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Reduction of Blood Pressure by Electro Acupuncture in Mild to Moderate Hypertensive Patients: Randomized Controlled Trial

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There is a growing interest in integrative medical treatments such as acupuncture on hypertension although therapy to control high blood pressure (BP) is available. We have demonstrated in a series of experimental investigations the mechanisms and actions of acupuncture and electro acupuncture (EA) in models of elevated BP associated with reflex induced sympathoexcitation [1-4]. These studies suggest that bilateral EA at select acupoints PC5-6 and ST36-37, in contrast to EA at LI6-7 and GB37-39, inhibits sympathetically-mediated reflex responses lowering BP through cardiovascular regions in the brain and specific neurotransmitter systems. The experimental findings provided guidance in designing the clinical study to proof the overall hypothesis that weekly EA at PC5-6+ST36-37 but not LI6-7+GB37-39 acupoints for 8 weeks decreases BP for a prolonged period of time in patients with mild to moderate hypertension. We have used 24 h ambulatory blood pressure measurements to monitor EA-inhibition of peak and average systolic and diastolic BP (SBP and DBP) and to identify high and low responders to EA. In a cross-over and double blinded design, we have shown that EA application to acupoints PC5-6+ST36-37 for 8 weeks reduces peak and average SBP by 8 and 6 mm Hg in the overall group. Of interest, in high responders EA decreases peak and average SBP by 16 and 11 mm Hg. Following 8 weeks of EA treatment, sympathetic activity reduces and therefore ultimately norepinephrine, renin-aldosterone-system. In a subgroup of patients, we observed a long-lasting blood pressure lowering acupuncture effect for at least an additional four weeks after the end of EA treatment.

Novelty and Significance

What is new?

Electro acupuncture at two sets of standardized acupoints known to provide input to brain stem regions that regulate sympathetic outflow lowers blood pressure in patients with mild hypertension who are not on antihypertensive therapy [5,6]. The blood pressure response is point specific since stimulation of another set of acupoints known to provide little input to cardiovascular regions in the medulla do not alter blood pressure. The blood pressure lowering response occurs over a 4-6 weeks when acupuncture is applied once weekly for 30 min using low frequency and low intensity [7,8]. Approximately 70% of patients, called high responders, who demonstrate larger responses to acupuncture, show persistent lowering of blood pressure for a month following an eight week course of therapy. Continued reinforcement treatment in the latter group once monthly maintains the acupuncture-related hypotensive effect for at least six months.

- Electro acupuncture applied once weekly for 30 min for 8 weeks lowers blood pressure in patients with mild to moderate hypertension who are off antihypertensive medications.
- The onset of the blood pressure lowering response occurs by the second week of the therapy and the decrease in blood pressure is observed over 4 to 6 weeks of acupuncture with a prolonged action, lasting for at least one month after the treatment.
- Reinforcement once monthly maintains a persistent low blood pressure.

What is relevant?

Electro acupuncture lowers blood pressure in the absence of medications. A large proportion of patients with mild to moderate hypertension and elevated sympathetic outflow and enhanced renin-aldosterone activity respond to acupuncture with blood pressure decreases of 5 mm Hg or more [9-11]. Acupuncture only needs to be applied once weekly; a course of therapy for eight weeks effectively lowers systolic and diastolic blood pressure for prolonged periods of time [12].

- Stimulation of a standardized set of acupoints (P5-6 and ST36-37) lowers blood pressure most effectively.
- Patients with high sympathetic outflow and renin-activity are most responsive.

Summary

This study demonstrated that systolic and diastolic blood pressures of patients with prehypertension (systolic pressures 130-140 mm Hg) and mild hypertension (140-170/85-110 mm Hg) respond to electrical stimulation of the P5-6 and ST36-37 acupoints, located over the median and deep peroneal nerves. In contrast, there is no blood pressure reduction in response to stimulation of other points LI6-7 and G37-39, located over the superficial radial and peroneal nerves. Thus, over a 4-6 week period electro acupuncture applied in standardized point specific protocol once weekly for 30 min lowers the blood pressure of hypertensive subjects not on antihypertensive medical therapy. This response is persistent in a group of high responders, which comprise approximately 70% of the patient population, lasting for a month after termination of acupuncture and for at least six months during monthly maintenance therapy [13,14]. The mechanisms underlying these blood pressure actions of electro acupuncture include reductions in both sympathetic outflow, as reflected by plasma norepinephrine, and renin-aldosterone [15,16].

- Electro acupuncture, through a neurohumoral mechanism, lowers blood pressure in 70% of subjects with mild hypertension when it is applied in a standardized manner at acupuncture points overlying deep somatic nerve pathways.

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