

Effect of electroacupuncture on chemotherapy-induced peripheral neuropathy in patients with malignant tumor: a single-blinded, randomized controlled trial

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Abstract

OBJECTIVE: To evaluate the effect of electroacupuncture on chemotherapy-induced peripheral neuropathy (CIPN), quality of life and immune status of patients with malignant tumors.

METHODS: From Jan, 2013 to May, 2014, 37 patients with malignant tumors were included in this prospective single-blinded study, and randomized to receive either electroacupuncture or acupuncture treatment on basis of chemotherapy. The chemotherapy was continued for 2 courses as previous before the treatments, with 21 days as a course of treatment. Patients received acupuncture and electroacupuncture once per day starting at the day before chemotherapy for consecutive 7 days followed by 14 days off, with 21 days as a course of treatment, and continued for two courses of treatment. Then CIPN, traditional Chinese clinical symptoms, quality of life and immune status were all evaluated for each patient prior treatment and after two courses of treatment.

RESULTS: The gender, age, cancer species as well as incidence (83.3% vs 84.2%) and grades of CIPN before treatments were all similar in patients receiving acupuncture or electroacupuncture (all $P > 0.05$). After treatments, most patients with peripheral neuropathy were cured by two courses of electroacupuncture (84.2% vs 21.1%), whereas the other group of patients had similar incidences of peripheral neuropathy compared with prior-acupuncture (83.3% vs 72.2%). Besides, patients receiving electroacupuncture had lower incidence of peripheral neuropathy than those receiving acupuncture

treatment ($\chi^2 = 9.745$, $P = 0.002$). The grades of peripheral neuropathy were significantly different in the two groups post-treatment ($\chi^2 = 13.983$, $P = 0.007$). The total effective rates for traditional Chinese clinical symptoms were 16.7% and 84.2% in acupuncture and electroacupuncture groups, respectively ($Z = -4.239$, $P < 0.001$). The electroacupuncture treatment provided a more satisfactory life for patients compared with acupuncture ($Z = -4.76$, $P < 0.001$). Both electroacupuncture and acupuncture had no effects on immune function.

CONCLUSION: Electroacupuncture could alleviate CIPN, and improve traditional Chinese clinical symptoms and quality of life, but did not affect immune function.

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Keywords: Electroacupuncture; Quality of life; Chemotherapy-induced peripheral neuropathy; Randomized controlled trial

INTRODUCTION

Although chemotherapy is the most commonly used and effective therapy for various malignant tumors,¹ it is usually associated with many side effects adversely affecting quality of patients life.^{2,3} Patients often suffered from myelosuppression, hair loss, nausea, vomiting and depressed immunity.³ Besides, chemotherapy induced peripheral neuropathy (CIPN) is the second most frequent side effect inferior to hematologic toxicity, and affect 10%-20% of patients exposed to chemotherapy.⁴ Affected patients experience a mixture dysfunction of sensory, sensorimotor and autonomic nervous of the peripheral nervous system.

Several complementary and Alternative Medicine have been proposed to either prevent or treat CIPN, like antiepileptic drugs, high doses of vitamins, calcium-magnesium infusions, magnet therapy and herbal remedies,⁵ Acupuncture is also demonstrated to reduce the CIPN symptoms in several studies⁶⁻⁸ and 30% of patients prefer to use acupuncture. Alternatively, hydroelectric baths as a traditional therapy has been used for the management of peripheral neuropathy in German-speaking countries.⁹ However, few studies have focus on acupuncture combined with electrostimulation to treat CIPN in cancer patient;^{10,11} whereas it was proved with improved neuropathic pain in paclitaxel-treated rats at a low (10 Hz) or a high (100 Hz) frequency.¹²

In this randomized, randomized controlled study, we compared the effects of acupuncture and electroacupuncture on CIPN, quality of life and immune status of patients with malignant tumors.

METHODS

Patients

This prospective, single-blinded randomized controlled trial enrolled hospitalized patients with malignant tumors in Department of Oncology and General Surgery from Shuguang Hospital Affiliated to Shanghai University of Traditional Chinese Medicine, Songjiangqu Fangta Traditional Chinese Medicine Hospital and Jinganqu central hospital (all in Shanghai, China). The inclusion criteria include: a diagnosis of malignant tumors after clinical and pathological examination according to the guideline for diagnosis and treatment of common malignant tumor;¹³ age range of 18-80 years; an expected survival time of > 6 weeks and a Karnofsky Performance Status (KPS) score¹⁴ of ≥ 60 ; patients were being treated with one or multiple kinds of platinum-, paclitaxel-, vinblastine- and etoposide-based chemotherapy; and they were tolerant to electroacupuncture and had no prior experience of acupuncture treatment and electroacupuncture. Patients were excluded if they had serious systemic disease or liver and kidney diseases or psychiatric disorders, or if they were currently in duration of pregnancy or lactation, or if they had poor compliance and noncooperation. This study has been registered in Chinese Clinical Trial Registry (Identifier: ChiCTR-TRC-13003253). All the procedures were approved by the Regional Ethics Committee of our hospital and all patients signed informed consents.

Interventions

Patients who meet the eligibility criteria were randomized to two groups to receive either acupuncture or electroacupuncture treatment on the basis of chemotherapy. Randomization was achieved by a series of randomly computer-generated numbers, which were kept in consecutively numbered, sealed and opaque envelopes. Patients were blinded to assignment groups. The clinical data of patients including gender, age, cancer types and peripheral neuropathy before treatment were all collected.

The chemotherapy was continued for 2 courses as previous before the treatments, with 21 days as a course of treatment. Patients received acupuncture and electroacupuncture once per day starting at the day before chemotherapy for consecutive 7 days followed by 14 days off, with 21 days as a course of treatment, and continued for two courses of treatment. For electroacupuncture, patients were placed in decubitus position. The disposable aseptic acupuncture needles (0.30 mm \times 40 mm) were perpendicularly inserted 0.5-1.0 Chinese inch at Hegu (LI 4) acupoints in both hands and Taichong (LR 3) acupoints in both feet after skin antiseptis with 75% ethanol. The needles were stimulated manually until the appearance of *De Qi*, which was a needle sensation characterized by a subjective painless symptom, tingling or distention around the acupoints, or a radiating sensation originating from the needled points. Then electrical stimulation was applied

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