



Fire Acupuncture for Varicose Veins in the Lower Extremities: A Review of Randomized Controlled Trials

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Varicose veins have a substantial burden on individuals' aesthetics and overall quality of life. The current body of research on Korean medical interventions for varicose veins is limited in Korea, and exploration into clinical trends is lacking. This review specifically analyzed fire acupuncture, which is an understudied intervention in Korea that demonstrated efficacy in alleviating pain and paralysis while promoting tissue regeneration. A comprehensive investigation of the China National Knowledge Infrastructure database was conducted, utilizing terms such as "varicose vein," "fire needle," "fire acupuncture," "burning acupuncture," "burning needle," "huǒzhēn," "xiàzhī jìngmài," and "jìngmài qūzhāng." This review included 14 studies investigating the role of fire acupuncture in treating varicose veins. We extracted variables, including age, sex, disease duration, intervention method, treatment frequency, treatment period, acupoints, and outcomes. Fire acupuncture appeared as the primary intervention method, followed by general acupuncture. The protruding part of varicose veins is the main treatment area for fire acupuncture, while the acupoints BL57 and ST36 were most frequently utilized for general acupuncture. Treatment results revealed significant improvement in all studies. However, there are limitations, such as scarce studies, limited side effects studies, and potential bias. Consequently, extensive and well-structured future studies are necessary to demonstrate the role of fire acupuncture in varicose veins.

Keywords: Fire acupuncture; Fire acupuncture with bloodletting; Fire needle; Lower extremity; Varicose vein

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INTRODUCTION

Varicose veins, which are a prevalent condition affecting 29–39% of women and 10–23% of men, are characterized by superficial vein enlargement to > 3 mm in diameter [1,2]. This condition is caused by elevated venous pressure, impaired venous valve function, and structural alterations in vein walls [3], and saphenous vein reflux is one of the most frequent causes [4,5]. The majority of affected individuals are manual laborers, farmers, or housewives because prolonged standing and intense muscle activities increase the risk of developing varicose veins [6]. This condition causes swelling, heaviness sensation, hyperpigmentation, ulcers, and pain in the lower extremities [7], which can negatively affect not only the cosmetic appearance but also the quality of life of patients. Current treatment options include nonsurgical approaches, such as lifestyle modification, medication, and compression therapy, and surgical procedures, such as high ligation and stripping surgery, intravenous treatment, ambulatory phlebectomy, branch vein sclerotherapy, and refluxing perforating vein ligation [8]. However, surgical interventions may cause sensory abnormalities, hematomas, intravenous thrombosis, and postoperative complications due to potential saphenous and sural nerve damage. Moreover, the indication of surgery is limited by the varicose vein location, and recurrence is possible post-treatment [9].

General acupuncture and herbal medicine are often employed to treat varicose veins in the context of Korean medicine, but research on these modalities remains lacking. Notably, no studies have investigated fire acupuncture, which is a technique that effectively alleviates pain and paralysis while promoting tissue regeneration. Therefore, this review primarily aimed to analyze the evolving clinical trend of employing fire acupuncture in varicose vein treatment.

MATERIALS AND METHODS

1. Database search

Studies on fire acupuncture for varicose veins were searched using domestic search engines (KMBASE, KISS, OASIS, and SCIENCE ON) and international search engines (Pubmed, CiNi, and Cochrane libraries), excluding China National Knowledge Infrastructure (CNKI). Domestic search engines demonstrated no relevant studies, and international search engines demonstrated limited related publications. The retrieved studies were either less rele-

vant to the topic or were found in CNKI. Consequently, this study selected CNKI as the primary search engine and included studies investigating the effects of fire acupuncture on varicose veins throughout the entire period. The search terms used were a combination of “varicose vein,” “burning acupuncture,” “burning needle,” “fire acupuncture,” and “fire needle” in English, and “huǒzhēn,” “xiàzhī jīngmài,” and “jīngmài qūzhāng” in Chinese.

2. Selection and exclusion of studies

Randomized controlled trials (RCTs) evaluating fire acupuncture for patients with varicose veins were selected among the clinical studies retrieved from CNKI. The intervention methods in the experimental group included fire acupuncture alone or in combination with other treatments, such as general acupuncture and herbal medicine. The control group intervention methods included general acupuncture, surgery, pharmaceuticals, physical therapy, rehabilitation, exercise, and lifestyle management. This review excluded studies with no complete original text, did not primarily aim to confirm the effects of fire acupuncture, or presented incorrect figures. Two independent researchers searched for the combination of terms in the search engine, reviewed the titles, abstracts, and texts of the selected studies, and assessed them following the inclusion and exclusion criteria. A third researcher conducted an additional review in cases of disagreement.

3. Data extraction and quality assessment

Each study was categorized into a control group and an experimental group. Data on the number of participants, sex, age, and treatment methods, location, depth, cycles, duration, and outcomes were extracted. Moreover, 2 researchers used the Cochrane risk-of-bias tool to assess the quality of the included studies. A third researcher was consulted for resolution if disagreements arose.

