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Original Article

Whether Fire-Needle Therapy Benefits Plaque Psoriasis: A Multicenter, Randomized, and Controlled Trial*

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ABSTRACT **Objective**: To observe the clinical effectiveness and safety of fire-needle therapy, an external approach of Chinese medicine in treating plaque psoriasis. **Methods**: This study was a two-parallel-arm randomized controlled trial. A total of 151 participants with plaque psoriasis were randomly assigned to the fire-needle therapy group (treatment group, 76 cases) or the control group (75 cases) at a 1:1 allocation ratio using SAS software. All participants received Oral Huoxue Jiedu Decoction (活血解毒汤, HXJDD) and applied externally vaseline cream twice a day. Participants in the treatment group received fire-needle therapy once weekly for 4 weeks plus HXJDD and vaseline cream applied the same as the control group. The primary outcome measure was Psoriasis Area and Severity Index (PASI) score, and the secondary outcomes were Dermatology Life Quality Index (DLQL), and Hamilton Anxiety Rating Scale (HAMA), as well as Chinese medicine (CM) syndrome score and photos of target lesions. The indices were evaluated before and after treatment. **Results**: Sixty-eight patients in each group completed the study. The treatment group has not yet achieved significant improvement in PASI score ($P>0.05$) compared to the control group. However, significant differences were found between the two groups in relieving CM syndrome ($P<0.05$) and improving quality of life ($P<0.05$). **Conclusions**: Fire-needle appears to be safe and may have benefit for psoriasis, the short-term treatment and small sample size limit the conclusions of this study. Further rigorous randomized controlled trials with longer treatment are recommended.

KEYWORDS fire-needle therapy, Chinese medicine, Huoxue Jiedu Decoction, plaque psoriasis, randomized controlled trial

Psoriasis is a common, autoimmune, recurrent inflammatory skin disease with poorly defined etiology and no curative treatments.[1,2] Psoriasis vulgaris is a typically type of psoriasis characterized by plaques of scaly and thickened skin.[3] Of those with plaque psoriasis, approximately 20% develop into moderate-to-severe cases[4] which affects patients both physically and psychologically leading to a significant negative effect on health-related quality of life (HRQoL).[5] Patients with psoriasis reduced HRQoL comparable with that due to hypertension, diabetes, cancer, depression, and heart disease.[6] There is no cure for psoriasis. Although many treatment options exist, including topical drugs, phototherapy, systemic drugs such as methotrexate, biological drugs and alternative therapies, their effects in treating psoriasis are limited by contraindications, poor tolerability,[7-9] adverse events and patient preference/tolerability for administration route, especially for plaque psoriasis.[10,11] Additionally, not all patients are responsive to currently available treatments, or may lose their initial response over time.

Chinese medicine (CM) has been widely used in China and some other eastern Asian countries in the treatment of psoriasis. It was found that Huoxue Jiedu Decoction (活血解毒汤, HXJDD) could significantly improve the symptoms of the skin lesion and decrease the Psoriasis Area and Severity Index (PASI) scores

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in patients with plaque psoriasis.[12] Fire-needle therapy is a traditional Chinese external treatment.[13] In treatment, after being heated on the flame until red, the fire-needle will be immediately inserted into the target area and removed quickly. Fire-needle therapy has been used for a long time as an adjunctive method to treat various diseases, especially knotty disorders such as spastic hemiplegia,[14] osteoarthritis,[13] and psoriasis.[15]

However, to our knowledge, few randomized controlled trials (RCTs) have been conducted to provide evidence supporting their benefits and safety. Herein, the objective of this study is to explore the effectiveness and safety of fire-needle therapy in the treatment of plaque psoriasis.

METHODS

Inclusion and Exclusion Criteria

Participants were eligible if they were: (1) aged 18–65 years old, (2) diagnosed with plaque psoriasis according to the "Clinical Guidelines of Psoriasis 2008" issued by the Chinese Medical Association,[16] and (3) had the skin lesion area < 30%, with no special treatment within 1 week before inclusion. All participants provided written informed consent prior to participation in the study. Participants were excluded if they had infectious disease, liver disease, kidney disease, diabetes mellitus and psychosis. Participants who refused to receive fire-needle therapy treatment or participated in other clinical trials at the same time were excluded from this study and patients who were allergic to medication applied in the study or its composition were rejected from this study.

