Rheumatology Advance Access published February 18, 2013

Concise report

doi:10.1093/rheumatology/ket013

Acupuncture for gouty arthritis: a concise report of a systematic and meta-analysis approach

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Abstract

Objective. To assess the effectiveness of acupuncture as complementary therapy for gouty arthritis from randomized controlled trials (RCTs).

Methods. Five electronic databases, including English and Chinese, were systematically searched until August 2012. All RCTs involving acupuncture in combination with conventional therapy for gouty arthritis were included.

Results. Ten RCTs involving 852 gouty arthritis patients were systematically reviewed. Among them six studies of 512 patients reported a significant decrease in uric acid in the treatment group compared with a control group, while two studies of 120 patients reported no significant decrease in uric acid in the treatment group compared with the control group. The remaining four studies of 380 patients reported a significant decrease in visual analogue scale score in the treatment group.

Conclusion. The results of the studies included here suggest that acupuncture is efficacious as complementary therapy for gouty arthritis patients. More research and well-designed, rigorous and large clinical trials are necessary to address these issues.

Key words: gout, arthritis, gouty, acupuncture, concise report, systemic review, meta-analysis, randomized controlled trials.

Introduction

Gout, a result of hyperuricaemia above 390 μmol/l (6.5 mg/dl), is often associated with other metabolic disorders. Because of changing dietary and other lifestyle habits, at least 1–2% of all adults in the industrialized nations are now affected by gout. In the Framingham Study, 9.2% of men and 0.4% of women had hyperuricaemia, and 19% of these suffered from gout [1]. Management of gout generally requires the use of a combination of anti-inflammatory and urate-lowering agents, including colchicine, NSAIDs and glucocorticoids (anti-inflammatory), as well as probenecid and allopurinol (urate-lowering). While these urate-lowering agents are physiologically effective (with recommendations from the European League Against Rheumatism suggesting that a target serum urate of 6.0 mg/dl is optimal to reduce attacks), studies indicate that the quality of gout management is typically poor, owing to both patient and physician issues [2]. Although there are short-term benefits of drug treatment for gout, long-term pharmacological treatment often produces side effects. A number of NSAIDs are available to treat acute gout flare-ups [3]. Newer, better and safer medications are still needed.

Therefore, recent research has focused on complementary and alternative medicine (CAM) as effective treatment for gouty arthritis without significant adverse effects. Acupuncture is a particularly useful focus because it is popular with patients, especially for pain-related conditions [4]. In many diseases, preference for non-pharmacological treatment has resulted in the increased promotion and provision of complementary medicine, with acupuncture being one of the most popular options. For example, in May 2009, the UK National Institute for Health and Clinical Excellence recommended acupuncture as an appropriate treatment option for patients with persistent non-specific low back pain.

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Submitted 30 October 2012; revised version accepted 21 January 2013.

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CLINICAL SCIENCE

Among current CAMs, the effectiveness of acupuncture has been debatable. There have been some Chinese randomized controlled trials (RCTs) of acupuncture treatment for gouty arthritis, but there has been no systematic review and meta-analysis of acupuncture for gouty arthritis. Thus, we conducted this concise report of a systematic and meta-analysis approach to summarize and critically assess the evidence from RCTs proving that acupuncture is effective as treatment for gouty arthritis.

Methods

Search design

The following sources were used for the literature review until August 2012: AMED (Allied and Complementary Medicine Database), EMBASE, CINAHL (Cumulative Index to Nursing and Allied Health Literature), MEDLINE and the Cochrane Central Register of Controlled Trials.

The reference lists of articles were checked for current relevant publications, and experts were asked for information concerning any additional trials. Furthermore, a manual search was conducted for relevant journals, symposia and conference proceedings. All identified publications were cross-referenced. Personal contact was made with the authors of published studies, if necessary, to request additional data.

The search terms used were (Gout OR Arthritis, Gouty OR gout* OR tophus OR tophi OR tophaceous OR Gouty Arthritis OR Gouty Arthritides) AND (Acupuncture OR acupuncture OR Acupuncture Therapy OR Electroacupuncture OR Acupuncture, Ear OR Meridians OR ear acupuncture OR meridian* OR auriculotherapy OR auricular acupuncture OR electroacupuncture OR electro acupuncture OR electroacupunc* OR electrical acupuncture OR acupoint OR acupoint injection OR acupoint injections OR acupuncture point OR acupuncture points OR chinese acupuncture NOT Moxibustion* NOT Acupuncture Analgesia) AND (randomized controlled trial OR clinical trial OR random* OR placebo* OR drug therapy OR trial OR groups NOT (Animals NOT Humans)). Since all the various databases searched for this review possessed their own subject headings, each database was searched independently. No language restrictions were imposed.

