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## Acupuncture for Hypertension Using Traditional Chinese Medicine Concepts

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### Abstract

Hypertension affects 25% of the adult population worldwide. Biomedical treatment involves various blockers and is associated with side-effects. Acupuncture was one of the earliest methods of treatment for “hard pulse disease” (now called *hypertension*); it is effective and is associated with no untoward effects. Various studies showing the effectiveness of acupuncture for addressing hypertension are presented, along with an illustrative case. Acupuncture is effective for reducing blood pressure. This modality can be used as a stand-alone therapy or along with antihypertensive medications—in which case the dosages of the medications can be reduced significantly—and this helps to reduce the side-effects of medications.

**Keywords:** blood pressure, complementary and alternative medicine, acupuncture, electrophysiology, hypertension

### Introduction

Ancient records as far back as 2600 BC (Yellow Emperor Chou You-J 2600 BC), show that acupuncture, venesection, and bleeding by leeches were the only means of treating what was called “Hard Pulse Disease.”<sup>1</sup>

Since then, the concept of hypertension has gone through a lengthy evolution. English clergyman Stephen Hales first published measurement of blood pressure (BP) in 1732 (Kotchen, 2011).<sup>2</sup> Hales inserted a brass pipe into the femoral artery of a horse, connected that to a vertical glass pipe, and showed that the fluctuations of the blood column in the glass pipe were synchronous with the horse's heartbeat. Descriptions of conditions that would be called hypertension soon came from Richard Bright in 1836 (Esunge, 1991),<sup>1</sup> who noted the link between cardiac hypertrophy and kidney disease, which was often called Bright's disease. Fredrick Akbar Mahomed, MBBS, MRCP, MRCS (1849–1884 AD)—an Irish-Indian physician from Guy's Hospital, in London, first described essential hypertension, separating it from hypertension sec-



ondary to conditions such as Bright's disease (Cameron and Hicks, 1996).<sup>3</sup> It was called *essential hypertension* because it existed in many normal people especially when they got older and hence the condition was considered an essential aging process.

The sphygmomanometer was invented by Samuel Siegfried Karl von Basch in the year 1881 (Booth, 1977).<sup>4</sup> In 1896 Scipione Riva-Rocci developed the mercury sphygmomanometer as is used today (Roguin, 2006).<sup>5</sup> This could only record systolic BP (SBP). Nikolai Korotkoff then described Korotkoff's sounds (1905), which enabled the recording of both SBP and diastolic BP (DBP; Roguin, 2006).<sup>5</sup> In the year 1928, the term *malignant hypertension* was coined by the physicians from the Mayo Clinic to describe a syndrome of high BP, severe retinopathy, and impaired renal function, which usually resulted in death within a year from strokes, Heart failure or kidney failure.<sup>6</sup> Since then, hypertension was often referred to as benign or malignant. The medical opinion was then, not to tamper with benign hypertension, as it was considered a compensatory mechanism.<sup>7</sup>

Charles K. Friedberg, MD's (1905–1972 AD) classic text book *Diseases of the Heart*, which was the prescribed textbook for the author's physician training stated that people with BP below 210/100 mm Hg need not be treated.<sup>8</sup> In 1950, Tinsley Randolph Harrison, MD (1900–1978 AD, in his first edition of *Principles of Internal Medicine* advocated that the treatment of hypertension should be based on coronary difficulties. According to Dr. Harrison, patients without chest pain should not be treated.<sup>9,10</sup> However, it became increasingly recognized that benign BP was not that harmless. A classic example is that of the former U.S. president Franklin Delano Roosevelt (D). who died of cerebral hemorrhage due to uncontrolled hypertension. His physician Howard G. Bruenn, MD (1905–1995 AD), wrote: “I have often wondered what a turn the subsequent course of history may have taken if the modern methods for the control of hypertension had been available then.”<sup>11</sup>

