

ORIGINAL ARTICLE

The Immediate Effect of Acupuncture Therapy on Reducing Blood Pressure in Cases of Hypertension

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ABSTRACT

Introduction: Hypertension is the silent killer which, if uncontrolled, can attacks target organs, and cause heart attacks, strokes, kidney disorders, and blindness. Surveys show that selected therapies such as acupuncture can be used to avoid or minimize the side effects of conventional medicine. **Methods:** The purpose of this study was to determine the effect of acupuncture shortly after the acupuncture action on blood pressure reduction in hypertension cases. The chosen research design was a comparative analytic test of blood pressure pre-post acupuncture therapy. The target population of this study were hypertensive patients with systolic blood pressure at rest ≥ 140 mmHg or diastolic blood pressure at rest ≥ 90 mmHg, who met the inclusion criteria and did not meet the exclusion criteria. The points used are ST 36 Zusanli, LR 3 Taichong, and LI 11 Quchi. **Results:** The study showed that there was a significant decrease in systole, diastole and pulse blood pressure ($p < 0.05$) on the examination before the acupuncture needle puncture compared to after the acupuncture needle was removed. **Conclusion:** Acupuncture is effective in reducing blood pressure in cases of hypertension.

Keywords: Hypertension, Acupuncture, Blood pressure

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INTRODUCTION

Hypertension is a silent killer that if not controlled can attack target organs, and cause heart attacks, strokes, kidney disorders, and blindness. Several studies report that uncontrolled hypertension has a 7 times greater chance of causing a stroke, 6 times more likely to cause congestive heart failure, and 3 times more likely to cause a heart attack (1).

There are several things that are still a problem of hypertension, namely the increased prevalence of hypertension, hypertensive patients who have not received treatment or have received treatment but whose blood pressure has not reached the target are still many, and there are complications and accompanying diseases that increase morbidity and mortality (2).

The target of hypertension treatment is the patient's blood pressure (BP) $< 140/90$ mmHg, but if the patient is at high risk (suffering from diabetes, kidney failure proteinuria) the target is $< 130/80$ mmHg. Therapy

begins by giving one type of drug with a low dose. If the blood pressure has not reached the target, the dose will be increased or moved to other antihypertensive drugs with a low dose. Hypertension treatment generally must be done for life (2). Surveys show that selected therapies such as acupuncture can be used to avoid or minimize the side effects of conventional medicine (3).

Sударsono, et al (2008) conducted a study on the effectiveness of acupuncture therapy in moderate essential hypertension. Acupuncture was performed at the point of 20 GB *Fengchi*, LI 11 *Quchi*, LR 3 *Taichong*, SP 6 *Sanyinjiao*, ST 36 *Zusanli*, as well as the ear points of the Heart and *Jiang Ya Gou*. Results showed a significant difference in blood pressure in the two groups, $p < 0.05$ (4). Aside from being a single therapy, acupuncture combined with herbs also gives good results. Acupuncture therapy at Fengchi (GB20), Taichong (LR3), Hegu (LI4) Xuehai (SP10), Chize (LU5) points combined with Herbal Celery (*Apium graveolens* L.) and Carrot (*Daucus carota* L.) can reduce blood pressure and other additional complaints in patients with hypertension (5).

Acupuncture inhibits sympathetic effects through regulation of NOS expression in the central nervous system. NO generated from blood vessel endothelial

cells is a powerful vasodilator and plays an important role in blood pressure homeostasis (6). Specifically, NO endothelium modulates vascular processes, including blood pressure, flow distribution, platelet aggregation, platelet adhesion and leukocytes in the endothelium, proliferation of vascular smooth muscle cells, and angiogenesis (7).

MATERIALS AND METHODS

The chosen research design was a comparative pre-post analytic test in which blood pressure was compared before and after the acupuncture procedure . Subjects were 20 patients with essential hypertension with stable BP (BP measurements were carried out 2 times at intervals of 5 minutes, which gave the same results or the difference in BP was not more than 5 mmHg). Subjects were still permitted to take the standard oral antihypertension recommended or given by the doctor who treated him. Acupuncture therapy is carried out at point 36 Zusanli, LR 3 Taichong, and LI 11 Quchi. The puncture is done until the matchmaking sensation is reached. The needle is left for 30 minutes, then the needle is removed. 10 minutes after the acupuncture procedure, the BP was re-examined 2 times at 5 minute intervals.

For the comparative hypothesis of numerical variables normally distributed by two groups of pairs using the paired T test, if the data distribution is not normal then it uses the Wilcoxon test. This research was conducted after passing the ethical study and received approval from the Airlangga University Hospital Ethics Committee. The research subjects included had agreed to participate by signing an informed consent that was guaranteed confidentiality and was voluntary without coercion.

RESULTS

The number of subjects in this study was 20 subjects, consisted of 5% men and 95% women with an age range between 48-78 years, where the average age was 59.05 years.

