● Systematic review

Effectiveness of bee venom acupuncture in alleviating post-stroke shoulder pain: a systematic review and meta-analysis

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ABSTRACT

BACKGROUND: Shoulder pain is a common complication of stroke. Bee venom acupuncture (BVA) is increasingly used in the treatment of post-stroke shoulder pain.

OBJECTIVE: To summarize and evaluate evidence on the effectiveness of BVA in relieving shoulder pain after stroke.

SEARCH STRATEGY: Nine databases, namely MEDLINE, EMBASE, the Cochrane Library, the China National Knowledge Infrastructure (CNKI), the Japan Science and Technology Information Aggregator, Electronic (J-STAGE), and four Korean medical databases, namely, the National Assembly Library, the Research Information Service System, the National Discovery for Science Leaders, and OASIS, were searched from their inception through August 2014 without language restrictions.

INCLUSION CRITERIA: Randomized controlled trials (RCTs) were included if BVA was used at acupoints as the sole treatment, or as an adjunct to other treatments, for shoulder pain after stroke.

DATA EXTRACTION AND ANALYSIS: Two review authors independently selected trials for inclusion, assessed methodological quality and extracted data.

RESULTS: A total of 138 potentially relevant articles were identified, 4 of which were RCTs that met our inclusion criteria. The quality of studies included was generally low, and a preponderance of positive results was demonstrated. All four trials reported favorable effects of BVA on shoulder pain after stroke. Two RCTs assessing the effects of BVA on post-stroke shoulder pain, as opposed to saline injections, were included in the meta-analysis. Pain was significantly lower for BVA than for saline injections (standardized mean difference on 10-cm visual analog scale: 1.46 cm, 95% CI = 0.30–2.62, P = 0.02, n = 86)

CONCLUSION: This review provided evidence suggesting that BVA is effective in relieving shoulder pain after stroke. However, further studies are needed to confirm the role of BVA in alleviating post-stroke shoulder pain. Future studies should be conducted with large samples and rigorous study designs.

Keywords: bee venoms; acupuncture therapy; stroke; shoulder pain; meta-analysis; systematic review

1 Introduction

Strokes are a major cause of mortality and disability worldwide[1]. Shoulder pain is a common complication among stroke survivors, and is linked to the contracture of the shoulder, glenohumeral subluxation, rotator cuff injury, and the spasticity of shoulder muscles. It may also interfere with the functions of upper extremities, active rehabilitation, and other daily activities[2]. The prevalence of post-stroke shoulder pain is typically 22%–23% in the general population of stroke patients, and 54%–55% among stroke survivors in rehabilitation settings[3]. Hemiplegic shoulder pain is generally treated with non-steroidal anti-inflammatory drugs, corticosteroid injections, exercise, strapping, and electrical stimulation; nevertheless, overall estimates of treatment effects for available treatments have been reported at around 30%–50% for the post-stroke population as a whole. Therefore, there is a need for complementary and alternative treatments that are efficacious in relieving post-stroke shoulder pain[4,5]. Research has demonstrated that approximately half of the stroke survivors in the U.S. use some form of complementary and alternative medicine (CAM), such as herbal, acupuncture-type, or chiropractic treatment. Patients who use CAM generally do so as a complement to conventional treatments rather than as an alternative for its presumed potential to alleviate symptoms, in addition to its lower cost and easier accessibility[6].

Bee venom acupuncture (BVA) involves injecting purified and diluted bee venom (BV) into acupoints. BVA reportedly has anti-arthritic, anti-inflammatory, analgesic, and anti-nociceptive effects, and is effective in the treatment of arthritis, pain, rheumatoid diseases, multiple sclerosis, and chronic inflammation[7]. BVA, in particular, has been used to treat a variety of painful conditions in an individualized and practical approach[8]. Several randomized controlled trials (RCTs) assessing the efficacy of acupuncture for alleviating post-stroke shoulder pain have been published[2]. However, there has been relatively little evidence in RCTs on the efficacy of BVA for treating post-stroke shoulder pain. Therefore, no systematic review of this topic is currently available. The aim of the present study was to summarize and assess the evidence on the effectiveness of BVA for relieving post-stroke shoulder pain.

2 Methods

2.1 Search methods for identification of studies

The following electronic databases were searched from their inception through August 2014: MEDLINE, EMBASE, the Cochrane Library, the China National Knowledge Infrastructure (CNKI), the Japan Science and Technology Information Aggregator, Electronic (J-STAGE),

and four Korean medical databases (the National Assembly Library, the Research Information Service System, the National Discovery for Science Leaders, and OASIS). Our search was limited to the search strings "bee venom OR apiotherapy OR apitherapy OR apipuncture OR bee venom therapy OR bee venom acupuncture" AND "stroke OR apoplexy OR CVA OR cerebrovascular attack OR cerebrovascular accident OR cerebral infarction OR cerebral hemorrhage" in each database language. The search strategy was adjusted for each database. In addition, six Korean traditional medicine journals (*Journal of Oriental Medicine*, *The Journal of Korean Acupuncture and Moxibustion Society*, *Journal of Pharmacopuncture*, *The Korean Journal of Meridian and Acupoint*, *Korean Journal of Oriental Physiology and Pathology*, and *The Journal of Korean Oriental Internal Medicine*) were manually searched for relevant articles.

2.2 Inclusion/exclusion criteria

RCTs were included if BVA was used at acupoints, either as the sole treatment or as an adjunct to other treatments for stroke. Trials were excluded if study designs did not evaluate the effectiveness of BVA for shoulder pain after the occurrence of a stroke. No search restrictions on language or publication forms were imposed. During the first stage of selection/exclusion, titles and abstracts were analyzed, and literature that had no relevance to the present study was excluded. The second stage of selection/exclusion involved analyzing the full text of particular studies, because it was impossible to determine their relevance to the present research based solely on their abstracts.

2.3 Data extraction

Two review authors (S. M. L. and S. H. L.) independently selected trials for inclusion, assessed methodological quality, extracted data, and resolved any differences through discussion. For studies with insufficient data, we contacted the primary author to obtain and verify data where possible.

2.4 Quality assessment

The two reviewers independently assessed the methodological quality and the risk of bias of the included studies using the Cochrane classification.

2.5 Statistical analysis

The statistical analysis was performed using Review Manager (The Nordic Cochrane Centre). We extracted data on mean changes in pain from baseline, as assessed with a Visual Analog Scale (VAS) and the Fugl-Meyer Motor Assessment (FMMA) for pain improvement, and estimated discrepancies between the intervention and control groups. Summary estimates of treatment effects were calculated using a random effects model. Statistical heterogeneity was analyzed using the I^2 test and was considered significant when $I^2 > 50\%$. Publication bias was not a factor in the trials due to the limited number of studies.