The latest European guidelines define high BP as >140/90 mm Hg,<sup>12</sup> whereas the American guidelines define hypertension as >130/80.<sup>13</sup> The American College of Cardiology/American Heart Association guidelines explain further that normal BP should be 120/80; 120–129/80 is elevated BP; 130–139/80–89 is stage 1 hypertension, which should be treated. It was estimated in the year 2000, that 24% of the global adult population (972 million people) had hypertension.<sup>14</sup> Since then, hypertension has been increasing in low-and-middle income countries and steadily decreasing in high-income countries.<sup>15</sup> The prevalence is expected to increase to 25% by 2025.<sup>14</sup>

Essential hypertension, sometimes referred to as *primary hypertension*, has no known single cause. Heredity is a predisposing factor, and obesity, stress, and high sodium intake are precipitating factors. This affects 90%–95% of patients who have hypertension.<sup>16</sup> Of these patients, 5%–10% have secondary hypertension,<sup>16</sup> secondary-to-primary aldosteronism, renal disease, obstructive sleep apnea, renovascular disease, pheochromocytoma, Cushing's disease, hypo- and hyperthyroidism, coarctation of the aorta, acromegaly, and congenital adrenal hyperplasia. When BP remains uncontrolled after the use of 3 different anti hypertension drugs, it is called *resistant hypertension*. Prolonged severe hypertension damages the brain, kidneys, and cardiovascular system—and this is important because most cases of hypertension are asymptomatic until symptoms of organ damages occur. Modern biomedicine treatment involves lifestyle changes, including walking and other forms of regular physical exercise, a low sodium/high potassium diet,

treatment of secondary causes of hypertension, and drugs. These drugs include diuretics; angiotensin-converting enzyme (ACE) inhibitors; angiotensin II receptor blockers; calcium-channel blockers; and centrally acting drugs, such as moxonidine, and  $\alpha$ -channel blockers such as prazosin.

## Hypertension in Chinese Medicine

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According to Chinese concepts, an Excess of the Liver in the form of Liver Yang Rising (headache and wiry pulse) or Liver Fire—extreme Liver Excess (a red tongue with redder sides and a yellow coating) is present in most cases. The Excess of the Liver is usually due to Liver Yin Deficiency (dry eyes and a dry tongue without a coating), and this, in turn, is due to Kidney Yin Deficiency (back ache and night sweats), with Kidney being the Mother of Liver in the Five Element system. Sometimes the Liver Excess will present as Liver Qi Stagnation, causing distension in the hypochondrium (right or left upper-quadrant of the abdomen) with a wiry pulse, and the Liver Excess can invade the Spleen to produce Spleen Deficiency (constipation or loose stools). If this is prolonged, the Spleen's function of moving fluids would be affected, producing Dampness and Phlegm (thick tongue coating and a slippery pulse). In older people, the Spleen Deficiency may be Spleen Yang Deficiency (a feeling of coldness and loose stools) and this can combine with Kidney Yang Deficiency (coldness with a low-back ache).

The details of these various syndromes and their treatments are given in [Table 1](#). The signs and symptoms given in parentheses above indicate the possible diagnosis of the Disharmony Pattern. In the experience of the author, individualizing the treatment to correct the involved Disharmony Pattern produces better results than using the same group of points for all patients (see the [Discussion](#) section.)

Table 1.

