCM external treatment group will receive JYPG two times daily after meals and moving cupping therapy three times weekly for 8 weeks.

**TCM treatment group (Group C)**

Participants in the TCM treatment group will receive JYG two times daily after meals and moving cupping therapy and NB-UVB placebo therapy three times weekly for 8 weeks.

**WM treatment group (Group D)**

Participants in the WM treatment group will receive JYPG two times daily after meals and moving cupping placebo therapy and NB-UVB therapy three times weekly for 8 weeks.

**Integrated Chinese and Western medicine group (Group E)**

Participants in the integrated Chinese and Western medicine group will receive JYG two times daily after meals and moving cupping therapy and NB-UVB therapy three times weekly for 8 weeks.

All patients in each of the treatment groups will be provided with an emollient (YuZe Skin Barrier Recovery Body Lotion®, developed by the Rui Jin Hospital and produced by Shanghai Jahwa United Company, China) as a basic skin care. This emollient will be provided free of charge by the research team, and we anticipate that this will contribute to enhancing patient compliance. During the fortnightly follow-ups of treatment period, each participant will be requested to record the use of emollients and drugs. Unused emollients and drugs will be required to be returned to the hospital for recovery prior to the distribution of new emollients and drugs.

In the preparatory phase of the trial, we fully considered the time cost of each patient follow-up. In the debugging phase of the case management system, we added the mobile
phone upload function of the patient laboratory examination report and skin lesion photos, and set up the treatment follow-up reminder function to reduce the loss of visit rate. When signing the informed consent form, participants were informed of the burden of the study and their freedom to withdraw from the study at any time. All participants will receive feedback on the results of the relevant assessment upon completion of the study.

Outcome measures

**Primary outcome**

The primary outcome in this trial is an evaluation of the efficacy and incidence of relapse in response to sequential treatment with integrated Chinese and Western medicines during the treatment and follow-up periods. In the context of the present study, relapse is defined as a PASI score exceeding the baseline score at the time of enrolment, or development of new pustules or erythroderma [26]. PASI will be assessed at the baseline and at 2-week intervals during the treatment period and 4-week intervals throughout the follow-up period.

**Secondary outcomes**

The secondary outcome measures in the study will be as follows: (i) improvement in BSA, (ii) improvement in physician’s global assessment (PGA), (iii) visual analogue scale (VAS) scores for pruritus, (iv) improvement in TCM symptom score, (v) improvement in the Dermatology Life Quality Index (DLQI) and Patient-Reported Quality of Life (PRQoL), and (vi) incidence of serious adverse events (SAEs).

The BSA, PGA, VAS score, TCM symptom score, DLQI, and PRQoL will be assessed at baseline, at 2-week intervals during the treatment period, and at the end of the follow-up period. Laboratory tests, including complete blood counts, urinalysis, and hepatic and renal function tests, will be performed at baseline and 8 weeks after treatment (Table 2).

Sample size
We calculated the sample size necessary for the proposed trial based on the results of previous studies performed by our group and domestic counterparts [27–29]. The effective rates for group A, B, D, and E were 30.0%, 75.0%, 66.0%, and 88.0%, respectively. The significance level (alpha) was 0.05 and the statistical power was 80%. On the basis of our calculation using PASW Statistical software (V.18.0), we determined that sample sizes of 32 for groups A and B and 54 for groups C, D, and E would be necessary. However, taking into account a potential 40% loss of patients to follow-up, we considered it prudent to adjust the total sample size of groups A and B to 54 patients and that of groups C, D, and E to 90 patients.

Randomization and allocation

Eligible patients with mild-to-moderate and severe psoriasis enrolled at each of the six participating institutions will be randomized separately. At the second visit, patients with mild-to-moderate psoriasis will be randomly assigned to either Group A or Group B in a 1:1 ratio, whereas those with severe psoriasis will be randomly assigned to Group C, Group D, or Group E in a 1:1:1 ratio. Randomization will be performed using a computer-generated random assignment sequence using the central layering and block randomization method of SAS software (V.9.4).

A responsible unit unrelated to this clinical trial will be designated to complete the packaging and distribution of the drugs (test drug and control drug) under the supervision of statisticians. Allocation concealment will be ensured. A randomization code will be released using a data network platform designed by the data management center of Jiangsu Famaisheng Medical Technology. Thereafter, the participants will be randomly allocated to the different treatment groups.