RESULTS

1. Data selection

A comprehensive search of the CNKI database for studies on varicose veins and fire acupuncture treatments yielded a total of 106 studies. This study excluded 19 irrelevant studies and 44 non-RCT based on title and abstract evaluation, as well as 6 studies with no complete original text. Further, 2 studies with incorrect figures, 2

irrelevant studies, and 19 non-RCTs were further excluded upon full-text analysis. Ultimately, 14 records were selected for analysis (Fig. 1).

2. General characteristics of the studies

All 14 studies were conducted between 2010 and 2023, with patient sample sizes ranging from 46 to 146. The studies involved 518 male and 515 female patients. Disease duration spanned from 3 months to 32 years, except for 2 studies that failed to accurately report disease duration. Sex, age, or disease duration demonstrated no significant differences among the studies (Table 1).

3. Intervention method

All experimental groups in the included studies used fire acupuncture as the intervention method. The fire acupuncture method was conducted as delineated by the specific procedures of these studies in the following manner. First, the treatment site was sanitized using iodine or alcohol. Second, the tip of the acupuncture needle was heated until it glowed red or white-hot. Then, a rapid series of insertions into the treatment site followed to stimulate bloodletting. The ensuing bleeding from the treatment site was allowed to persist until expelling a specified volume of blood. Some studies [10,11] supple-

mented this process with cupping when the volume of blood was deemed insufficient. Needles made of tungsten-manganese alloy, tungsten alloy, and molybdenum alloy were used, with 0.15–0.8 mm diameters and 5–70 mm lengths. The insertion depth was 0.25–20 mm. The amount of bloodletting per treatment was 10–75 mL, with most treatments involving < 50 mL. Patient satisfaction with fire acupuncture was not reported. Various parallel treatments were used in addition to fire acupuncture, including general acupuncture [10,12–17], compression stockings [12,16,18], medication [13,19,20], herbal medicine [13], rehabilitation treatment [21], and Chinese medicine soaking and washing [22]. Fire acupuncture was primarily performed around the areas where lower extremity veins were most prominent due to varicose veins. The control group included intervention methods such as general acupuncture [10,14,15,23], medication [13,19,20], compression stockings [12,16,18], surgery [11,21], Chinese medicine soaking and washing [22], rehabilitation treatment [21], and non-intervention (Table 1) [17].

4. Treatment frequency and duration

Eight studies [10,11,14,16,19,21–23] administered fire acupuncture treatment twice a week, 4 studies [10,17,18,20] once a week, 1 study [13] once every 3 days, and 1 study [12] once every 2 days. Seven studies [10,11,18,19,21–23] demonstrated a treatment duration of 28 days, 3 studies [12,16,17] of 56 days, 2 studies [14,15] of 42 days, and 1 study [13] of 30 days. One study [20] demonstrated no specified treatment duration (Table 1).

5. Acupoints

Common acupuncture treatment points included BL57 [10,12,14–17], ST36 [10,12–16], BL40 [10,12,14–16], GB34 [10,12,14–16], SP6 [12–16], SP10 [12–16], BL55 [10,14,15,17], BL39 [14,15], BL56 [10,17], BL60 [10,17], GB39 [14,15], and SP9 [15]. The needle retention time was 20–30 minutes, except in studies where it was not documented (Table 1).

6. Quality assessment

Eight studies demonstrated low risk in random sequence generation due to a clearly described randomization method, while 4 studies demonstrated unclear risk because they lacked a specific method, and 2 studies [15,20] demonstrated high risk due to randomization based on the order of visit or hospitalization. Allocation concealment was not specified, except in 1 study [17]. Blinding was not possible due to the nature of fire acu-

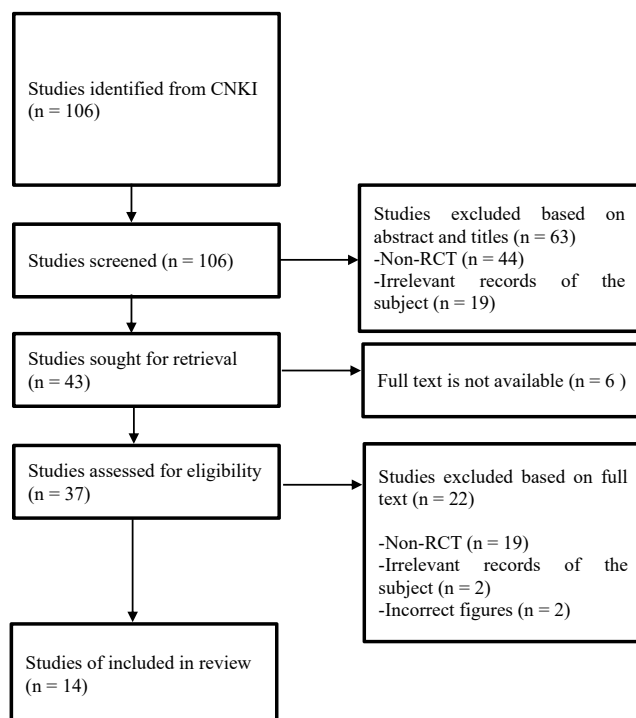


Fig. 1. Flow chart of study selection. RCT, randomized controlled trial.

