

Acupuncture for Diabetic Peripheral Neuropathy: A Network Meta-analysis



Wen-Jing Xioing, Xue Feng and Wei Chen*

Centre For Evidence-Based Chinese Medicine, Beijing University of Chinese Medicine, China

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*Corresponding author: Wei Chen, Centre for Evidence-Based Chinese Medicine, Beijing University of Chinese Medicine, Bei San Huan Dong Lu, Chaoyang District, 100029 Beijing, China; Email: chenweibucm@163.com

Abstract

Aim: Acupuncture therapy has been commonly used in China alone or in combination with conventional medicine to treat diabetic peripheral neuropathy (DPN), and different types of acupuncture existed. RCTs could just assess two interventions treating the same disease. When there are more than two treatments for the same disease, indirect comparisons between each treatment could not be gotten.

Objectives: To conduct a network meta-analysis to assess the potential therapeutic effects and safety of different acupuncture therapy for the treatment of DPN.

Methods: We conducted literature research from their inception to August, 2014 in the following databases: Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, SinoMed, CNKI and VIP. RCTs of manual acupuncture, electroacupuncture, needle knocking acupuncture or warm needling and moxibustion for DPN were included.

Results: A total of 40 RCTs which involved 2,602 patients have been included. NMA results also indicate that compared with mecobalamin, vitamin B or no treatment, acupuncture therapy had better effect on global symptom improvement, and needle knocking acupuncture had better rank probability of effect (60.8%).

Conclusion: NMA showed that all the included acupuncture therapies had benefit, but the needle knocking acupuncture had better rank probability than others on effect of global symptom improvement. However, due to the insufficient included studies of needle knocking acupuncture and warm needling and moxibustion, the rank probability of each intervention may still need further research to prove. In addition, the positive results should be interpreted prudently because of the high risk of bias of included trials.

Keywords: Diabetic peripheral neuropathy; Network meta-analysis; Randomized controlled trial

Abbreviations: DPN: Diabetic Peripheral Neuropathy; NMA: Network Meta-Analysis; RCT: Randomized Controlled Trial

Introduction

Diabetic peripheral neuropathy (DPN) is one of the most common chronic complications of diabetes mellitus [1]. The incidence of DPN (ranging from 30%~90%) is increasing over time [2], and associates with a huge disease burden in the aspect of disability and depletion of health care resources [3-5]. The only established intervention to treat DPN is strict glycemic control. Supportive therapies, including pain management and podiatric care, were also used aiming to improve quality of life and prevent chronic ulcerations [6]. However, the effectiveness is not satisfactory. Acupuncture is an alternative medicine methodology originating in ancient China. In China, acupuncture has different types. Results of our preliminary literature searching showed that among them, manual acupuncture, electroacupuncture, needle knocking acupuncture (tapping), and warm-needling and moxibustion were the most frequently-used types of acupuncture for DPN. However, it is unclear about which acupuncture treatment is the most effective.

RCTs could just assess two interventions treating the same disease. However, when there are more than two treatments for the same disease, indirect comparisons between each treatment could not be gotten. Network meta-analysis, as a new statistical method for meta-analysis, has been commonly used to compare the efficacy and safety of multiple treatments. Therefore, we conducted a network meta-analysis of randomized clinical trials to evaluate the benefits and harms of different acupuncture interventions in patients with DPN.

Methods

We have searched the Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, Chinese BioMedical CD-ROM (SinoMed), Chinese National Knowledge Infrastructure Database (CNKI), and VIP Chinese Science and Technique Journals Database from their inception to August, 2014. Parallel randomized controlled trials (RCTs) which assessed effects and safety of acupuncture therapy for DPN have been

included. The acupuncture therapy was defined as the four most frequently-used types of acupuncture therapy, including manual acupuncture, electroacupuncture, needle knocking acupuncture (tapping), and warm-needling and moxibustion methods.

RevMan 5.3 and R 3.2.2 software were used to conduct

data synthesis. Multiple treatment comparison analyses were performed through Markov-Chain-Monte-Carlo (MCMC) method. The mtc model was built and data was pooled by gemtc package. Node analysis has been performed to test the consistency of direct and indirect comparison evidence by R software.