Test drugs, therapies and blinding
The JYG and corresponding placebo granules that will be used in the trial have been prepared by Sanjiu Pharmaceuticals (Hefei, Anhui Province, China). These drugs have met the requirements of Good Manufacturing Practice for Pharmaceutical Products. The main constituents of the placebo granules are maltodextrin, lactose, and a natural edible pigment, which are similar to JYG constituents in terms of appearance, weight, and taste. The glass cupping jars used for moving cupping therapy are produced by Guandong Glass Products (Haimen City, Jiangsu Province, China). Moving cupping placebo therapy will be performed by drilling a hole in the top of the tank (0.6 cm in diameter). Moving cupping placebo therapy will have a push and pull effect on and around the skin lesion, but will not have negative pressure attraction effect. The standard operating procedure of moving cupping will be in accordance with Part 5. Cupping of the People’s Republic of China Standard G/B21709.5–2008. In both moving cupping therapy and moving cupping placebo therapy, we will use white Vaseline as a lubricating matrix. NB-UVB therapy will be performed using an NB UV-wave therapy device, and the placebo therapy will be performed by adjusting the dose to 100 mJ/cm\(^2\). Moving cupping therapy and phototherapy will be performed by designated trained researchers, and patients will be required to wear an eye patch when the treatment is being performed. Practitioners will be blinded to the allocation, and patients in all five treatment groups will undergo similar medical procedures. Moreover, the statisticians assigned to analyze the results will be blinded to the group allocation.

Statistical analysis

All analyses will be performed using SAS statistical software and the data network platform designed by the data management center of Jiangsu Famaisheng Medical Technology. The outcome assessors will be blinded to group allocation. A comprehensive
efficacy analysis will be performed using the full analysis set and the compliance set. The analysis of demographic and other baseline characteristics and other efficacy indicators will be selected according to the compliance set.

Qualitative data will be analyzed using the chi-square test, Fisher’s exact probability method, Wilcoxon rank sum test, and Wilcoxon least squares covariance. Quantitative data conforming to a normal distribution will be analyzed using a t-test (a homogeneity test of variance between groups, with 0.05 as the test level, and the Satterthwaite method will be used for the corrected t-test when the variance is not uniform). Data that do not conform to a normal distribution will be analyzed using the Wilcoxon rank sum test, Wilcoxon symbol rank sum test, and generalized linear model covariance. Hypothesis testing will be performed using a two-sided test with \( P \leq 0.05 \) indicating statistical significance and \( P \leq 0.01 \) indicating a high statistical significance.

**Adverse events**

Medical history records will be prepared for each participant, which will include the results of standard laboratory examinations before the start of the study and after 8 weeks of treatment. Standard laboratory examinations will include the following: blood routine, urine routine, and indices of renal function (uric acid, creatinine, and urea) and hepatic function (alanine aminotransferase, aspartate aminotransferase, total bilirubin, and \( \gamma \)-glutamyl-transpeptidase).

At each of the 2-weekly visits during treatment, the investigator will collect data pertaining to all adverse events, their severity, and potential relationship to treatment. Safety assessment will include determination of the incidences of treatment-related adverse events (trAEs) or SAEs, the rate of trAEs contributing to discontinuation, and changes in laboratory parameters. If SAEs occur, all medications and therapies in this trial will be discontinued immediately.
Data management

All researchers and research assistants will attend training seminars before the beginning of the trial. Researchers at different centers will be requested to follow the same standard operating procedures. Data entry will be completed using the case management system specifically designed for this trial by Jiangsu Famaisheng Medical Technology. To ensure quality and consistency between the source data and the data entered into the system, after the completion of each visit, the data will be entered separately at each center by two research assistants and reviewed by the lead investigator. The quality control personnel of the Shanghai Yueyang Integrated Hospital (Shanghai, China) will regularly monitor the data collected at each participating center during the entire study period. The final data will be reviewed and inspected by the Office of State Key Technology R&D Program of the Ministry of Science and Technology of China.

