

Acupuncture-induced changes of vagal function in patients with depression: A preliminary sham-controlled study with press needles



Yoshihiro Noda ^{a, b, c}, Takuji Izuno ^a, Yoshie Tsuchiya ^a, Shunsuke Hayasaka ^a,
Kiiko Matsumoto ^d, Hirohiko Murakami ^a, Arata Ito ^a, Yukari Shinse ^a, Aya Suzuki ^a,
Motoaki Nakamura ^{a, *}

^a Kanagawa Psychiatric Center, 2-5-1 Serigaya, Kohnan-ku, Yokohama, Kanagawa, 233-0006, Japan

^b Department of Neuropsychiatry, Graduate School of Medicine, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo, 113-8655, Japan

^c Centre for Addiction and Mental Health, Department of Psychiatry, University of Toronto, 1001 Queen Street West, Toronto, ON, M6J 1H4, Canada

^d Kiiko Matsumoto Acupuncture Clinic, 1223 Walnut Street, Newton Highlands, MA, 02461, USA

ARTICLE INFO

Article history:

Received 21 May 2015

Accepted 3 July 2015

Keywords:

Autonomic function

Blood pressure

Medication-resistant depression

Holter electrocardiogram

Press needle acupuncture

Vagal function

ABSTRACT

To study the biological effects of acupuncture on depression, we hypothesized that acupuncture will exert its antidepressant effect through a bottom-up neuromodulation of the autonomic dysfunction in depression. The participants received press needle (PN) acupuncture for 72 h continuously in a sham-controlled design. Psychological assessments and Holter electrocardiography were performed before and after PN acupuncture. We evaluated their autonomic functions through the heart rate variability (HRV). As a result, following PN acupuncture participants showed significant improvement in the Beck's Depression Inventory scores ($P = 0.031$), systolic/diastolic blood pressures ($P = 0.002/P = 0.011$), and coefficient of variation of the R–R interval ($P < 0.0001$), compared to sham PN. The present findings showed PN acupuncture induced alterations in vagal function, blood pressure, and Beck's Depression Inventory scores. It was suggested that vagal stabilization effect by acupuncture may be associated with the therapeutic mechanism in depression.

© 2015 Elsevier Ltd. All rights reserved.

1. Introduction

Affective disorder is a highly prevalent condition associated with large socioeconomic loss [1]. In October 2012, the World Health Organization (WHO) estimated that more than 350 million patients are suffering from depression worldwide. Antidepressants and psychotherapy are typically administered for depression and are effective in many patients. However, approximately 10–40% of patients remain significantly treatment-resistant [2].

1.1. Acupuncture and depression

The therapeutic effect of acupuncture on depression is well known empirically, however, evidence from randomized controlled trials (RCTs) is relatively limited [3–7]. Further, acupuncture reportedly affects the autonomic nervous system, but the

therapeutic mechanism underlying this effect remains unknown [8] because of the variable results such as the effects on heart rate variability (HRV) from several sham-controlled RCTs [9]. Nevertheless, there are convincing prior studies demonstrating that patients with major depression exhibited diminished parasympathetic reactivity and, presumably, increased sympathetic reactivity [10,11]. Moreover, Wang et al. has reported that the severity of depression was associated with the severity of autonomic dysfunction [11].

1.2. Press needle acupuncture

Press needle (PN) is a special acupuncture needle, which has been developed in Japan by improving the conventional intradermal needles (see Fig. 1). PN can stimulate the targeted acupoints continuously for a few days in a non-invasive and safe way [12], and further it enable us to apply acupuncture in a double-blind, placebo-controlled design by using sham PN. Indeed, there are several clinical studies using PN for various diseases. For example, Anders et al. applied active PN to PC6 (*nèiguān*) to alleviate the symptom of acute vomiting in children with gastroenteritis and pneumonia,

* Corresponding author. Laboratory of Neuromodulation, Kanagawa Psychiatric Center, 2-5-1 Serigaya, Kohnan-ku, Yokohama, 233-0006, Japan.

E-mail address: motoaki@motoaki.com (M. Nakamura).

