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# Acupuncture treatment for hypertension: a case study

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## ABSTRACT

This report describes the regular use of acupuncture treatments for a patient with hypertension who could not tolerate the side effects of the antihypertensive agents. The patient received 60 acupuncture treatments in the course of 12 weeks, during which time his overall wellbeing improved, his blood pressure reduced and the side effects of antihypertensive drugs were removed. Although acupuncture plus the drug appeared to have a substantial synergistic effect that was weakened when the drug was discontinued, acupuncture may still play a role in the management of hypertension, especially for patients who cannot tolerate the side effects of antihypertensive agents.

## INTRODUCTION

We report a case in which intensive blood pressure (BP) monitoring of a patient with hypertension seems to indicate a synergistic effect of antihypertensive medication and an intensive course of acupuncture. Acupuncture may be a possible alternative when a patient cannot tolerate the side effects of antihypertensive agents.

## CASE DESCRIPTION

A 56-year-old man (height 165 cm, weight 75 kg) was admitted to The First Affiliated Hospital of Tianjin University of Traditional Chinese Medicine on 24 September 2012 with hypertension and side effects of antihypertensive drugs. He was diagnosed with hypertension in 2007 and his usual BP was 160/100 mm Hg. He started taking levamlodipine 5 mg once daily in March 2011. However, his BP remained the same and he reported side effects such as flushing and palpitations. He was switched to irbesartan 150 mg once daily in July 2012. His BP remained at 140/85 mm Hg but he reported side effects of diarrhoea, fatigue and decreased sexual function, among others.

He denied a family history of alcoholism and cardiovascular disease and did

not have a preference for a salty diet. He exercised about 2 h a day.

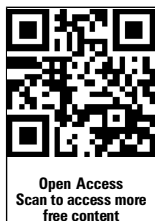
## Physical examination and investigation

Investigations revealed mild hypocalcaemia (2.11 mmol/L) and reduced high density cholesterol (0.88 mmol/L). Transcranial cerebral Doppler showed increased blood flow in the right intracranial internal carotid artery while the blood flow frequency spectrum in the other cerebral vessels was normal. Carotid artery ultrasound revealed a plaque with a thickness of 2.0 mm in the left common carotid artery wall, which accounted for 25.6% of the blood vessel. Cardiac colour ultrasound revealed no findings in left ventricular hypertrophy: interventricular septum thickness at end-diastole (IVSTd) = 10.9 mm, left ventricular posterior wall depth (LVPWd) = 9.7 mm, E/A = 0.87, left ventricular mass index (LVMI) = 112 g/m<sup>2</sup>, relative wall thickness (RWT) = 0.39.

## Treatment and outcome

In view of the side effects of his medication, the patient asked for a course of acupuncture. He received a total of 60 sessions of acupuncture treatment over the course of 12 weeks (5–6 treatments per week) from 24 September to 24 December 2012. Each acupuncture treatment session lasted 30 min. The acupuncture was stopped because he no longer had side effects from the antihypertensive drugs and he decided to return to work.

During the treatments, acupuncture points LI4, LI11, ST36 and ST9 were used bilaterally for antihypertensive purposes. Needles were inserted 0.8–1.0 cun perpendicularly. Twirling with tonifying or reducing manipulation was applied (tonifying or reducing manipulation is to inspire *jing qi* through proper acupuncture technique). LI11, ST36 and ST9 were needled with tonifying manipulation for 1 min at a frequency of 120–160 twirls/min;



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LI4 was needled with reducing manipulation for 1 min at a frequency of 40–60 twirls/min. CV4, CV6 and SP6 were also needled to treat adverse drug reactions (eg, diarrhoea, fatigue).

The acupuncturists who administered the treatment had at least 10 years of experience. Stainless steel needles (Suzhou, China), 0.25×40 mm, were employed at corresponding points. Appropriate stimulation was applied in order to attain the *de qi* sensation, which was associated with physiological changes<sup>1</sup> that played an important role in the effects of acupuncture.

#### Acupuncture point selection

The patient received individualised acupuncture treatments for hypertension and for adverse drug reactions such as diarrhoea and fatigue. Frequently used antihypertensive acupuncture points as described in systematic reviews are LR3, LI11, GB20, ST36 and ST40.<sup>2</sup>

In this case, the antihypertensive point selection was based on Traditional Chinese Medicine meridian theory.<sup>3</sup> In traditional concepts, points located on the *Yangming* meridian, such as LI4, LI11 and ST36, can ‘reconcile *qi* and blood’. We also selected ST9 *Renying*, a meeting point of the Stomach and Gallbladder channels that regulates *qi* and blood. Located next to the carotid sinus, ST9 is the pressure sensor of the human body that regulates BP. Based on TCM theory, CV4, CV6 and SP6 were chosen to treat diarrhoea and fatigue.