Discussion

Psoriasis is an immune-related disease characterized by a gradual long-term development and frequent recurrence of symptoms. It can lead to social isolation, occupational stress, and stigmatization, and have negative impacts on the quality of the daily life of adults and children [30–37]. On the basis of an in-depth survey of recent clinical trials and research on the underlying mechanisms, we found that there is increasing evidence to support the identification of psoriasis as a chronic multi-system inflammatory disease that is associated with a variety of related diseases. The complications associated with psoriasis include hypertension, cardiovascular disease, metabolic syndrome, malignant tumors, and inflammatory bowel disease [38]. Moreover, psoriasis has emerged as a condition that is indicative of an increased risk of disease and death associated with these diseases [39]. Three types of psoriasis syndrome are widely recognized based on TCM theory, namely
blood heat, blood stasis, and blood deficiency. Blood heat is considered a key pathological factor in the progression of psoriasis, whereas blood deficiency is more common in the stationary phase of the disease, and blood stasis may be present throughout the course of the disease. JYP is a representative prescription for the blood-heat syndrome of psoriasis, and in the treatment of plaque psoriasis, the seven constituents that comprise this preparation play roles in clearing heat and cooling blood, and in the detoxification and removal of blood stasis.

In a previous study, our research group found that JYP was an effective and safe medication for mild-to-moderate psoriasis vulgaris, with no obvious adverse reactions [12]. In addition to mechanistic research, we also conducted acute and chronic toxicity tests for 6 months in a mouse model of psoriasis and found that treatment with Jueyin granules caused no significant abnormalities in physiological parameters or pathological changes in the major organs of rats [40]. We accordingly consider that Jueyin granules are a safe and effective medication for the treatment of psoriasis. A pooled analysis conducted by our research group has also indicated that levels of IFN-γ, IL-17, IL-23, and TNF-α are significantly increased and those of IL-4 and IL-10 significantly decreased in the sera of patients with the blood-heat syndrome of psoriasis [41]. Determining whether the JYP has any effect on the aforementioned immune factors will be a focus area of our future research. To ensure high treatment compliance in the present trial, we intend to use JYP granules instead of Chinese herbal medicine. In this regard, we have previously established the quality control standard of JYG by using high-performance liquid chromatography to determine the contents of chlorogenic acid and paeonol in granules [42].

Most clinical trials in China have shown that the clinical effects of oral administration of TCM combined with external treatment of psoriasis are superior to those obtained via
oral administration or external treatment alone. Moving cupping therapy is particularly effective for the treatment of plaque psoriasis. It is non-invasive and has no-side effect therapeutic advantages, being simple, convenient, and inexpensive. Furthermore, it can promote lesion thinning and regression. Given that previous studies have indicated that the efficacy of moving cupping therapy in the treatment of plaque psoriasis for 8 weeks was higher than that for 4 weeks [43], we designed the entire treatment cycle to run over a course of 8 weeks.

In the present study, patients with mild-to-moderate psoriasis will be treated with TCM. After 4 weeks of treatment, depending on whether PASI 75 is reached, the necessity to adjust the JYPG to JYG or the moving cupping placebo therapy to moving cupping therapy will be evaluated. This novel study design facilitates not only a comparison of the curative effects of internal treatment using TCM with those of external treatment with TCM, but also enables an assessment of the intervention opportunities for internal and external treatment with TCM. The use of sequential treatment of TCM is in line with clinical practice.

For the purposes of the present trial, we intend to conduct NB-UVB phototherapy three times weekly, given that additional exposure and higher UVB doses can increase the incidence of adverse reactions, although for some patients, it has been found that a frequency of five exposures a week is associated with a more rapid cure of psoriasis [44, 45]. Moreover, NB-UVB phototherapy three times a week can be combined with moving cupping therapy to enhance patient compliance. Patients with severe plaque psoriasis will be treated separately with TCM, WM, or integrated Chinese and Western medicine, in an effort to achieve the desired goal of rapid and long-term effects with no side effects, and to establish high-level clinical evidence and treatment norms for integrated Chinese and Western medicine.
In addition, the use of moisturizer is necessary in any course of treatment for plaque psoriasis, and in this regard, all participants enrolled in this trial will receive a basic skin care product, namely, YuZe Skin Barrier Recovery Body Lotion®, a moisturizer containing linoleic acid-ceramide. Clinical trials have shown that local use of this moisturizer can relieve psoriasis and may be an effective approach in the treatment and prevention of this disease [46].