Participants

This study was a two-parallel-arm randomized controlled trial. We recruited participants with plaque psoriasis from the Department of Dermatology of China-Japan Friendship Hospital, Dongzhimen Hospital Affiliated to Beijing University of Traditional Chinese Medicine, and Shunyi District Branch of Beijing Hospital of Traditional Chinese Medicine between May 2013 and December 2015. This study was approved by the Medical Ethics Committee of China-Japan Friendship Hospital (No. 2013-18) and registered in World Health Organization (WHO) acupuncture clinical trial registry (No. AMCTR-IOR-16000013).

Eligible patients were randomly allocated to the fire-needle therapy group (treatment group) or the control group at a 1:1 allocation ratio, using a computer-generated program through SAS software by an independent statistician. The allocation concealment was applied using a centralized service. No blinding was practical for this trial, and the treatments were open to both the researchers and participants.

Application of Intervention

Participants in the control group orally took the HXJDD 100 mL twice daily after meals, and applied externally vaseline cream twice daily to all the skin lesions on all areas of the body, continuously for 4 weeks. The ingredients of HXJDD consists of *seedsmen Persicae* 12 g, *Flos Carthami* 10 g, *Rhizoma Curcumae* 12 g, *Ramulus Euonymi* 15 g, *Radix et Rhizoma Salviae Miltiorrhiza*e 15 g, *Caulis Spatholobi* 30 g, *Herba Hedyotis Diffusa*e 30 g, and *Spina Gleditsiae* 15 g. These Chinese herbs purchased by the Department of Pharmacy of China-Japan Friendship Hospital were made into decoction, and stored in 100 mL bottles. Quality of the HXJDD was controlled by the Department of Pharmacy of China-Japan Friendship Hospital. Vaseline cream was purchased by the Department of Pharmacy of China-Japan Friendship Hospital.

Participants in the treatment group received fire-needle therapy weekly for 4 weeks, in addition to HXJDD and vaseline cream the same as the control group. The procedure of fire-needle therapy was as follows: (1) in a comfortable and warm environment, participants were instructed to choose a position which they felt comfortable and exposed the lesion areas; (2) the fire-needle (Jiajian Medical Instrument Co., Ltd., Wuxi, China, 0.8 mm × 40 mm/0.5 mm × 40 mm) was heated on the top of flame of an alcohol burner until became red or white, and immediately inserted around 3–5 mm of the lesion area and removed quickly; the insertion of fire-needle was applied every 1 cm in the targeted lesion areas.

Effect Assessment

The primary outcome measure was PASI.[17] The secondary outcomes were Dermatology Life Quality Index (DLQL)[18] and Hamilton Anxiety Rating Scale (HAMA)[19], as well as CM syndrome score[20] and photos of target lesions. The target lesion was chosen with typical symptom for plaque psoriasis and photos

were taken at a vertical angle and in a fixed distance to the target lesion. All the outcomes were collected at baseline, week 2 and 4.

Safety Assessment

Safety was observed and evaluated by clinical examinations and laboratory investigations. Any adverse events were recorded during the study. The indices include clinical signs and skin symptoms, blood routine examination, urine routine examination, liver and kidney functions and other potential adverse events.

Statistical Analysis

Data were presented as means ± standard deviation ($\bar{x} \pm s$). One-way ANOVA was used to analyze the changes in the mean values from baseline to week 2 and 4 for each group. Unpaired *t* test was used to analyze the differences of the mean values between the two groups. Differences in other outcomes between the two groups were evaluated by the Chi-square of *Fisher*'s exact test. An independent statistician, who was blinded to the group allocation, conducted data analysis using GraphPad Prism 6. $P<0.05$ was considered as significant difference.

RESULTS

Study Participants

A total of 151 eligible participants with plaque psoriasis were randomly allocated into the treatment group (76 cases) or the control group (75 cases). During the study, 15 patients dropped out or withdrew or lost to follow-up, 68 patients in the treatment group and 68 patients in the control group completed the study and were included in the analysis (Figure 1). The baseline characteristics of all participants was shown in Table 1. No significant differences were found between the two groups ($P>0.05$).

Comparison of PASI Score and CM Syndrome Score between Groups

The target lesion PASI score in the control group was significantly decreased after 4-week treatment, as well as the lesion score, scale score, infiltration score, erythema score, CM syndrome score and itching score, compared with the baseline data. Although a significant difference of between-group analysis was detected in the CM syndrome after 4-week treatment ($P<0.01$, Figure 2B), no marked differences were found in PASI (Figure 2A).