Table 1 : Comparison of blood pressure and pulse before and after acupuncture therapy

	Average Before Therapy	Average After Therapy	P
Sistol	154.2	144.8	0.001
Diastole	90.9	87.5	0.028
Pulse	84.3	77.1	0.000

Based on the data in Table I, It was found that there was a significant decrease in systolic blood pressure (p <0.05), from 154.2 mmHg on examination before therapy to 144.8 mmHg on examination after acupuncture therapy.

Likewise with the results of diastolic examination, where there was a significant decrease in diastolic blood pressure (p <0.05), from 90.9 mmHg on examination before therapy to 87.5 mmHg on examination after acupuncture therapy. On the pulse examination there was also a significant decrease (p <0.05), from 84.3 times per minute on examination before therapy to 77.1 times per minute on examination after acupuncture therapy.

DISCUSSION

Significant decrease in systole and diastole blood in this study is in line with research conducted by Williams et al (1991) where 1 stabbing was performed at the same point as this study namely LI 11 *Quchi*, ST 36 *Zusanli*, LR 3 *Taichong*, but added point MA-PS groove for lowering blood pressure, using a 10 Hz frequency EA for 30 minutes electroacupuncture (EA). The study used a low frequency EA, while in this study only used manual acupuncture without manipulation. Decreased blood pressure in both studies showed that both the techniques with EA and manual acupuncture gave significant results in reducing blood pressure (p <0.05) (8).

The cardiovascular system is affected by acupuncture through the nervous system autonomous. Afferent input on somatic nerve fibers show a significant effect on pain relief as well as on function autonomous and hormonal. The somato-autonomic reflex has been linked to the effect of acupuncture on modulating the sympathetic system and cardiovascular. Central nervous interactions, the peripheral inhibitory reflex mechanism and the peripheral excitatory reflex mechanism modulate equilibrium simpatovagal. Preganglions in the same or adjacent segments are activated by these interactions resulting in somatosympathetic and / or somatoparasympathetic reflex (9).

The exact mechanism of action of acupuncture for BP reduction is not yet known. Possible mechanisms of action of acupuncture based on research are segmentally and centrally. On the segmental mechanism, puncture of acupuncture needles at certain acupuncture points can stimulate the afferent nerve which then stimulation is delivered to the posterior cornu spinal cord, continues to the intermediolateral cornu, then to the autonomic nervous system which inhibits sympathetic excitability, so that vasodilation occurs (10). The central mechanism shows that stimulation of acupuncture points on the Nervus Facial (N. VII), Nerve Glossopharyngeal (N. IX), and Nerve Vagus (N. X) will activate the baroreceptor sensitive neurons in the Nucleus Tractus solitarius (NTS), as well as reflex baroreceptor on cardiovascular inhibition. Afferent input received by NTS through cranial and spinal nerves from the head and several organs, is an important neural substrate in the regulation of cardiovascular function (11). The puncture of the acupuncture needle can stimulate the activation of

the arkuatus nerve in the hypothalamus to release endogenous opioids (β -endorphins). Noradrenalin, dopamine and serotonin at the central level in the brain will increase through regulation of the opioid system. Ventrolateral periaqueductal gray will be stimulated by the presence of β -endorphins and monoamines to further inhibit sympatho-excitatory neurons in the rostral ventrolateral medulla which results in decreased sympathetic activity. Research shows the results that SRAA can be influenced by acupuncture through the mechanism of reducing plasma renin, angiotensin II, and aldosterone so that it can reduce BP through decreasing SRAA activity. Another study also showed a decrease in BP after including sterility through regulation of vasoactive substances by increasing levels of nitric oxide (NO) and the activity of NOS (nitric oxide synthase) which is a vasodilator and reducing levels of vasoconstrictor endothelin (ET) which is vasoconstrictor (12).

The ability of blood vessels to respond to a variety of chemical and physical stimulation is physiologically related to the blood flow that is distributed through the blood vessels. Vasodilation is the most basic response of blood vessels to increased pressure and blood flow (hemodynamic stress). NO acts as an important chemical mediator in this vasodilatation process (13).

Besides acting as a vasodilator, NO also inhibits the endothelial inflammatory process and the remodeling process of cells in the subendothelial extracellular matrix. Another role of NO is anti-platelet aggregation so that the vascular endothelial surface is always resistant to various changes in hemodynamic and oxidative stress (14).

Acupuncture therapy can also directly provide the effect of lowering blood pressure which is influenced by the presence of vasodilation due to afferent nerve stimulation which is then continued to the posterior cornu spinal cord, then to the intermediolateral cornu, then to the autonomic nervous system that causes inhibition of sympathetic stimulation. This mechanism plays a role in reducing blood pressure immediately after acupuncture.

CONCLUSION

Acupuncture is effective in reducing blood pressure in cases of hypertension.

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