Table 1. Characteristics of the studies

1st author (y)	Sample size	Sex		Age, mean (y)	Duration	Intervention	Acupoint (AC)	Frequency duration	Piercing depth	Length (diameter)	Blood loss
		M	F								
Wang (2023) [21]	EG: 38	20	18	52.25 ± 3.17	6.17 ± 0.54 (y)	EG: FA + RE	-	2/wk	10-20 mm	50 mm	-
	CG: 38	21	17	52.41 ± 3.32	6.31 ± 0.67 (y)	CG: WM (surgery) + RE	-	28 d	-	(0.6 mm)	-
Chen (2021) [12]	EG: 50	20	30	25-67 (45.71 ± 5.45)	-	EG: FA + AC + CS	BL40, BL57, GB34, SP6, SP10, ST36	1/2 d	-	-	-
	CG: 50	21	29	27-69 (45.75 ± 5.50)	-	CG: CS	-	56 d	-	-	-
Cai (2021) [10]	EG: 25	14	11	40-75 (59.4 ± 11.69)	5-30 (9.4 ± 2.69) (y)	EG: FA + AC	BL40, BL55, BL56, BL57, BL60, GB34, ST36	1/wk	3-15 mm	25 mm	10-30 mL
	CG: 25	13	12	43-70 (58 ± 10.07)	4-28 (8.6 ± 3.49) (y)	CG: AC	-	28 d	-	(0.35 mm)	-
Guo (2021) [13]	EG: 30	14	16	44-70 (59.11 ± 7.88)	2-18 (6.98 ± 2.24) (y)	EG: FA + AC + HM (Boyanghwanotang) + WM (prednisone, vitamin B1, lidocaine)	SP6, SP10, ST36	1/3 d	-	50 mm	-
	CG: 30	11	19	45-71 (58.39 ± 6.49)	1-17 (6.48 ± 1.99) (y)	CG: WM (prednisone, vitamin B1, lidocaine)	-	30 d	-	(0.5 mm)	-
Jiang (2020) [11]	EG: 30	13	17	34-58 (44.56 ± 11.28)	6-14 (7.2 ± 3.2) (y)	EG: FA	-	2/wk	2-5 mm	-	20-30 mL
	CG: 30	12	18	32-61 (46.12 ± 10.24)	4-15 (7.5 ± 4.1) (y)	CG: WM (surgery)	-	28 d	-	-	-
Chen (2018) [18]	EG: 30	15	15	31-67 (53.2 ± 4.97)	4-57 (34.9 ± 4.8) (m)	EG: FA + CS	-	1/wk	0.01-0.05 inch	-	-
	CG: 30	16	14	34-72 (54.1 ± 5.38)	3-60 (36.9 ± 5.6) (m)	CG: CS	-	28 d	-	-	-
Ye (2018) [14]	EG: 40	23	17	25-80 (68 ± 12)	1-19 (9.7 ± 1.93) (y)	EG: FA + AC	BL39, BL40, BL55, BL57, GB34, GB39, SP6, SP10, ST36	2/wk	2-3 mm	50 mm	50 mL
	CG: 40	21	19	28-79 (65 ± 11)	2-24 (10.4 ± 1.83) (y)	CG: AC	-	42 d	-	(0.5 mm)	-
Yin (2018) [15]	EG: 35	23	12	35-58 (43.6 ± 6.9)	1-5 (2.4 ± 0.7) (y)	EG: FA + AC	BL55, BL39, BL40, BL57, GB34, GB39, SP6, SP10, SP9, ST36	2/wk	-	5 mm	-
	CG: 35	24	11	36-57 (43.7 ± 6.8)	1-4 (2.3 ± 0.6) (y)	CG: AC	-	42 d	-	(0.15 mm)	-
Dai (2017) [16]	EG: 48	22	26	53.27 ± 5.12	21.35 ± 7.68 (y)	EG: FA + AC + CS	BL40, BL57, GB34, SP10, SP6, ST36	2/wk	2-4 mm	70 mm	50 mL
	CG: 48	24	24	49.89 ± 6.55	22.57 ± 8.15 (y)	CG: CS	-	56 d	-	(0.5 mm)	-
Dong (2017) [23]	EG: 73	41	32	34-76 (46.53 ± 2.81)	3-15 (9.85 ± 2.27) (y)	EG: FA	CG (ashi)	2/wk	-	5 mm	-
	CG: 73	43	30	36-77 (45.85 ± 2.73)	2-16 (9.34 ± 2.51) (y)	CG: AC	-	28 d	-	(0.5 mm)	-

(Continued on next page)