Study selection

Our review was restricted to RCTs that compared acupuncture with a control group, which included western pharmacological treatments, to assess the efficacy of acupuncture for the treatment of gouty arthritis. No restriction was imposed on studies with respect to publication type, language, blinding and the type of design, such as parallel or crossover. Crossover trials were included as long as outcome data were available for each treatment segment prior to the crossover. This review excluded quasi-randomized trials.

Quality assessment

From each trial, we (L.W.B. and W.S.H.) independently selected the endpoint data of the main outcomes measured at the end of the acupuncture treatment. The details of this procedure have been explained elsewhere [5]. We preferred continuous to binary data because most of the eligible trials reported continuous outcomes. Further information was requested from the authors when articles contained inadequate information to make a decision about eligibility. The quality assessment of all studies were undertaken following the description of these categories as described in the Cochrane Handbook for Systematic Reviews of Interventions [6]. The studies were assessed by reviewers in six domains by seven tools. Selection bias was examined by random sequence generation and allocation concealment. Performance bias was examined by blinding of participants and personnel. Detection bias was examined by blinding of outcome assessment. Attrition bias was examined by incomplete outcome data. Reporting bias was examined by selective reporting. Other bias was examined by other sources of bias. This review used Y, U and N as keys to summarize the reports found. An answer yes indicated a low risk of bias (Y), unclear indicated an uncertain risk of bias (U) and no indicated a high risk of bias (N).

Statistical analysis

The study data were summarized using basic statistics by simple counts and means. The main purpose of the analyses was to quantify and compare the effect of the controlled trials of the group provided with only acupuncture (treatment group) versus the group provided with only conventional therapy (control group) for gouty arthritis patients.

The mean difference (MD) for changes in the continuous scale scores of gouty arthritis symptoms as a degree of reduction in severity of pain and uric acid, and the risk ratio (RR) for responder rates with improved and unimproved gouty arthritis symptoms, with their 95% CI, were calculated using Review Manager (Rev-Man) software (version 5.1 for Windows; The Nordic Cochrane Centre, Copenhagen, Denmark) individually in each trial. For duplicated publications and companion papers of a primary study, the yield of information was maximized by simultaneously evaluating all available data. Whenever it was difficult to determine whether two papers represented duplicate publications of one study or two separate studies (for example, clinical trials performed in the same hospital during the same period), the original publication (usually the oldest version) was given priority, and all others were excluded. Effect sizes were not pooled because of the small number of studies and the clinical heterogeneity of the trials.

Results

Study description

An initial search identified 57 potentially relevant articles of which only 10 studies [7–16] met our inclusion criteria and thus were subjected to our systematic review. Two articles were in English and eight articles in Chinese.

A total of 46 articles were initially excluded because they did not meet our inclusion criteria. Among them, 11 articles were excluded because of duplication with other articles or clearly irrelevant titles. Another 21 articles were excluded after abstract review. With more detailed evaluation of each article, 14 more articles were excluded. Three articles were duplicated and 11 articles did not match our inclusion criteria. After further evaluation regarding randomization, one article that was not a RCT was excluded. The remaining 10 studies, involving 852 subjects, met our inclusion criteria and were systematically reviewed.

The intervention varied considerably across the trials. All studies based the acupuncture point selections on Traditional Chinese Medicine meridian theory. Various acupoints for acupuncture treatments were used in the included RCTs; the SP6 acupuncture point was commonly used in six trials, and ST36 acupuncture point was second commonly used. Acupuncture was administered from 5 to 15 days, daily [8–12, 14, 15] or every other day [7, 16], for 20–30 min at each session. Needle stimulation was given manually in four RCTs [9, 11, 13, 14] and electrically (2 and 100 Hz) in six RCTs [7, 8, 10, 12, 15, 16]. Four RCTs [11, 13–15] reported de qi sensation. These data are reported in the included study for Standards for Reporting Interventions in Clinical Trials of Acupuncture (STRICTA) recommendations [17]. Two trials were conducted by Zou *et al.* [15, 16]. Key data are summarized in Table 1.

