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Review article

Acupuncture point injection therapy plus pharmacotherapy for chronic obstructive pulmonary disease: A systematic review of randomised controlled trials

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ABSTRACT

Introduction: Acupuncture point injection therapy has been used for respiratory conditions, including chronic obstructive pulmonary disease (COPD), and may be an effective adjunct to pharmacotherapy. This review evaluated the efficacy and safety of acupuncture point injection therapy plus pharmacotherapy for COPD.

Methods: Five English and four Chinese databases were searched from inceptions to May 2015. Studies of acupuncture point injection therapy reporting on clinical outcomes (including lung function, symptom severity, quality of life and exercise capacity) were included. Methodological quality was assessed using the Cochrane Collaboration's risk of bias tool, and data analysed using RevMan 5.2.

Results: Twelve studies (841 participants) were included. Results from meta-analyses showed the combination of acupuncture point injection therapy plus pharmacotherapy produced better outcomes for lung function during acute exacerbation (FEV_1 L: MD 0.16 L [0.04, 0.28], $I^2 = 0\%$; FVC L: MD 0.29 L [0.14, 0.44], $I^2 = 0\%$) and effective rate for stable COPD and acute exacerbations (RR 1.45 [1.17, 1.79], $I^2 = 0\%$ and RR 1.16 [1.07, 1.26], $I^2 = 0\%$, respectively) than pharmacotherapy alone. Higher arterial oxygenation (PaO_2) was seen in participants with acute exacerbations who received acupuncture point injection therapy plus pharmacotherapy (MD 7.43 mmHg [3.49, 11.39], $I^2 = 93\%$), although considerable statistical heterogeneity was detected.

Conclusions: Based on the included studies, there is insufficient information on the safety of acupuncture point injection therapy for COPD. There is some evidence that acupuncture point injection therapy may improve lung function and effective rate in people with COPD, however the conclusions are limited by the small number of included studies and methodological differences.

Contents

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1. Introduction

Chronic obstructive pulmonary disease (COPD) is a condition of persistent airflow limitation which is usually progressive [1]. COPD is associated with an abnormal inflammatory response in the airways in response to noxious stimuli [2], leading to symptoms of shortness of breath and cough. Pharmacologic therapy such as bronchodilators and anti-inflammatory drugs can reduce COPD symptoms, the frequency and severity of exacerbations and prevent the development of subsequent exacerbations [1]. While many pharmaceuticals are beneficial for people with COPD, they are not without side effects [2–4]. Many people with COPD turn to complementary therapies to address their symptoms and to counteract the side effects of pharmacotherapy [5].

Chinese medicine (CM), including acupuncture and related therapies, has a long history of use for a range of health conditions, including respiratory diseases. In treating COPD, Chinese medicine can reduce clinical symptoms and improve quality of life, and may be an effective adjunct therapy for people with COPD [6]. Acupuncture point injection therapy is a technique involving injection of a substance into acupuncture points [7]. The substance used for injection may include western or Chinese medicines, vitamins, sterile water or saline solution [7]. The World Health Organization provides a differing definition, referring to the injection of liquid medicine into acupuncture points [8]. The volume of liquid injected varies depending on the anatomy surrounding the acupuncture point, and can range from 0.3 mL up to 15 mL [7].

A generally accepted benefit of this technique is the dual action of the substance being injected and the stimulation of acupuncture points during injection, although the mechanism is not fully understood [9]. A recent study examined a possible mechanism via neuronal activity in a murine model, and found that injection of bee venom, vitamins B1 and B12, and saline all activated the same acupuncture pathways, regardless of the pharmacological action of the substance injected [9], although a greater number of neurons expressed Fos when bee venom was injected. The authors suggested that acupuncture point injection produces local changes in spatial configuration caused by the injected substance, and that the magnitude of the effect may vary depending on the substance injected.

Studies of acupuncture point injection therapy have shown benefit for internal medicine and surgical conditions [10], and in treating pain [11–13]. The mechanism of this therapy is still unclear. Stimulation of acupuncture points using traditional filiform needles has been postulated to partially reduce bronchospasm and decrease respiratory muscle tension in people with COPD [14,15], and may regulate pro- and anti-inflammatory cytokines, although this finding has not been confirmed [16]. It is likely that injection of a substance to an acupuncture point will elicit similar responses.

Acupuncture point injection therapy is commonly used for the clinical management of COPD in China, however, there is limited evidence to support its use. A literature search did not identify any systematic evaluation of this therapy in treating COPD. As part of a broader search to evaluate the evidence for Chinese medicine therapies (Chinese herbal medicine, acupuncture and related therapies, and other Chinese medicine therapies) in treating COPD, this systematic review and meta-analysis evaluated the efficacy and safety of acupuncture point injection therapy in combination with pharmacotherapy compared with pharmacotherapy (i.e. as add-on therapy) for the treatment of COPD.

2. Methods

Five English databases (PubMed, Embase, AMED, CINAHL and Cochrane CENTRAL) and four Chinese databases (CNKI, CQVIP, CBM and Wanfang Data) were searched from inceptions to May 2013. An update search was conducted in May 2015. Search terms for the intervention included acupuncture, point injection, and variants, and variants of chronic obstructive pulmonary disease. Results were exported to a citation manager for title and abstract screening. Full text was retrieved where eligibility could not be determined from the title and abstract.

Randomised controlled trials investigating acupuncture point injection therapy (of either herbal medicine or pharmacotherapy) in combination with pharmacotherapy (i.e. as add-on therapy) were eligible for inclusion. Further inclusion criteria were diagnosis of COPD according to GOLD, British Thoracic Society, American Thoracic Society, European Respiratory Society, British Medical Research Council, Chinese COPD guideline and/or confirmation using spirometric testing; use of the same pharmacotherapy as co-intervention and comparator (e.g. acupuncture point injection therapy plus bronchodilators versus bronchodilators); pharmacotherapy recommended in COPD clinical practice guidelines [1,2], and reporting on at least one of the pre-specified outcomes: (1) lung function (FEV_1, FVC), (2) symptom severity (e.g. dyspnoea scales), (3) health related quality of life (e.g. St. George's Respiratory Questionnaire (SGRQ), other quality of life scales), (4) exercise capacity (distance walked in six minutes (6MWT)), (5) arterial blood gases (PaO_2, $PaCO_2$), (6) frequency of acute exacerbation, (7) BODE index (a composite measure of disease risk based on body mass index, obstruction, dyspnoea, exercise capacity), (8) effective rate and (9) adverse events. No restriction was placed on gender or stage of COPD (e.g. stable or acute exacerbation). Studies which used acupuncture point injection therapy with another Chinese medicine intervention, or which reported on acupuncture point injection therapy using autologous blood (patient's own blood withdrawn and injected into acupuncture points) were excluded.

For eligible studies, data were extracted into a pre-defined form, and included characteristics of the study, details of the intervention and co-intervention/comparator, reported outcome measures and results. Data were verified by a second researcher. Contact was made with one study author verbally for clarification of data. Methodological quality assessment was made at the study level based on the Cochrane risk of bias tool for the domains sequence generation, allocation concealment, blinding of participants and outcome assessors, incomplete outcome data, selective reporting and other forms of bias such as baseline imbalance or funding source. Due to the nature of the comparisons, it was not feasible to blind the therapist, and risk of bias was not assessed for this domain.

Results were entered into RevMan 5.2 software for analysis. Data were pooled for meta-analysis where possible. Continuous