Table 1. Continued

1st author (y)	Sample size	Sex		Age, mean (y)	Duration	Intervention	Acupoint (AC)	Frequency duration	Piercing depth	Length (diameter)	Blood loss
		M	F								
Lin (2017) [19]	EG: 29	15	14	40-67 (53.66 ± 6.8)	-	EG: FA	-	2/wk	10 mm	50 mm	-
	CG: 29	13	16	43-68 (54.13 ± 5.81)	-	CG: WM (diosmin tablets)	-	28 d	-	(0.8 mm)	-
Yu (2017) [20]	EG: 30	15	15	38-59 (46.57 ± 1.74)	1-4 (2.54) (y)	EG: FA	-	1/wk	3-4 mm	45 mm	75 mL
	CG: 30	14	16	43-56 (48.24 ± 1.68)	1-3 (2.01) (y)	CG: WM (corticosteroid)	-	Not reported	-	-	-
Wang (2016) [17]	EG: 25	6	19	53 ± 7	17.8 ± 10.4 (y)	EG: FA + AC	BL55, BL56, BL57, BL60	1/wk	-	70 mm	50 mL
	CG: 25	8	17	55 ± 11	15.8 ± 8.9 (y)	CG: untreated	-	56 d	-	(0.8 mm)	-
Fu (2010) [22]	EG: 25	9	16	< 40: 4, 40-60: 12, > 60: 9	< 10: 3, 10-20: 11, > 20: 6 (y)	EG: FA + SW	-	2/wk	-	-	-
	CG: 21	6	15	< 40: 2, 40-60: 10, > 60: 9	< 10: 5, 10-20: 9, > 20: 7 (y)	CG: SW	-	28 d	-	-	-

M, male; F, female; AC, acupuncture; EG, experimental group; CG, control group; FA, fire acupuncture; RE, rehabilitation; WM, western medicine; CS, compression stockings; HM, herb medicine; SW, Chinese medicine soaking and washing; -, not applicable.

puncture treatment and thus was assessed as high risk. Detection bias was unclear in all studies due lacking information. Incomplete outcome data was considered unclear risk if dropout or exclusion criteria were not mentioned [14,20], if dropouts were unexplained [19], or if dropouts were not considered in the result analysis [17]. Selective reporting was evaluated as an unclear risk in 2 studies [17,18] that did not provide specific results and as

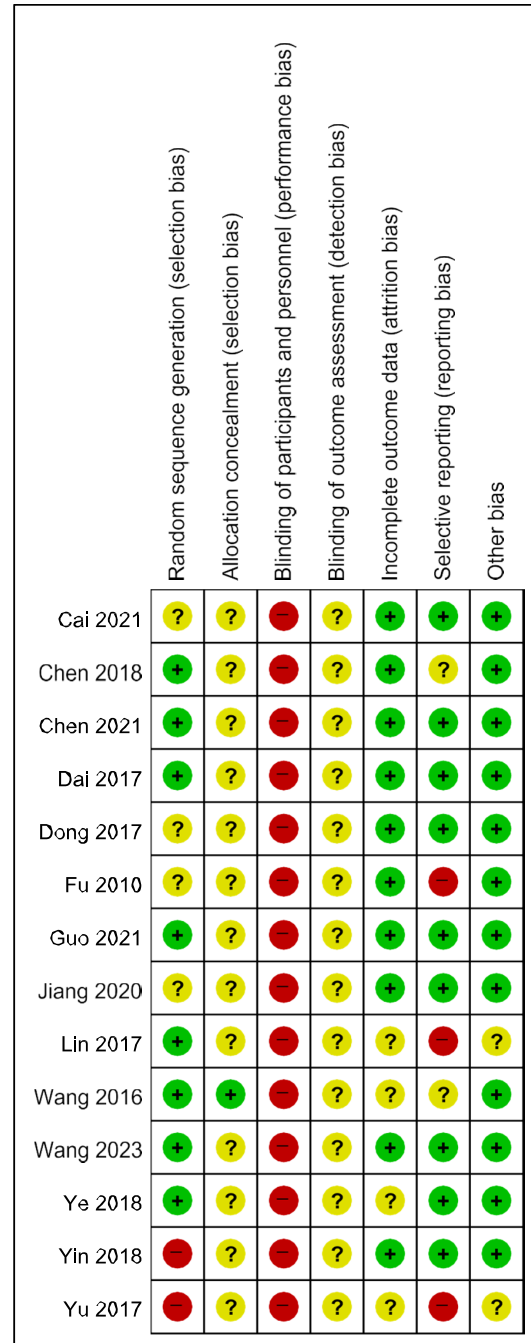


Fig. 2. Risk of bias summary.

a high risk in 3 studies [20,22,23] that only reported the total effective rate. One study [20], which did not specify a significant difference in symptoms between groups before treatment, was assessed as having an unknown risk for other biases (Figs. 2, 3).