Uric acid

We identified eight trials [8–12, 14–16] (632 patients) that reported on uric acid. The pooled analysis showed that acupuncture therapy alone decreased uric acid more than western therapy (MD = 30.37; 95% CI 4.28, 56.47; $P < 0.00001$). The randomized-effects model was used because of heterogeneity of the results of trials ($\chi^2 = 43.67$ with 7 *df*; $P = 0.02$) (Fig. 1A). Two trials [12, 15] reported a worse effect than the control group on uric acid. In these two trials, there were three groups. Yin *et al.* [12] include an electroacupuncture combined with western medicine group, and Zou *et al.* [15] include an electroacupuncture group with different stimulation (100 Hz).

Visual analogue scale

We identified four trials [8, 14–16] (380 patients) that reported on visual analogue scale (VAS). The pooled analysis showed that acupuncture therapy alone improved the VAS more than western therapy (MD = 2.23; 95% CI 1.39–3.08; $P < 0.0001$). The randomized-effects model was used because of intertribal heterogeneity of the results of trials ($\chi^2 = 25.76$ with 3 *df*; $P < 0.00001$) (Fig. 1B).

Discussion

This systematic review of the 10 RCTs investigated the efficacy of acupuncture therapy alone in gouty arthritis patients. To our knowledge, this is the first systematic review and meta-analysis that has specifically investigated the use of all types of acupuncture for gouty arthritis following the standard guidelines of QUOROM recommendations for the reporting of systematic reviews and meta-analysis [18]. There were no restrictions applied to language, and a number of literature databases were searched using a comprehensive search strategy.

There are some reviews where acupuncture is effective against pain non-specifically [19]. Some RCTs suggest that acupuncture has no specific efficacy over placebo [20]. Unlike these studies, this review was conducted not only about VAS but also about uric acid. Furthermore, this study was conducted on acupuncture *vs* western medicine not acupuncture plus western medicine *vs* western medicine like other reviews. So, this study can directly compare the effectiveness of acupuncture against that of western medicine. Consequently, this study suggests that acupuncture treatment has an effect on gouty arthritis with uric acid and also has a non-specific effect on pain. As distal points and ashi points were used in all trials, this study does not suggest that decreased uric acid and pain is a segmental or non-segmental acupuncture effect.

This study had several limitations. First, the quality evaluation of the studies was not highly detailed. The allocation sequence generation and concealment were unclear in all studies. Blinding of participants, personnel and outcome assessment were not mentioned or were not done properly in all the studies.

Second, among 10 articles, only 2 [9, 13] were written in English. The remaining 8 articles were written in Chinese, which reduces accessibility for other researchers and limits further research based on the results of those studies.

Also, as the quality of the trials in this study is generally weak, further high-quality trials are needed to assess the effectiveness of acupuncture in gouty arthritis patients. There is no clear information about how acupuncture works on gout. So research is needed to describe the mechanism of its effect. First, *in vitro* experiments should be conducted, followed by *in vivo* experiments. Researchers should consider studying the effect of using acupuncture and western medicine at the same time.

In conclusion, this concise report of a systematic and meta-analysis approach demonstrates significant efficacy of acupuncture treatment *vs* standard therapy in improving quality of life and decreasing uric acid. More controlled trials are worth performing to investigate other efficacy measures of potential interest. In addition, more RCTs should be investigated to determine the role of acupuncture treatment in gouty arthritis.

Rheumatology key messages

- This is the first systematic review and meta-analysis of acupuncture in gouty arthritis.
- This study demonstrates efficacy of acupuncture treatment in decreasing VAS and uric acid in gout.