Results

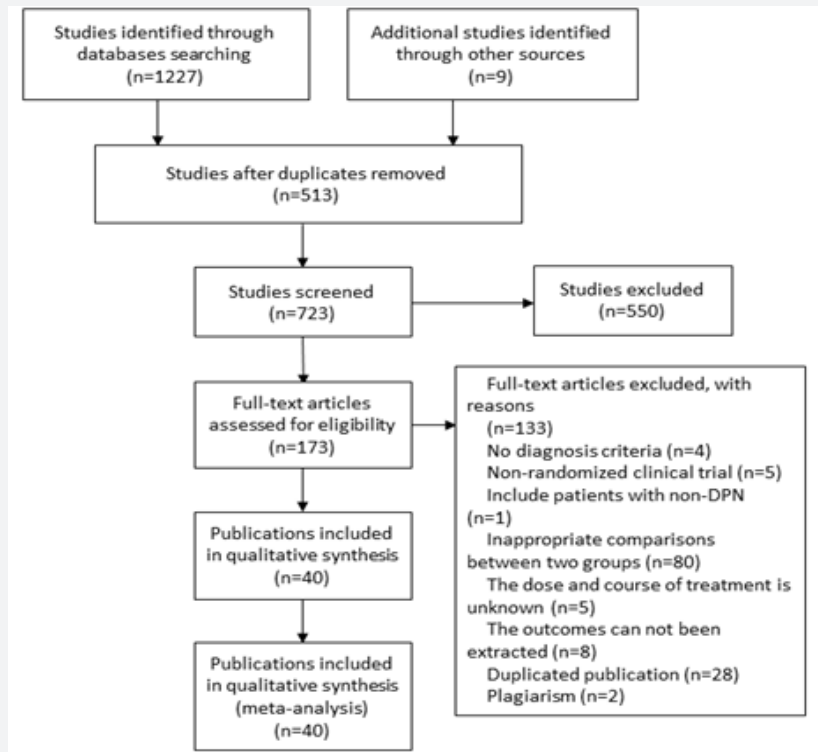


Figure 1: Flow chart.

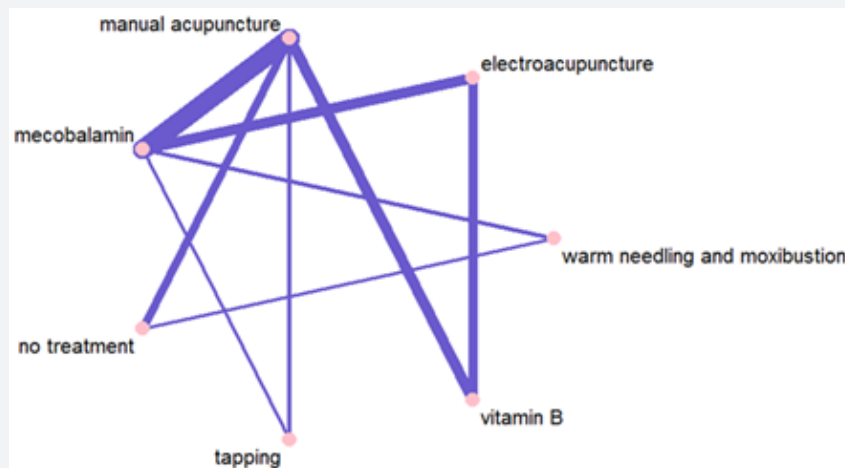


Figure 2: Network plot of included interventions by netmeta package.

A flow chart depicted the search process and study selection (Figure 1). A total of 40 RCTs involving 2,602 participants were included [7-46]. All of the included trials were performed and published in China. No trial reported patients' differentiation of symptoms. The control intervention included mecobalamin, vitamin B and no treatment. No trial used sham acupuncture

or placebo as control. Basic hypoglycemic therapies including oral antidiabetic drug, insulin treatment or physical training were adopted in all included trials. The network plot of all the interventions plotted by netmeta package was shown in Figure 2. It showed that the number of trials compared manual acupuncture with mecobalamin was the most.