In this trial, we will compare TCM granules, moving cupping therapy, and NB-UVB phototherapy with placebo granules or placebo therapy to obtain high-grade clinical evidence. In the study design, there is no stratification based on TCM syndromes, because JYG can clear heat, cool blood, and detoxify and remove blood stasis. As an important part of the National Key Research and Development Program of China, which focuses on the real world research of psoriasis with different syndrome types and the systematic pharmacological study of representative prescriptions, this study will contribute to determining the basic principles and application of the “new blood syndrome theory” and promote the innovation of the academic connotation of “TCM differentiation of blood treatment theory” for psoriasis. The results will provide a new perspective on the timing and options of therapy based on internal and external TCM treatment and integrated Chinese and Western medicine treatment for plaque psoriasis.

**Trial Status**

Protocol version 3.0 (May 03, 2019). Participant recruitment began on September 2019 and is expected to be completed by the end of September 2021. The trial procedures are expected to be completed by the end of December 2021.

**Abbreviations**

TCM: Traditional Chinese medicine; WM: Western medicine; JYP: Jueyin prescription; PASI:
psoriasis area and severity index; NB-UVB: narrow-band ultraviolet B radiation; JYG: Jueyin granules; BSA: body surface area; JYPG: Jueyin placebo granules; PASI 75: 75% reduction in the PASI; PGA: physician’s global assessment; VAS: visual analog scale; DLQI: Dermatology Life Quality Index; PRQoL: Patient-Reported Quality of Life; SAEs: serious adverse events; trAEs: treatment-related adverse events.

Declarations

Ethics approval and consent to participate

The study has been approved by the Institutional Ethics Committee of Shanghai Yueyang Integrated Medicine Hospital (#2019–031), and we will not begin recruiting at other centers until local ethical approval has been obtained. Informed consent will be obtained from all participants before study initiation.

Consent for publication

Not applicable.

Availability of data and materials

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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Authors’ contributions
BL, XL, XYZ, and RYH contributed to the conception and design of the study; SXY, XL, and BL provided administrative support; YGW, WXY, NH, YFD, SG, CYY, HLW, YZ, and LL were involved in the provision of materials or patients; all authors contributed to writing the manuscript; and all authors provided final approval of the manuscript.

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Tables

Table 1. Constituents of the Jueyin prescription

| Main constituents         | Scientific name         | Plant part(s) | Amount (g) |
|---------------------------|-------------------------|---------------|------------|
| Abalone shell             | Concha haliotidis       | shell         | 30         |
| Honeysuckle               | Lonicera japonica Thunb | flower        | 15         |
| Tree peony bark           | Cortex Moutan           | bark          | 15         |
| Dried rehmannia root      | Rehmannia glutinosa Libosc | root     | 30         |
| Hedyotis diffusa          | Hedyotis diffusa Willd  | whole grass   | 30         |
| Folium                    | Isatidis                | leaf          | 30         |
| Turmeric root-tuber       | Curcuma aromatica Salisb | root     | 9          |

Table 2. Schedule for treatment and outcome measurements
| Enrolment | Intervention | Assesement | Other issues |
|-----------|--------------|------------|-------------|
| Eligibility screening | JYG + moving cupping placebo | PASI | Drug distribution |
| Informed consent | JYPG + moving cupping | BSA | Combined medication record |
| Laboratory examination | Emollients | PGA | |
| Pregnancy test (women of child-bearing age) | | DLQI | |
| Characteristic | | PRQoL | |
| Medical history | | VAS | |
| Random allocation | | TCM syndrome | |
| Skin lesion area ≤ 10% BSA | | Safety assessment | |
| JYG + moving cupping | | Shooting lesions | |
| JYPG + moving cupping | | Drug distribution | |
| Emollients | | | |
| 10% < Skin lesion area ≤ 15% BSA | | | |
| JYG + moving cupping + NB-UVB placebo | | | |
| JYPG + moving cupping placebo + NB-UVB | | | |
| JYG + moving cupping + NB-UVB | | | |
| Emollients | | | |
| | | | |
| Adjustments according to PASI 75% | | | |
| Adjustments according to PASI 75% | | | |

BSA: body surface area, JYG: Jueyin granules, JYPG: Jueyin placebo granules, NB-UVB: narrow-band ultraviolet B radiation, PASI: Psoriasis Area and Severity Index, PGA: Physician Global Assessment, DLQI: Dermatology Life Quality Index, PRQoL: Patient reported quality of life, VAS: visual analog scale, TCM: traditional Chinese medicine

Figures
Supplementary Files

This is a list of supplementary files associated with the primary manuscript. Click to download.

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