7. Evaluation measures and results

Varicose veins can be influenced by inflammatory reactions, blood coagulation states, and vascular endothelial dysfunction. Thus, the effectiveness of fire acupuncture was evaluated following related biomarkers (soluble vascular cell adhesion molecule-1 [sVCAM-1], tumor necrosis factor- α [TNF- α], high sensitivity C-reactive protein [hs-CRP], plasminogen activator inhibitor 1 [SERPINE1], Kruppel-like transcription factor 2 [KLF2], activated partial thromboplastin time [aPTT], tissue plasminogen activator [t-PA], prothrombin time [PT], thrombin time [TT], nitric oxide [NO], von Willebrand factor [vWF], 6-Keto-prostaglandin F1 α [6-Keto-PGF1 α], erythrocyte sedimentation rate [ESR], plasma viscosity, and fibrinogen). Moreover, varicose veins can cause symptoms, such as edema, ulcers, and pain, which reduce the quality of life, and thus related evaluations were employed (e.g., venous damage scale [VDS], venous clinical severity scale [VCSS], chronic venous insufficiency questionnaire [CIVIQ], revised venous clinical severity score [RVCSS], venous insufficiency epidemiologic and economic study of symptom score [VEINES-Sym], venous insufficiency epidemiologic and economic study of quality of life scale [VEINES-QoL], Homburg varicose vein severity score [HVSS], visual analog scale [VAS], and clinical/etiological/anatomical/pathophysiological classification [CEAP]). The efficacy ratio and recurrence rate were used as evaluation indicators. All reviewed studies demonstrated sig-

nificant treatment effects, but Wang [21], which compared surgery and fire acupuncture, revealed no significant difference in efficacy rates between the control and experimental groups. Only 2 studies [17,21] reported side effects of fire acupuncture. Among 38 patients by Wang et al. [21], 6 experienced blood clots, 5 had pigmentation, and 5 exhibited subcutaneous hemorrhage, with no significant difference between the control and experimental groups. Out of 25 patients by Wang et al. [17], 15, 15, 2, and 2 had local pain and redness, subcutaneous hemorrhage, ankle numbness and itching, and dizziness, respectively, which resolved after rest. Side effects, such as infections, were not observed (Table 2).

DISCUSSION

Health Insurance Review and Assessment Service has reported a steadily increasing number of patients with varicose veins, from 141,736 in 2010 to 249,095 in 2021 [24]. Korean medicine classified varicose veins under the “Geunlyu” category due to vein distension, as documented in the “WaiKeZhengZong” text which states, “patient’s veins with Geunlyu are curled up like worms.” Static blood, stagnant qi, and phlegm retention were thought of as the primary etiological factors contributing to this condition [25]. Fire acupuncture involves heating the acupuncture needle on fire and inserting it into the acupoint. This method treats pain and paralysis by warming the meridian, stimulating yang qi, and promoting tissue regeneration [26]. Fire acupuncture with bloodletting releases a controlled amount of blood in the context of varicose veins, thereby creating a local negative pressure that encourages blood flow to the affected area, alleviat-

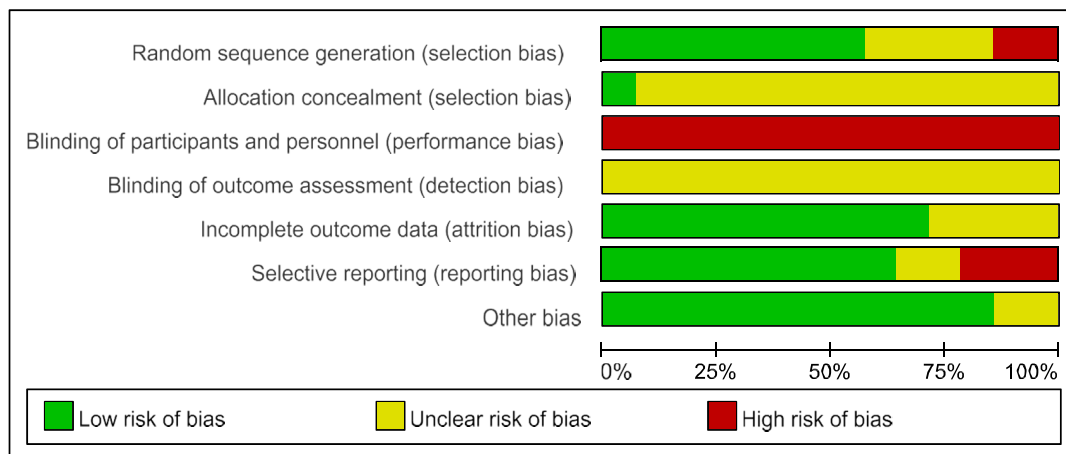


Fig. 3. Risk of bias graph.