Abbreviations			
ANOVA	Analysis of variance	HRV	Heart rate variability
BDI-II	Beck's depression inventory, 2nd edition	ICD-10	International Classification of Disease, 10th edition
BP	Blood pressure	JIS	Japanese Industrial Standard
CSI	Cardiac sympathetic index	LF	Low frequencies
CVI	Cardiac vagal index	LF/HF	Ratio of low- to high-frequency power
CVRR	Coefficient of variation of the R–R interval	PN	Press needle
DBP	Diastolic blood pressure	RCT	Randomized controlled trial
ECG	Electrocardiogram	SBP	Systolic blood pressure
ECT	Electroconvulsive therapy	STAI	State-Trait Anxiety Inventory
HC	Healthy control	TMI	Toho Medical Index
HF	High frequencies	VLf	Very low frequency
HR	Heart rate	VNS	Vagal nerve stimulation
		WHO	World Health Organization

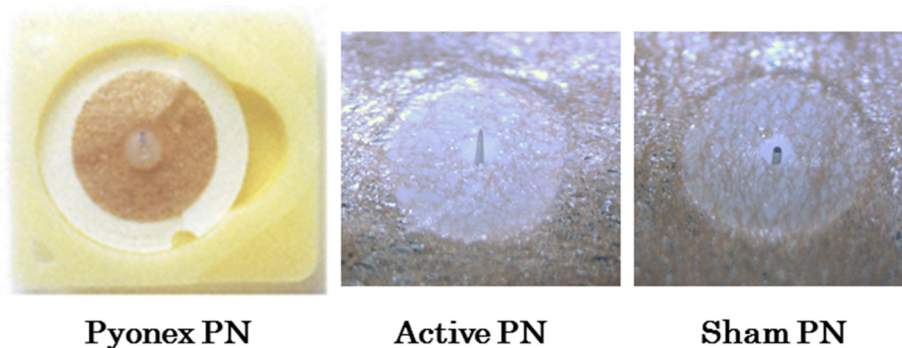


Fig. 1. The left figure shows the appearance of the PN (Pyonex; Seirin Co., Ltd.). The middle figure shows the appearance of an active PN with an acupuncture needle while the right figure shows a sham PN without an acupuncture needle.

which resulted in clinical improvement with feasibility and high acceptance for these children [13]. In other case series study, they stimulated at LI11 (*Qūchī*) with active PN for treatment of hospital-induced constipation in children and observed a remarkable effect in all children within 2 h after active PN intervention [14]. Further, a randomized, double-blind, placebo-controlled trial using active or sham (i.e., placebo) PN to BL23 (*shēnshū*) for patients with lower back pain has shown a significant effect for pain relief and also active and sham PNs were indistinguishable for the subjects [15].

1.3. Objectives of the present study

With this background, we intended to verify the therapeutic effects of acupuncture on depression and investigate its therapeutic mechanism for depression by employing PN approach in the sham-controlled design described below. In this study, we hypothesized the following therapeutic mechanism of PN acupuncture for depression: PN acupuncture stimulates the somatosensory nerves through multimodal receptors in the skin; thereby this somatosensory afferent input indirectly neuromodulates the autonomic nervous system [16–18]; thus the neuromodulated autonomic function (primarily through a vagal nervous function) indirectly provides an antidepressant effect [19,20].

2. Material and methods

2.1. Study participants

Twelve healthy participants and 30 inpatients with medication-resistant depression, who were recruited from

Kanagawa Psychiatric Center (Yokohama, Japan), have participated in this sham-controlled study. Diagnosis was determined by certified psychiatrists based on the International Classification of Disease, 10th edition (ICD-10). In this study, we defined medication-resistant depression as the lack of response to more than 2 antidepressants over 3 months and a persistent depressive state. Of the 30 patients (16 men and 14 women; mean \pm standard deviation, 50 ± 11 years old), 20 had monopolar depression, 2 had bipolar I depression, 4 had bipolar II depression, and 4 had dysthymia in the diagnosis. For patients group, the inclusion criteria were i) patients who have diagnosis of depression, ii) score over 11 (this is a cutoff value for autonomic dysfunction) in the Toho Medical Index (TMI) [21] for either autonomic nerve symptoms (factor A) or psychiatric symptoms (factor P), and iii) enough consent capacity for this study. The exclusion criteria were other psychiatric comorbidities; a history of seizure, epilepsy, severe or acute medical illnesses, neurological disorders, alcohol or other drug dependence; or electroconvulsive therapy (ECT) within 6 months of the study. All patients received antidepressants throughout the study period but the type and dose of medication remained constant. The mean imipramine equivalent dose of the antidepressant [22] in the patients group was 96.1 ± 25.8 mg. The healthy control (HC) group comprised 12 healthy participants (5 men and 7 women; 36 ± 8 years) with no history of depression or any of the exclusion criteria. There were no dropouts in this study. The study design was reviewed by the local ethics committee of Kanagawa Psychiatric Center and the committee approved this study. The study was carried out in accordance with the latest version of the Declaration of Helsinki, and informed consent of the participants was obtained after the nature of the procedures had

Download English Version:

<https://daneshyari.com/en/article/2628481>

Download Persian Version:

<https://daneshyari.com/article/2628481>

[Daneshyari.com](https://daneshyari.com)