## Diagnosing and Treating Chinese Syndromes in Hypertension

	stools, dark yellow urine, hematemesis, hemoptysis, epistaxis & sleep-disturbed dreams			<i>Yang</i> , LI 11 (clear Heat in general)	
Liver Qi Stagnation	Hypochondrium distension, poor appetite, hypertension & dizziness	Wiry	Red on the sides	<i>Reduce</i> PC 6 TB 6, GB 34 (eliminate Qi Stagnation), SP 10, LI 4, LR 3 (reduce Rebellious Blood)	Shu Gan Jiao Xue Tang—Soothing the Liver and Regulating Blood Decoction
Liver Excess invading the Spleen & causing Spleen Deficiency & Phlegm	Hypertension, high DBP, heaviness of the head, dizziness, tinnitus, blurred vision, numb limbs, obesity, tiredness & loose stools	Slippery, sometimes wiry	Swollen with sticky coating	<i>Reduce</i> ST 40, CV 9, SP 6 (resolve Phlegm), PC 6, TB 6, LR 3, GB 34 (resolve Qi Stagnation), LI 4 & LU 7 to regulate Ascending and Descending Qi, ST 8 to resolve Phlegm from the head. <i>Reinforce</i> BL 20 and CV 12 to tonify Spleen	Ban Xie Bai Zhu Tian Ma Tang—Pinella Atractyloedes Gastrodia Decoction
Blood Stasis in connecting channels	Hypertension with high DBP, headache, dizziness, blurred vision, numbness of limbs, epistaxis	Wiry, choppy	Purple tongue is the most important finding	SP 4, PC 6 in that order to open <i>Chong Mai</i> Extra Channel to address Blood Stasis; LR 3, SP 10, BL 17, HT 7, HT 5, GB 13, CV 17 to eliminate Stagnation; all points stimulated by the <i>even</i> method	Shen Tong Zhu Yu Tang—Body Pain Eliminating Stasis Decoction

Table by Sudhakaran, 2020.

DBP, diastolic blood pressure.

## Evidence for Acupuncture in Hypertension

Randomized clinical trials involving 140 patients (72 receiving active treatments and 68 receiving sham acupuncture) lowered 24-hour ambulatory SBP by 5.4 mm Hg without side-effects.<sup>17</sup> Treatment was given for 6 weeks, in 22 sessions, with each lasting 30 minutes, using Traditional Chinese Medicine (TCM) guidelines. Benefit was not apparent after 3 months, but no effort was made to see how long the benefit lasted by performing interim measurements of BP.

Cevik and Iseri treated 24 male and 10 female patients using acupuncture at KI 3, LR 3, SP 9, LI 4, HT 7, ST 36, SP 6, KI 7, and LU 9.<sup>18</sup> All of these patients had been on multiple-drug therapy for at least 24 months; this therapy was continued during acupuncture. After 15 sessions in a span of 1 month, there was significant reduction of BP (163 mm Hg to 129 mm Hg SBP and 94 mm Hg to 79 mm Hg DBP) The aim of the study was to reduce drug therapy and thus reduce side-effects of this therapy.<sup>18</sup>

In a study involving 50 untreated patients with hypertension, Chiu et al., found that 30 minutes after acupuncture, their SBP was reduced from  $169 \pm 2$  to  $151 \pm 2$  mm Hg, and diastolic BP from  $77 \pm 2$  to  $72 \pm 2$  mm Hg.<sup>19</sup> Plasma rennin activity decreased from 1.7 to 1.1 ng/mL/2 hours.<sup>19</sup> Acupoints were individualized.

Tushiya et al. found in a study involving 20 volunteers that acupuncture increased nitric oxide in the blood.<sup>20</sup> This can reduce vascular resistance. Increased vascular production of reactive oxygen species (ROS or *oxidative stress*) has been implicated as a cause and result of hypertension.<sup>21</sup> An investigation published in 2018 showed that acupuncture reduced BP by reducing the level of ROS.<sup>22</sup>

Huang et al., in a study involving 60 patients with hypertension, used acupuncture at GB 20, LI 11, PC 6, ST 36, ST 40, and LR 3.<sup>23</sup> The researchers found that acupuncture not only reduced BP, but also delayed or reversed the course of atherosclerosis with mechanisms possibly related with the function of protecting the vascular endothelium.<sup>23</sup>