Table 2. Results of the studies

1st author (y)	Evaluation measures	Result	Figure
Wang (2023) [21]	1. sVCAM-1, TNF- α , hs-CRP 2. SERPINE1, KLF2, aPTT, t-PA 3. NO, vWF, 6-Keto-PGF1 α 4. ESR, plasma viscosity, fibrinogen 5. VDS, VCSS, CIVIQ 6. Effective ratio	1. SE, SC, SD 2. SE, SC, SD 3. SE, SC, SD 4. SE, SC, SD 5. SE, SC, SD 6. ND	1. 534.29 \pm 42.51 \rightarrow 309.58 \pm 30.11 (μ g/L)/13.09 \pm 2.71 \rightarrow 6.07 \pm 1.23 (pg/mL)/ 2.58 \pm 0.31 \rightarrow 0.86 \pm 0.14 (mg/L) 2. 406.45 \pm 30.09 \rightarrow 182.16 \pm 20.44 (pg/mL)/5.98 \pm 2.25 \rightarrow 15.18 \pm 3.39 (pg/mL)/ 24.42 \pm 3.75 \rightarrow 36.58 \pm 4.78 (s)/16.09 \pm 3.13 \rightarrow 25.48 \pm 4.71 (μ mol/L) 3. 50.34 \pm 5.32 \rightarrow 62.42 \pm 7.61 (mm/h)/2.83 \pm 0.75 \rightarrow 1.29 \pm 0.33 (mPa-s)/ 5.46 \pm 1.20 \rightarrow 2.52 \pm 0.71 (g/L) 4. 50.34 \pm 5.32 \rightarrow 62.42 \pm 7.61 (μ g/L)/12.0.95 \pm 14.03 \rightarrow 82.19 \pm 7.75 (%)/ 78.09 \pm 18.31 \rightarrow 53.07 \pm 11.23 (pg/mL) 5. 2.40 \pm 0.75 \rightarrow 0.73 \pm 0.21/17.26 \pm 4.67 \rightarrow 3.36 \pm 1.05/59.51 \pm 12.26 \rightarrow 22.16 \pm 6.82 6. 97.37 (%)
Chen (2021) [12]	1. Effective ratio 2. Time of symptom improvement 3. RVCSS 4. PT, aPTT, TT	1. SD 2. SD 3. SE, SC, SD 4. SE, SC, SD	1. 94.00 (%) 2. Pain 19.77 \pm 3.12 (d)/bruise 16.87 \pm 2.22 (d) 3. (Before treatment \rightarrow after 4 weeks \rightarrow after 8 weeks) 12.27 \pm 2.45 \rightarrow 8.42 \pm 1.41 \rightarrow 4.45 \pm 1.23 4. 1.27 \pm 3.13 \rightarrow 13.69 \pm 4.23 (s)/30.15 \pm 2.23 \rightarrow 32.56 \pm 4.39 (s)/14.04 \pm 2.03 \rightarrow 16.37 \pm 2.50 (s) ($p < 0.051$)
Cai (2021) [10]	1. Effective ratio 2. VCSS	1. SD 2. SE, SC, SD	1. 92 (%) 2. 8.47 \pm 3.17 \rightarrow 3.38 \pm 0.55
Guo (2021) [13]	1. Effective ratio 2. VCSS 3. Recurrence rate	1. SD 2. SD 3. SD	1. 96.67 (%) 2. 5.29 \pm 1.44 \rightarrow 2.01 \pm 0.98 3. 0 (%)
Jiang (2020) [11]	1. Effective ratio 2. Circumference of the ankle 3. Ulcer area 4. Discomfort in the lower extremities 5. Quality of life 6. Symptom score	1. SD 2. SE, SC, SD 3. SE, SC, SD 4. SE, SC, SD 5. SE, SC, SD 6. SE, SC, SD	1. 86.7 (%) 2. 29.72 \pm 2.36 \rightarrow 24.92 \pm 2.14 (cm) 3. 7.21 \pm 2.14 \rightarrow 3.02 \pm 1.56 (cm) 4. 7.24 \pm 1.34 \rightarrow 2.32 \pm 1.23 5. (Body function/general health/vitality/social function/mental health) 37.43 \pm 3.23 \rightarrow 75.62 \pm 4.34/25.32 \pm 3.6 \rightarrow 75.43 \pm 2.42/34.42 \pm 2.32 \rightarrow 73.24 \pm 3.45/46.34 \pm 3.25 \rightarrow 83.14 \pm 2.22/26.35 \pm 3.64 \rightarrow 74.62 \pm 2.63 6. 16.43 \pm 2.54 \rightarrow 9.23 \pm 3.21
Chen (2018) [18]	1. CEAP 2. Degree of impairment of lower extremity function 3. Effective ratio	1. SE, SC, SD 2. SE, SC, SD 3. SD	1. C0/C1/C2/C3/C4/C5/C6 0 \rightarrow 5/3 \rightarrow 10/7 \rightarrow 10/7 \rightarrow 3/8 \rightarrow 2/3 \rightarrow 0/2 \rightarrow 0 2. 0/1/2/3 2 \rightarrow 8/7 \rightarrow 14/15 \rightarrow 7/6 \rightarrow 1 3. 93.3 (%)
Ye (2018) [14]	1. Effective ratio 2. Quality of life 3. Recurrence rate	1. SD 2. SD 3. SD	1. 97.5 (%) 2. 71.42 \pm 5.83 \rightarrow 89.62 \pm 6.38 3. 5.0 (%)
Yin (2018) [15]	1. Symptom score 2. Effective ratio	1. SD 2. SD	1. (Swelling/heat/pain/redness) 2.56 \pm 0.68 \rightarrow 1.37 \pm 0.43/2.62 \pm 0.75 \rightarrow 1.47 \pm 0.49/3.01 \pm 0.88 \rightarrow 2.06 \pm 0.41/ 2.51 \pm 0.67 \rightarrow 1.97 \pm 0.47 2. 97.14 (%)

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ing vasospasm, and reducing pressure on venous valves to facilitate damaged vein and valve repair [16].