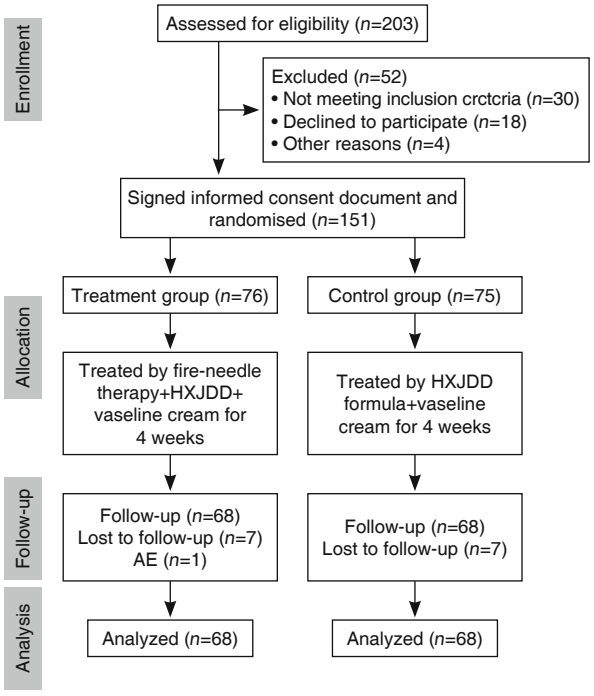

Figure 1. Flow Chart of Study on Whether Fire-needle Therapy Benefits Plaque Psoriasis

Note: AE: adverse effect

Table 1. Baseline Characteristics of Patients in Two Groups ($\bar{x} \pm s$)

Items	Treatment group (68 cases)	Control group (68 cases)	*P* value
Sex (Case, M/F)	46/22	43/25	0.4995
Age (Year)	44.92 ± 13.07	45.19 ± 12.91	0.9001
Body weight (kg)	69.81 ± 11.24	70.32 ± 11.41	0.7817
Eating habits (Case, normal/ vegetarian/non-vegetarian)	48/10/10	45/16/7	0.4879
Duration (Year)	13.72 ± 9.56	13.41 ± 11.19	0.8570
Family medical history (Case)	11	11	0.5351
Allergic history (Case)	7	4	0.2616
History of prior treatment (Case)	48	53	1.0000
Other medical history (Case, Yes/No)	13/55	13/55	0.7131

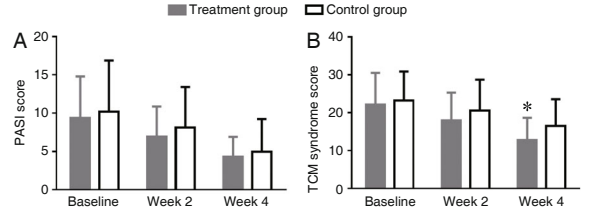

Figure 2. Comparisons of PASI Score (A) and CM Syndrome Score (B) between Groups (68 Cases in Each Group, $\bar{x} \pm s$)

Note: $^{*}P<0.01$, compared with the control group at the same time point

Comparison of Lesion Area, Scale Score, Infiltration Score, and Erythema Score between Groups

The lesion area, scale score, infiltration score

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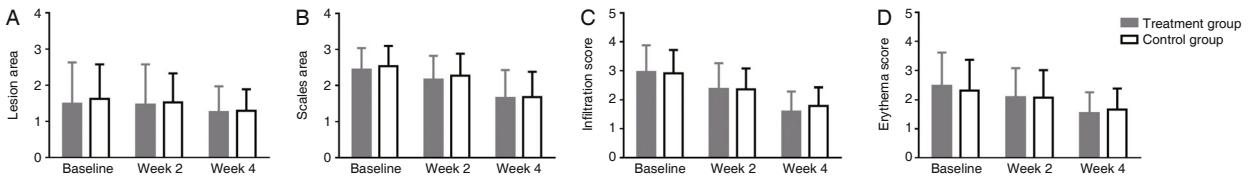

Figure 3. Comparisons of Lesion Area (A), Scale Score (B), Infiltration Score (C), and Erythema Score (D), between Groups (68 Cases in Each Group, $\bar{x} \pm s$)

and erythema scores were compared between groups and no significant difference was observed with or without fire-needle therapy (P>0.05, Figure 3).

Comparison of DLQI Score and HAMA Score between Groups

Furthermore, we evaluated the impact of the illness on patients' quality of life and anxiety state. DLQI scores showed significant decrease between the two groups 4 weeks after treatment (P<0.05), favoring the treatment group (Figure 4A), while HAMA score revealed no marked improvement in the treatment group comparing to the control group (Figure 4B).