Zhou et al demonstrated that electroacupuncture (EA) at PC 5–6 and LI 10–11 in cats activated neurons in the arcuate nucleus ventrolateral gray and nucleus raphe to inhibit neural activity on the rostral ventrolateral medulla in a model of visceral-reflex stimulated hypertension.<sup>24</sup>

Acupuncture has been found to rectify imbalances between sympathetic and parasympathetic activities and to modulate adaptive neurotransmitters in related brain regions to alleviate autonomic responses.<sup>25</sup>

Li et al. conducted a randomized controlled trial involving 65 patients with hypertension who were not receiving medications.<sup>26</sup> In this study, 33 patients were treated with EA at PC 5–6 + ST 36–37 and 32 patients were treated with LI 6–7 and GB 37–39 (acting as controls). The treatment group had significant reductions of BP and plasma concentrations of norepinephrine, renin and aldosterone.<sup>26</sup> In 14 patients, the reduction of BP lasted for 4 weeks after cessation of their acupuncture treatment.<sup>26</sup> However, the duration of reduction in renin/norepinephrine activity following acupuncture was not stated in the article about this study.

Wang et al. demonstrated that acupuncture at ST 9 in hypertensive rats reduced SBP and DBP and heart rate significantly, in addition to addressing the metabolic disorder associated with hypertension.<sup>27</sup> Acupuncture increased urine metabolites, including  $\alpha$ -ketoglutaric acid, N-acetyl glutamic acid, and betaine.

Xin et al. demonstrated that EA at bilateral PC 6 arrested hypertension development, and ameliorated cardiac hypertrophy and malfunction, in spontaneously hypertensive rats; this might be mediated by regulation of ACE angiotensin I and angiotensin II receptors.<sup>28</sup>

An et al. demonstrated that acupuncture stimulation at BL 12 and BL 23 in rabbits with nephritis improved Kidney function and decreased 24-hour urine protein, and that the underlying therapeutic mechanism could be correlated with acupuncture's ability to lower the excitability of sympathetic nerves, thus alleviating the renal pathologic lesion produced by nephritis.<sup>29</sup>

## Treatment

Treatment according to the Chinese syndromes are described in [Table 1](#). In general, GB 20, ST 36, and LI 11 are reduced; this clears the Excess Yang from these Yang channels. The acupuncturist reduces LR 3 and LR 2 to contain Excess Liver Yang and reduces *Tai Yang* (M HN 9) and TB 17 to reduce Excess Yang from the Head. If needed, the acupuncturist reduces SP 9, PC 6, and ST 40 to clear Dampness and Phlegm due to Spleen Deficiency. One reinforces KI 3 and SP 6 (the meeting point of the three Leg Yin channels) to address Kidney Yin Deficiency, which is almost always present. To calm the spirit, one stimulates HT 7 and *Anmian-2* (N-HN-22B) by the even method. If there is excessive Coldness, it indicates Yang Deficiency; then the acupuncturist reinforces CV 6 to warm the Sea of Qi and GV 4 to warm the Gate of Life. ST 9 is an empirical point for reducing BP and works well in a large percentage of cases.<sup>27</sup> The author reduces this point in all cases of hypertension, irrespective of the patient's Disharmony Pattern.

The reinforcing, reducing, and even methods of stimulation are as follows:

- *Reducing method*—One uses thick needles (0.3–0.5 mm), brief retention (10–15 minutes), against the channel flow, with a counterclockwise rotation, slow insertion, quick withdrawal, insertion during inhalation, and vigorous manipulation.
- *Reinforcing method*—One uses thin needles (0.1–0.3mm), long retention (15–30 minutes), in the direction of channel flow, with a clockwise rotation, quick insertion, slow withdrawal, insertion during exhalation, and mild manipulation.
- *Even method*—This is a perpendicular insertion of 0.3 m needle with no manipulation for 15 minutes.