This review examined 14 RCTs published in the CNKI database between 2010 and 2023. The studies demonstrated no significant variations based on factors, such as sex, age, or disease duration, and only 2 involved a

sample size exceeding 100 patients [12,23]. Larger sample sizes are recommended for enhanced objectivity. The treatment area was the most protruding segment of the lower extremity vein, indicating that fire acupuncture was not administered deeply, in all studies, while 8 studies reported the needle insertion depth (all were < 20

Table 2. Continued

1st author (y)	Evaluation measures	Result	Figure
Dai (2017) [16]	1. VCSS 2. CIVIQ 3. Effective ratio	1. SE, SC, SD 2. SE, SC, SD 3. SD	1. (Before treatment→after 4 weeks→after 8 weeks) 8.25 ± 3.12→4.85 ± 1.55→2.98 ± 1.21 2. (Before treatment→after 4 weeks→after 8 weeks) 49.35 ± 10.65→71.66 ± 7.69→85.15 ± 6.41 3. 97.9 (%)
Dong (2017) [23]	1. Effective ratio	1. SD	1. 95.89 (%)
Lin (2017) [19]	1. Circumference of the ankle 2. Ulcer area 3. Discomfort in the lower extremities 4. Symptom score 5. Effective ratio	1. SE, SC, SD 2. SE, SC, SD 3. SE, SC, SD 4. SE, SC, SD 5. SD	1. 28.22 ± 1.52→25.03 ± 1.12 (cm) 2. 5.21 ± 1.02→2.23 ± 1.05 (cm) 3. 6.8 ± 1.3→2.1 ± 1.2 4. 14.3 ± 2.1→7.1 ± 1.3 5. 93.1 (%)
Yu (2017) [20]	1. Effective ratio 2. Eczema treatment duration	1. SD 2. SD	1. 90.00 (%) 2. 4.56 ± 1.02 (d)
Wang (2016) [17]	1. RVCSS 2. VEINES-Sym 3. VEINES-QoL 4. HWSS	1. SE, SD (4, 8 wk) 2. SE, SD (8 wk) 3. SE, SD (4, 8 wk) 4. SE, SD (4, 8 wk)	(Before treatment→after 4 weeks→after 8 weeks→after 16 weeks) 1. 4.16 ± 1.41→2.68 ± 0.95→2.32 ± 1.33→2.48 ± 1.26 2. 47.86 ± 10.93→52.52 ± 9.75→54.56 ± 9.40→55.02 ± 8.93 3. 48.40 ± 10.16→53.44 ± 8.34→54.65 ± 8.31→55.15 ± 7.94 (<i>p</i> < 0.01) 4. 9.48 ± 3.86→5.08 ± 3.25→3.32 ± 3.20→3.20 ± 3.38
Fu (2010) [22]	1. Effective ratio	1. SD	1. 92 (%)

sVCAM-1, soluble vascular cell adhesion molecule-1; TNF- α , tumor necrosis factor- α ; hs-CRP, high sensitivity C-reactive protein; SERPINE1, plasminogen activator inhibitor 1; KLF2, Kruppel-like transcription factor 2; aPTT, activated partial thromboplastin time; t-PA, tissue plasminogen activator; NO, nitric oxide; vWF, von Willebrand factor; 6-Keto-PGF1 α , 6-Keto-prostaglandin F1 α ; ESR, erythrocyte sedimentation rate; VDS, venous damage scale; VCSS, venous clinical severity scale; CIVIQ, chronic venous insufficiency questionnaire; RVCSS, revised venous clinical severity score; PT, prothrombin time; TT, thrombin time; CEAP, clinical/etiological/anatomical/pathophysiological classification; CIVIQ, chronic venous insufficiency questionnaire; VEINES-Sym, venous insufficiency epidemiologic and economic study of symptom score; VEINES-QoL, venous insufficiency epidemiologic and economic study of quality of life scale; HWSS, Homburg varicose vein severity score; SE, significant improvement in the experimental group compared to before treatment (*p* < 0.05); SC, significant improvement in the control group compared to before treatment (*p* < 0.05); SD, significant differences between groups after treatment (*p* < 0.05); ND, no statistically significant differences between groups after treatment (*p* > 0.05).