#### Blood pressure monitoring

Office BP (OBP) was taken at each visit using an automated sphygmomanometer while seated and repeated after a 5 min break. If the systolic BP (SBP) or diastolic BP (DBP) changed more than 5 mm Hg within the 5 min period, a third measurement was taken. The average value was recorded.

In addition to OBP taken with an automatic sphygmomanometer, 24 h ambulatory BP monitoring (ABPM) was also applied to measure the daytime and

night time BP. As an adjunct to OBP, ambulatory measurements of BP can assist in identifying ‘white coat hypertension’ and predicting the risk of organ damage and cardiovascular disease.<sup>4,5</sup>

#### RESULTS

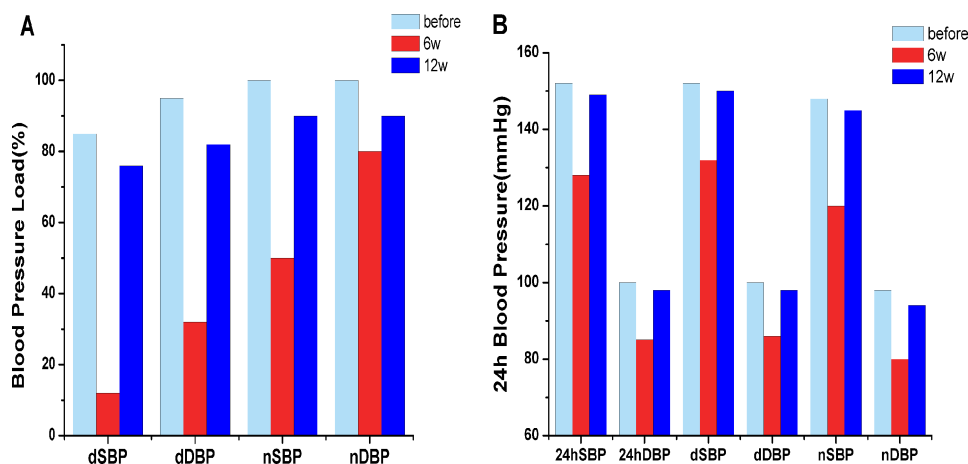
After 6 weeks of acupuncture treatment there was a decrease in BP load (percentage of readings >140 mm Hg (systolic) and >90 mm Hg (diastolic) recorded by ABPM: day SBP load from 85% to 12%; day DBP load from 95% to 32%; night SBP load from 100% to 50%; night DBP load from 100% to 80% (figure 1A).

With the lowering of BP (from 150/99 mm Hg to 128/85 mm Hg), the patient also stopped taking anti-hypertensive medication on 10 December. After about 14 days, BP values rebounded after 12 weeks of acupuncture treatment (to 146/95 mm Hg). The same trend was revealed in the 24 h BP monitoring for both day and night BP, except that changes in DBP readings were small (figure 1B).

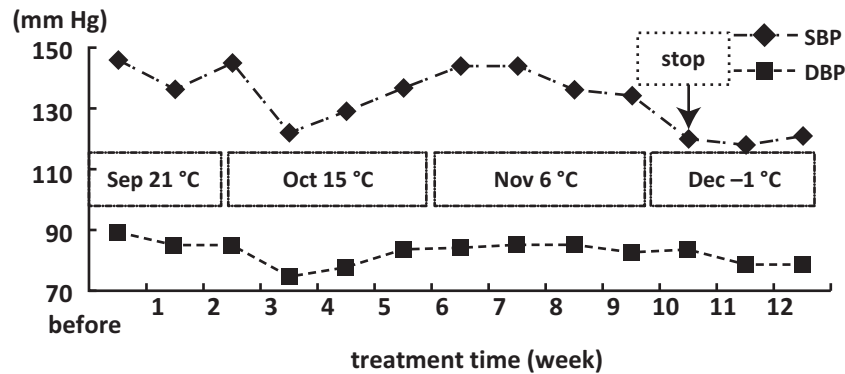
Acupuncture in combination with the drug appeared to have a substantial effect on treating hypertension. There may have been a synergistic effect between acupuncture and the antihypertensive agent because the antihypertensive effect was weakened when the antihypertensive drug was discontinued.