## Auricular Acupuncture

Recommended points are Hypertension 1, Hypertension 2, Point Zero, *Shen Men*, Sympathetic Chain, Heart C1, Heart C2, Heart E, Marvelous Point, Sympathetic Autonomic Point, Adrenal Gland C, Vagus Nerve, Thalamus Point, and Apex of the Ear. One selects according to the presence of tenderness in the patient.



## An Interesting Case

A 76-year-old man consulted the author for a persistent headache, which lasted for 9–10 days, with a slight buzzing in his ears. He was in excellent health otherwise and was not taking any medication. General physical examination findings did not reveal any abnormality apart from hypertension (192/110 mm Hg). He refused to take medications but was happy to have acupuncture. His tongue had minimal coating (Yin Deficiency); the color was red with redder margins (Liver Excess). Baldness, decreased libido, a slight lower-back ache, and no cold intolerance pointed to mild Kidney Yin Deficiency.

The author was reluctant to use acupuncture as the first line of treatment because, in such cases of high BP, sometimes acupuncture can precipitate a sudden fall of BP, especially if LR 3 is reduced. The patient was asked to have a hot shower, take cayenne pepper (*Capsicum annuum*) with honey and a tablespoon of apple cider vinegar, and return to have his BP checked. When he came back after 2 hours, his BP was 176/100. Cayenne pepper contains a phytochemical (capsaicin) that acts as a vasodilator.<sup>30</sup> Vinegar also reduces BP as shown in animal studies.<sup>31</sup> Acupuncture was then given at GB 20, LR 2, LR 3, ST 9, and HT 7 by the reduction method. This resulted in a fall of his BP to 164/96 mm Hg. The treatment was continued twice per week for 16 treatments and once per month thereafter. KI 3 and LR 8 were added to the regimen by the reinforcing method to address Kidney and Liver Yin Deficiency. Per advice, the patient walks for 1 hour per day, 6 days per week; avoids alcohol, does not smoke; and his diet consists of fruit and vegetables, fish, chicken, and eggs. He does not consume beef, lamb, or pork.

This patient has been on this regimen for more than 2 years, and his BP is well-controlled at ~135/80. He also takes 400 mg of milk thistle (*Silybum marianum*) daily as a Liver support. He had already been following most of the lifestyle measures recommended for several years prior to presenting to the author; the reduction of his BP was mostly due to acupuncture. Being a fitness enthusiast, this patient's hypertension came as a surprise to him.

## Discussion

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Acupuncture as a modality of treatment for hypertension is effective, is free from side-effects, and protects target organs. By itself, in a study, acupuncture reduced SBP by 6–8 mm Hg and DBP by 4 mm Hg at 8 weeks.<sup>26</sup> In another study, when acupuncture was used as an add-on for patients already receiving antihypertensive medication the response was better—34 mm Hg SBP and 15 mm Hg for DBP.<sup>18</sup> In both of these studies, all patients were treated at identical groups of points. While this approach appears to be scientifically correct and easier to demonstrate the efficacy of acupuncture to address hypertension, the author prefers to select points according to each patient's Disharmony Pattern. The fundamental principle of acupuncture is to bring the patient's body to a state of equilibrium, and that will not be possible when one uses the same set of points for all patients, because each person is individually different. Unless the body is brought to a state of equilibrium the claim of acupuncture to be side-effect free will be put to the test.

In the descriptions of various Chinese syndromes above, two clinical features are given in brackets and those indicate the Disharmony involved. That is simple to apply. Further diagnosis and treatment can be followed from [Table 1](#). There are only two pulse features to learn: (1) a *wiry* pulse that feels like an electric

wire and (2) a *slippery* pulse, when the pulse feels as if it is surrounded by a fluid medium and the pulse slips under the fingers. These things would not be difficult to learn, and the advantages are enormous.