mm). Post-treatment bleeding was allowed to proceed naturally, with a blood loss volume of < 50 mL in 5 studies. Clinicians should exercise caution to avoid excessive blood loss during the intervention. The frequency of acupuncture was twice a week in 8 studies, and 7 studies reported a treatment duration of 4 weeks. Three studies [12,16,17] comparing treatment durations indicated superior outcomes after an 8-week treatment course compared to 4 weeks, indicating that study designs with a duration of \geq 8 weeks could be beneficial. All the included experimental groups demonstrated significant effects. The effective ratio was the most commonly employed evaluation metric, followed by the venous clinical severity score (VCSS), which is a measure that encom-

passes both subjective and objective components, making it an apt tool for treatment efficacy assessment. Both Wang et al. [21] and Chen [12] evaluated the effectiveness of fire acupuncture by monitoring biological marker alterations, including those related to inflammatory response, vascular endothelial function, and coagulation indicators. Hs-CRP is an inflammatory marker that increases when inflammation is present in the body; sVCAM-1 intensifies vascular endothelial cell inflammatory response and deterioration; TNF- α induces inflammation and exacerbate vascular tissue damage; aPTT, PT, and TT are associated with coagulation function; SERPINE1 accelerates hemagglutination; KLF2 expands blood vessels and inhibits thrombus formation; t-PA promotes throm-

bolysis; 6-Keto-PGF1 α impairs vascular endothelial function; vWF release may be stimulated when vascular endothelial cells are damaged; NO protects vascular endothelial function [21].

Two studies [13,14] used the recurrence rate as a performance metric. Fire acupuncture appeared as a common intervention, with general acupuncture ranking second in terms of frequency, across all studies. Notably, the acupoints BL57 and ST36 were most frequently targeted in general acupuncture treatments. Eliminating blood stasis and ensuring smooth blood circulation is essential for varicose vein treatment. Consequently, BL57, which generally dispels wind and dampness and addresses leg cramps and pain, and ST36, which is recognized for relaxing sinews, unblocking meridians, and alleviating pain, were used [27]. Moreover, the acupoints primarily target the gastrocnemius muscle, which appears to help venous circulation pump function through gastrocnemius muscle stimulation. Wang et al. [21] revealed that rehabilitation treatment focused on the gastrocnemius muscle improves lower extremity blood circulation, thereby preventing blood clots. Fu et al. [22] applied a combined approach of Chinese medicine soaking and washing with fire acupuncture. This method involved the 30-minute immersion of the affected area in herbal medicine. No specific temperature was disclosed for the herbal medicine, but warming the lower extremities via a foot bath is generally accepted to dilate veins and potentially instigate blood reflux. Hence, caution may be warranted when applying this treatment. Further, Guo et al. [13] administered herbal medicine (Boyanghwanotang) in conjunction with fire acupuncture in the experimental group. Boyanghwanotang, which was used to enhance yang qi and promote blood circulation, was administered considering the lack of yang qi and poor circulation in the lower extremity veins as the cause of the disease. Components of Boyanghwanotang, such as Hwanggi, Danggui, and Cheongung, have improved immune function, blood vessel wall function, blood circulation, and inflammation suppression [13]. Three studies [11,20,23] used fire acupuncture as a standalone intervention for the experimental group, thereby prompting expectations for further research to validate the effect of fire acupuncture in isolation. Two studies [17,21] reported adverse effects, including blood clots, pigmentation, subcutaneous hemorrhage, pain, redness, numbness in the ankles, itching, and dizziness. However, no severe side effects were identified. Perfecting the technique is important to minimize patient discomfort, and a comprehensive report on side effects in all studies would be re-

quired.

The quality assessment revealed that approximately half of the studies suggest a randomization method. Only 1 case [22] reported allocation concealment, all studies ranked performance bias as high risk, and no studies documented information on detection. Not only subjective indicators but also objective indicators, such as blood tests, can be used for varicose veins, thus presenting only the total effective rate [17,19,24] can be high risk in selective reporting. Blinding may be difficult due to the nature of fire acupuncture treatment, but efforts should be made to minimize detection bias and plan experiments in detail and specifically in all RCTs.

The present study has several limitations, including a small number of investigations, a lacking studies specifically applying fire acupuncture, and insufficient research on the safety and potential side effects of fire acupuncture with bloodletting. Therefore, we anticipate the need for more comprehensive and detailed future investigations of fire acupuncture in the context of varicose veins treatment.

CONCLUSION

This review included 14 studies examining the role of fire acupuncture in treating varicose veins. We extracted variables, including age, sex, disease duration, intervention method, treatment frequency, period, acupoints, and outcomes. Fire acupuncture appeared as the primary intervention method, followed by general acupuncture. Biweekly was the most common treatment frequency, over a typical treatment duration of 28 days. The protruding part of varicose veins was the main treatment area for fire acupuncture, while the acupoints BL57 and ST36 were most frequently used for general acupuncture. Our results indicate that fire acupuncture alleviates clinical symptoms, reduces recurrence rates, enhances hematological markers, and improves patients' quality of life. However, limitations, such as lacking studies, scarce side effects research, and potential bias, were observed. Consequently, extensive and well-structured future studies are required to demonstrate the role of fire acupuncture in varicose veins.

AUTHOR CONTRIBUTIONS

Conceptualization: OJ. Methodology: OJ, JL, JS. Formal investigation: OJ, SP, Saerom C. Data analysis: OJ,

SP, Saerom C. Writing – original draft: OJ. Writing – review and editing: All authors.

CONFLICTS OF INTEREST

The authors have no conflicts of interest to declare.

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ETHICAL STATEMENT

This research did not involve any human or animal experiment.

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