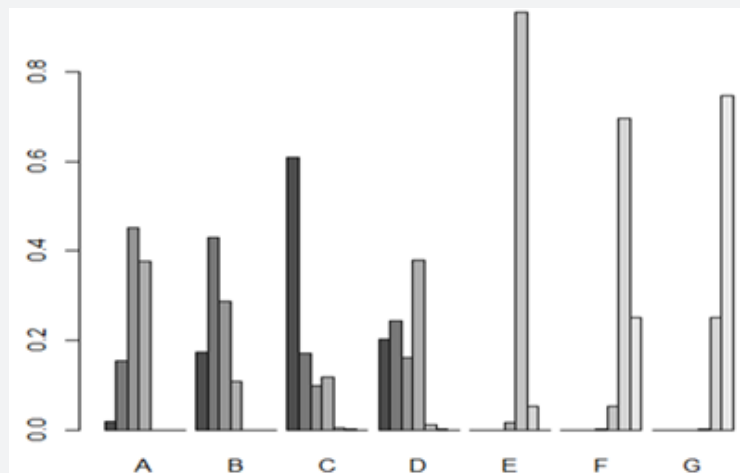


Figure 3: Rank probability plot of interventions. (A. manual acupuncture, B. electroacupuncture, C. needle knocking acupuncture, D. warm needling and moxibustion, E. mecobalamin, F. no interventions, G. vitamin B).

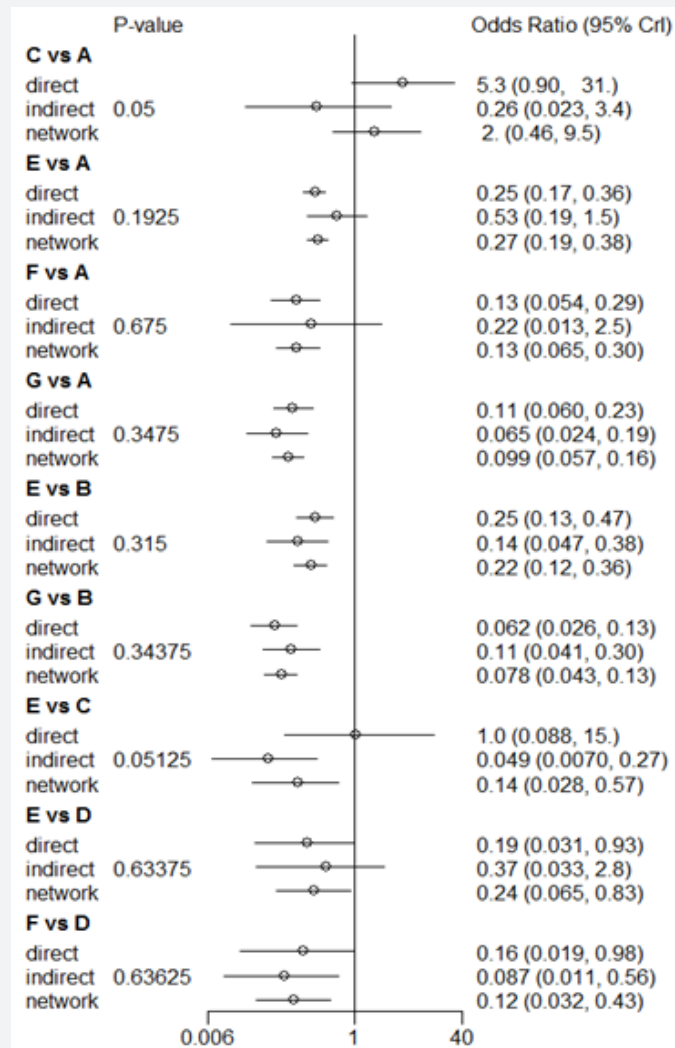


Figure 4: Forest plot of nod analyses. (A. manual acupuncture, B. electroacupuncture, C. needle knocking acupuncture, D. warm needling and moxibustion, E. mecobalamin, F. no interventions, G. vitamin B).

The majority of the included trials were assessed to be of general poor methodological quality according to the predefined quality assessment criteria. The NMA compared different acupuncture therapy for DPN on the outcome of global symptom improvement. We built mtc model through gemtc package, and calculated the rank probability of each intervention (Figure 3), it showed that needle knocking acupuncture has better rank probability than other interventions. We conducted the nod analyses by gemtc package, and we calculated the direct and indirect comparison results of each comparison (Figure 4). The statistic P value of inconsistency of each comparison was more than 0.05, so the consistency of direct and indirect comparison was fine.

Conclusion

NMA results showed that all the included acupuncture therapies had benefit, but the needle knocking acupuncture had better rank probability than others on effect of global symptom improvement. However, due to the insufficient included studies of needle knocking acupuncture and warm needling and moxibustion, the rank probability of each intervention may still need further research to prove. In addition, the positive results should be interpreted prudently because of the high risk of bias of included trials.

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Conflict of Interest

The authors declare that there is no conflict of interests.

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