The commonly used blanket points are ST 36 and PC 6. ST 36 is the most important point in the Stomach channel. When human beings are born, they come with pre-Heaven Qi, which is derived from their parents and is stored in the Kidneys. From birth, the post-Heaven Qi is derived from the food one eats; the Stomach, along with the Spleen, is responsible for post-Heaven Qi production. Although located in the Stomach channel, ST 36 controls both Stomach and Spleen Qi, which form the post-Heaven Qi and are often identified with life. ST 36 is also the Grand Point for the abdomen above the umbilicus level. It tonifies the Stomach and Spleen and strengthens the organism's resistance to external pathogenic factors. ST 36 is also used to improve the declining vision of old age. Old age is a Yang Deficiency, and ST 36 is the most important point for raising the Yang.

Similarly, PC 6 has multiple various functions. It is the Grand Point for the chest, and, hence, is used for almost all conditions of the chest. PC 6 moves the Blood and Qi in the chest and is of utmost importance in the treatment of Blood Stagnation in the chest. Pericardium has an axis relationship with the Liver, and, hence, PC 6 is used to address irritability associated with Liver Patterns. Pericardium also has an intimate relationship with the Heart and is used for almost all Heart Patterns. Pericardium also regulates the menstrual flow and, because it subdues Stomach Qi, is used to control nausea and vomiting. When one electronically reduces these points over a long period of time and does this repeatedly, it might lower BP, but there could be repercussions in various other parts and functions of the body; these would need evaluation by long-term studies.

An analogy would be that of bariatric surgery. While this surgery reduces weight very effectively, there are repercussions elsewhere in the form of dumping syndrome, gallstones due to rapid weight loss, protein and calorie malnutrition, vitamin and iron deficiency, acid reflux, and inability to eat certain foods.

Another example would be the use of proton pump inhibitors (PPIs) in gastroesophageal reflux disease. Gastric cells are not the only cells that use proton pumps for their cellular respiration; many other cells use these pumps too, and their functions can be impaired by long-term use of PPIs. That could be the reason why their use is associated with increased incidence of dementia, cerebral ischemic disease, and cardiac ischemia.<sup>32</sup>

For these reasons, the author prefers to use the time-honored method of stimulating only the points related to each patient's Disharmony, and not the blanket points for universal use. The treatment is aimed at bringing the body to a state of equilibrium; opinions may vary. If someone is keen on using the same points for every patient, ST 9 and LR 2 could be good choices. They are effective and do not have such wide ranges of actions as ST 36, PC 6, or LR 3 have. Modern biomedicine is slowly drifting away from the one-size-fits-all approach toward *personalized medicine*, fueled by the better understanding of the human genome. Ovarian cancer and melanoma are examples. Diseases result from the complex interactions of human biological makeups and the diverse pathologic and physiologic processes within human bodies. These will not only vary among patients who have the same disease but also within the same patient at different stages of life. Tailoring our treatments to the Disharmony Patterns present at the time of diagnoses and varying these treatments as the Patterns change during the courses of treatment would be the best approach.



In the experience of the author, acupuncture along with lifestyle changes<sup>33,34</sup> (keeping the waistline below 102 cm for men and 89 cm for women; brisk walking at least 150 minutes per week; eating a healthy diet that is rich in fruit and vegetables, whole grains, fish, eggs, and low fat dairy products; reducing sodium, caffeine, and alcohol intakes; and quitting smoking) can reduce BP effectively in the majority of cases when the BP is <170/100 mm Hg. Higher levels would need additional drug treatment, but, with acupuncture usage, the doses can be reduced considerably,<sup>18</sup> and, along with that, reduce the side-effects of the drugs.

## Conclusions

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Acupuncture had been used for treating hypertension from time immemorial. Acupuncture reduces BP through its effect on the neuroendocrine system, the vascular endothelium, the renin–angiotensin–aldosterone system, and oxidative stress. Acupuncture also protects target organs. It is best used in conjunction with lifestyle changes, and, in refractory cases, with the addition of pharmaceuticals drugs for which dosages—and, hence, side-effects—can be reduced due to the concomitant use of acupuncture.

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