The immediate effects of acupuncture on hypertension were evaluated by OBP (ie, the difference after and before treatment every 2 weeks). Over the course of the 12-week treatment period the BP decreased in the first 3 weeks, increased in weeks 4–7 and then gradually fell to a satisfactory level of 130/80 mm Hg (figure 2). Most importantly, the antihypertensive drug side effects such as diarrhoea, fatigue and impotence completely disappeared.

Adverse reactions occurring during acupuncture treatment were bleeding and haematoma. Haematoma occurred once at LI11, which resolved in 5 days after pressure using cold and hot compresses. There were four episodes of bleeding at ST36 and three episodes



**Figure 1** Changes of 24h ambulatory blood pressure in different time points during the treatment period.



**Figure 2** Changes of Office BP in different time points during the treatment period.

of bleeding at LI4 which were resolved after pressure for 10–20 s.

From January to March 2013 the patient monitored his BP at home. The average SBP was 125–135 mm Hg and the average DBP was 75–85 mm Hg. The highest reading was 140/95 mm Hg, but it was not common. What surprised us was that his cardiac function tested on 10 April revealed a slight improvement (IVSTd=10.3 mm, LVPWd=10.3 mm, E/A=1.3, LVMI=109 g/m<sup>2</sup>, RWT=0.39), and transcranial cerebral Doppler showed a normal blood flow in the right intracranial internal carotid artery after 12 weeks of acupuncture treatment.

The patient monitored his BP at home after March. From April to June the average BP was 140–145 mm Hg (systolic) and 80–90 mm Hg (diastolic). In July his BP rose to 160/95 mm Hg in the afternoon and he resumed taking antihypertensive medicine.

## DISCUSSION

Hypertension affects approximately one billion individuals worldwide, which includes 200 million people in China.<sup>6,7</sup> It is a high-risk factor for cardiac-cerebral vascular disease.<sup>8</sup> Much attention has been paid to the use of antihypertensive drugs.

Calcium channel blockers are most frequently associated with adverse drug reactions, followed by diuretics,  $\beta$ -blockers, angiotensin receptor blockers (ARBs) and ACE inhibitors.<sup>9</sup> The usual measure taken for adverse drug reactions is to add a low dose of a second agent with a different mode of action if one drug given alone does not sufficiently lower the BP. For example, vasodilatory oedema is a common adverse effect of dihydropyridine calcium antagonist and could be alleviated when combined with an ACE inhibitor or ARB.<sup>10</sup>

In this case, the patient stopped his antihypertensive medication after 46 acupuncture treatments and there was a slight rebound in his BP 14 days later. Systematic reviews of acupuncture for hypertension showed that acupuncture only marginally reduced DBP by 3 mm Hg (95% CI -6 to 0;  $p=0.05$ ) but,

when administered with antihypertensive medication, acupuncture could significantly reduce SBP by 8 mm Hg and DBP by 4 mm Hg (both  $p<0.05$ ).<sup>7</sup>

This case study opens up the possibility that acupuncture may serve as an alternative for hypertensive patients, especially for those who cannot tolerate the side effects of antihypertensive drugs. However, the intensive treatment course applied in this case might not be acceptable to all patients and requires intensive resources.

There seems to be a contradiction in the BP trend measured by 24 h ABPM and OBP: OBP showed that BP in week 12 was much lower than in week 6 while 24 h ABPM showed that BP in week 12 was much higher than in week 6. These contradictory findings may be explained by different factors influencing the results of 24 h ABPM. For example, the patient told us that he did not sleep well because of 24 h ABPM overnight, and other factors could be temperature, food, mood and activities. His OBP was measured after a 5 min break at almost the same room temperature, so these factors would only have a slight effect on OBP.

## CONCLUSION

This case report suggests that intensive acupuncture may have an effect on reducing BP, especially in synergy with medication. It may also reduce the side effects of antihypertensive drugs and might provide an alternative for individual hypertensive patients who cannot tolerate the side effects of antihypertensive drugs.

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**Competing interests** None.

**Patient consent** Obtained.

**Ethics approval** Ethics approval was obtained from the Ethics Committee of the First Affiliated Hospital of Tianjin University of TCM (Trial registration: ChiCTR-TRC-12002582).

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