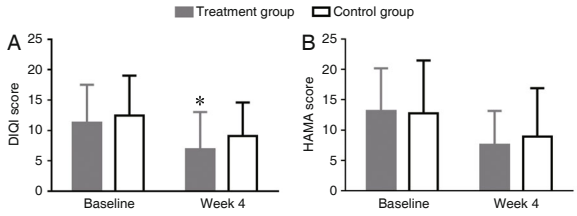

Figure 4. Comparisons of DLQI Score (A) and HAMA Score (B) between Groups (68 Cases in Each Group, $\bar{x} \pm s$)

Note: $^{*}P$<0.05, compared with the control group at the same time point

Safety

No significant differences between groups were found on blood routine examination, urine routine examination, liver and kidney functions. One case in the fire-needle therapy group had minor skin infection during the treatment. As a result, treatment for this participant by the fire-needle was delayed, but recovered after taking antibiotics for 1 week.

DISCUSSION

Psoriasis is a common dermatosis, of which causes are still unclear. When suffering from it, multiple squamous erythema are difficult to fade, which greatly affect the quality of life and mental health.[5] Psoriasis is called Bai Bi (白疕) in CM due to its distinctive white scales. Blood heat is thought to be the primary factor as hot type often cause rednesse on the skin. When the disease condition continued, it would develop into blood stagnation with thick, white scales, called plaque psoriasis, which is hard to be treated in current treatments.

In this study, we assessed the effect of HXJDD in combination with or without fire-needle therapy in treating plaque psoriasis. Fire-needle therapy is an acupuncture technique which quickly inserts a red hot needle into target areas of the body. It belongs to a warming and unblocking method. In the process of manipulations, the roles of needling and scorching jointly affect the function of yang qi, thus promote the circulation of blood and give way to hot evil to dissipate heat. Study has shown that fire needle can regulate the content of tunmor necrosis factor-α, interleukin-1, inhibit the abnormal proliferation of T cells and inflammatory response.[21] Herein, we inserted fire-needle in the psoriasis lesions and found that fire-needle therapy in combination with HXJDD was effective in treating plaque psoriasis. Moreover, CM syndrome scores, DLQI scores in treatment group significantly improved, indicating that fire-needle therapy had the potential to enhance the quality of life of psoriasis patients. But there was no statistical difference in skin lesion area, itching index, scales, infiltration, erythema and PASI scores between the two groups. The findings may be due to the short-term duration which might not be long enough to demonstrate any significantly statistical changes.

Herbal medicine has been frequently used as therapeutic or complementary and alternative medicines for treatment of skin disease, due to its effectiveness and less adverse reactions clinically.[22] However, little rigorous RCT were conducted to support the effects and safety. HXJDD, first proposed by ZHAO Bing-nan, has shown to be safe and effective for psoriasis vulgaris of blood stasis syndrome.[15] Herein we found that HXJDD significantly relieved the symptom of plaque psoriasis. When combining HXJDD with fire needle therapy, a faster remission was detected, which indicating that topical treatment using fire needle promoted the effects of CM formula.

Injury to the skin can trigger psoriatic skin changes at the injury area, which is known as Koebner phenomenon.[23] In this study, the Koebner phenomen on was not observed in the treatment group with fire-needle acupuncture. One case suffered from infection after treatment. No other adverse events were appeared. In this study, fire-needle therapy was an effective and safe method for the treatment of plaque psoriasis.

There are some limitations of our study. Firstly, the sample size is relatively small, which might produce underpowered results. Secondly, it is uncertain whether the findings in Chinese can be replicated to other populations. Thirdly, a 4-week treatment duration for the treatment of plaque psoriasis is a short-term period, therefore, the long-term effects and safety of fire-needle therapy for plaque psoriasis is still unknown.

Fire-needle therapy is potentially effective and safe in treating plaque psoriasis. It is easy to be applied to patients with plaque psoriasis. However, due to small sample size and short-term duration of the present study, the findings need to be interpreted cautiously. Further high-quality studies with larger sample size and longer treatment duration are warranted to confirm the findings.

Conflict of Interest

The authors declare that there is no conflict of interests regarding the publication of this paper.

Author Contributions

Bai YP proposed the study concepts, designed the study; Pan HD and Qi XL prepared the manuscript, analyzed the data and revised the manuscript. All the authors participated the clinical studies, acquired the data and approved the final manuscript.

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