Table 1 Characteristics of acupuncture RCTs for gouty arthritis

Study/ location	Participants (*n*)/mean age (age range), years	Intervention type/treatment frequency (treatment period)/ treated acupoints	Type of control group	Main outcome/result	Quality assessment
He [7]/China	60/(28–67)	EAT, point-injection (lidocaine)/every other day (5 days)/SP4,6, ST36, KI3 and adjunctive points	Point-injection (lidocaine 25 mg)/3 times per day (10 days)/ adjunctive points	Effective rate EAT, point-injection *vs* point-injection (100% *vs* 94%, $P < 0.01$) Significant difference in occurrence of side effect ($P < 0.01$)	U-U-Y-Y-U-Y
Liu *et al.* [8]/ China	100/55.14 (33–74)	Local blocking and EAT/daily (7 days)/SP1,6,9, ST36,40, LR3 and adjunctive points	Indomethacin 25 mg, allopurinol 100 mg, 3 times per day	Effective rate local blocking and EAT *vs* control (96.4% *vs* 84.1%, $P < 0.05$) Significant difference in pain scores ($P < 0.01$) Pain scores in local blocking and EAT is better than that of control ($P < 0.01$) Significant difference in uric acid in blood ($P < 0.01$) Uric acid in blood in local blocking and EAT is better than that of control ($P < 0.01$)	U-U-Y-Y-U-Y
Ma [9]/China	72/42.125 (29–78)	AT/daily (10 s)/SP6,10, BL22,23, CV3,4, KI3 and adjunctive points	Allopurinol 100 mg, 2–3 times per day. If with arthrocele, add brufen 0.2 g, 3 times per day	Effective rate AT *vs* control (95.24% *vs* 63.33%, $P < 0.01$) Significant difference in uric acid, blood creatinine, urea nitrogen, 24-h urinary protein content in AT ($P < 0.01$) Significant difference in uric acid in control ($P < 0.05$)	U-U-Y-Y-U-Y
Xie *et al.* [10]/ China	90/(56)/[40–71]	EAT/daily (10 days)/SP6,9, ST40 and adjunctive points	(1) Allopurinol 100 mg, twice a day (2) Probenecid 0.25 g, twice a day	Significant difference in uric acid in blood ($P < 0.01$) Uric acid in blood in EAT is better than that of (2) control ($P < 0.01$) Uric acid in blood in (1) control is better than that of (2) control ($P < 0.01$) Significant difference in uric acid in urine in EAT, (2) control ($P < 0.01$) Uric acid in urine in EAT is better than that of (1) control ($P < 0.01$) Uric acid in urine in (1) control is better than that of (2) control ($P < 0.01$) Effective rate EAT *vs* (1) control *vs* (2) control (93.3% *vs* 83.3% *vs* 80.0%)	U-U-Y-Y-U-Y

(continued)

Table 1 Continued

Study/ location	Participants (*n*)/mean age (age range), years	Intervention type/treatment frequency (treatment period)/ treated acupoints	Type of control group	Main outcome/result	Quality assessment
Xie *et al.* [11]/ China	60/60.2 (32–67)	AT/daily (15 days)/local affected area and adjunctive points	Indomethacin and allopurinol, 3 times per day for 15 days	Effective rate AT *vs* control (93.3% *vs* 80.0%, $P < 0.01$) Significant difference in uric acid in blood ($P < 0.05$) Uric acid in blood in AT better than that of control ($P < 0.05$)	U-U-Y-Y-U-Y
Yin *et al.* [12]/ China	100/60.78 (31–72)	EAT/daily (6 days)/ST36,40 and adjunctive points	Indomethacin tid and benzbromarone qd, for 6 days	Effective rate EAT *vs* control (90% *vs* 86.7%, $P < 0.05$) Significant difference in uric acid in blood ($P < 0.05$) Uric acid in blood in AT better than that of control ($P < 0.05$)	U-U-Y-Y-U-Y
Zeng [13]/ China	60/(26–57)	AT point-injection (chishao, dexamethasone)/LR3, LI4, SP1,6,10, GB39, TE5 and adjunctive points	AT/LR3, LI4, SP1,6,10, GB39, TE5 and adjunctive points	In acupoint-injection and acupuncture group, 15 and 9 cases had marked improvement, 12 and 10 were effective, and 3 and 11 failed in treatment, with the total effective rates being 90% and 63.3%, respectively. Acupoint-injection is significantly superior to acupuncture in therapeutic effect.	U-U-Y-Y-U-Y
Zhou *et al.* [14]/China	160/45.9 (36–65)	AT/daily (5 days)/ST36, LI11, SP6,10 GB34 and adjunctive points	Indomethacin 25 mg, 3 times per day for 5 days	The curative rate was 52.5% (42/80) in acupuncture group, which was superior to 22.5% (18/80) in indomethacin group ($P < 0.01$). In the acupuncture group, analgesia efficacy was better than in the indomethacin group ($P < 0.01$) and the effect on reducing BUA and ERS levels was same as that in the indomethacin group (all $P > 0.05$). After treatment, ALT and AST levels had no changes in the acupuncture group, but they apparently increased in the indomethacin group (all $P < 0.01$)	U-U-Y-Y-U-Y
Zou *et al.* [15]/ China	90/(31–72)	(1) EAT (100 Hz)/daily (6 days)/SP6, ST36 and adjunctive points (2) EAT (2 Hz)/daily (6 days)/SP6, ST36 and adjunctive points	Indomethacin 25 mg, allopurinol 100 mg, 3 times per day	Effective rate (1) EAT *vs* (2) EAT *vs* control (86.7% *vs* 100% *vs* 90%) (2) EAT *vs* (1) EAT ($P < 0.01$) (1) EAT *vs* control ($P > 0.05$) Significant difference in pain scores ($P < 0.01$)	U-U-Y-Y-U-Y

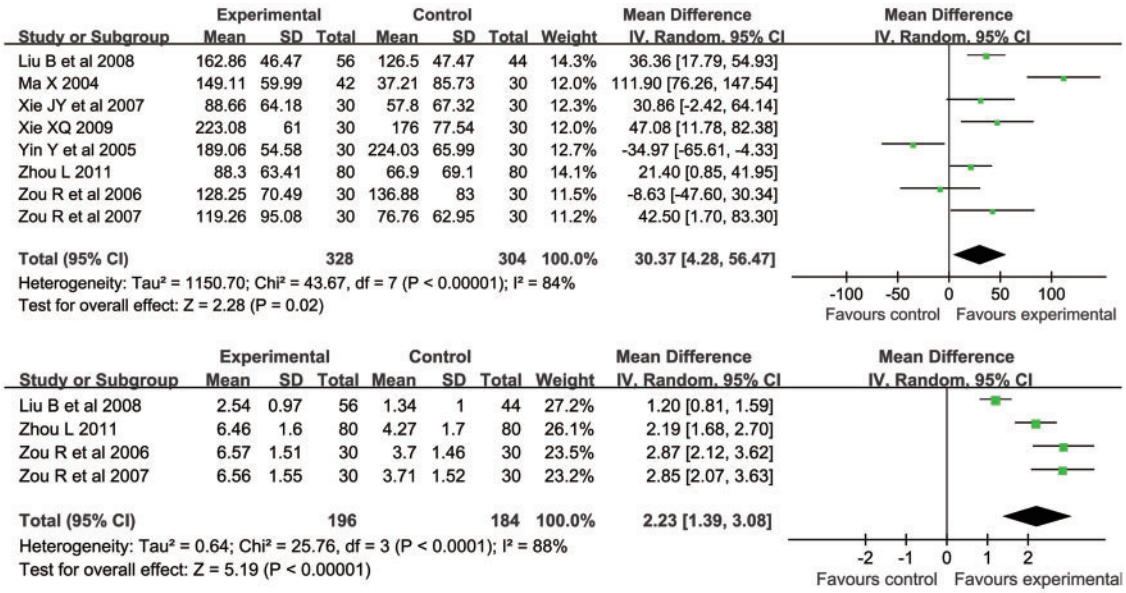
(continued)

Table 1 Continued

Study/ location	Participants (*n*)/mean age (age range), years	Intervention type/treatment frequency (treatment period)/ treated acupoints	Type of control group	Main outcome/result	Quality assessment
				Pain scores in (2) EAT better than in (1) EAT, control ($P < 0.01$) Pain scores in (1) EAT better than in control ($P < 0.01$) Initiating and sustaining time of analgesia in (1) EAT, (2) EAT better than control ($P < 0.01$) Initiating and sustaining time of analgesia in (2) EAT better than (1) EAT ($P < 0.01$) Significant difference in uric acid in blood ($P < 0.01$) Uric acid in blood in (1) EAT, (2) EAT better than control ($P < 0.01$) Significant difference in uric acid in urine ($P < 0.01$) Uric acid in urine in (1) EAT, (2) EAT better than control ($P < 0.01$)	
Zou *et al.* [16]/ China	60/(31–72)	EAT, point-injection/every other day (3 s)/SP6, ST36 and adjunctive points	Indomethacin 25 mg, allopurinol 100 mg, 3 times per day	Effective rate EAT, point-injection *vs* control (100% *vs* 93.3%, $P < 0.01$) Significant difference in pain scores ($P < 0.01$) Pain scores in EAT, point-injection better than control ($P < 0.01$) Significant difference in uric acid in blood ($P < 0.01$) Uric acid in blood in EAT, point-injection is better than control ($P < 0.01$)	U-U-Y-Y-U-Y

EAT: electoacupuncture treatment; AT: acupuncture treatment.

FIG. 1 Meta-analysis of acupuncture therapy versus western therapy.



(**A**) Effect of acupuncture therapy on uric acid. (**B**) Effect of acupuncture therapy on VAS.

Funding: This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korea government (MEST) (No. 2012-0005755).

Disclosure statement: The authors have declared no conflicts of interest.

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