

Case Series

Effect of acupuncture at LU9, LI11 and UB17 on hemodynamic parameters in hypertensive patients: a case series

Karthikeyan Palanisamy¹, Alkousar T. Mujeebullah², Reeves J. Dhas³,
Samyuktha Senthilkumar⁴, Kaarrthik Samynathan⁵, Yogapriya Chidambaram^{6*}

¹Department of Anatomy, Nandha Naturopathy and Yoga Medical College and Hospital, Erode, Tamil Nadu, India

²Department of Naturopathy, Govt. Yoga and Naturopathy Medical College and Hospital, Chennai, Tamil Nadu, India

³Nandha Naturopathy and Yoga Medical College and Hospital, Erode, Tamil Nadu, India

⁴Kongu Naturopathy and Yoga Medical College and Hospital, Erode, Tamil Nadu, India

⁵JSS Institute of Naturopathy and Yogic Science, Coimbatore, Tamil Nadu, India

⁶International Institute of Yoga and Naturopathy Medical Sciences, Chengalpattu, Tamil Nadu, India

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*Correspondence:

Dr. Yogapriya Chidambaram,

E-mail: yogapriyac96@gmail.com

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ABSTRACT

Hypertension is a prevalent cardiovascular disorder associated with substantial morbidity and mortality, and complementary approaches such as acupuncture have gained attention as potential adjunctive interventions for blood pressure regulation. This case series describes the effects of acupuncture at LU9, LI11, and UB17 on blood pressure and selected cardiovascular hemodynamic parameters in three patients with hypertension aged 55-65 years. Participants received acupuncture treatment at the three specified points for five consecutive days. Sterile disposable needles were manually stimulated and retained for 30 minutes during each session. We assessed blood pressure and cardiovascular hemodynamic parameters, including pulse pressure, mean arterial pressure, rate pressure product, and double product, at baseline, immediately after the first treatment session, and after completion of the five-day intervention. All three participants demonstrated reductions in systolic and diastolic blood pressure following the intervention. Favorable changes were also observed in pulse pressure, mean arterial pressure, rate pressure product, and double product, suggesting improved cardiovascular hemodynamics and reduced myocardial workload. The treatment was well tolerated, with no adverse events reported. These findings suggest that acupuncture at LU9, LI11, and UB17 may be an integrative approach to improving blood pressure control and cardiovascular hemodynamic function in individuals with hypertension. Larger, rigorously designed clinical studies are warranted to confirm these preliminary findings and clarify the underlying mechanisms.

Keywords: Acupuncture, Blood pressure, Hypertension, Traditional Chinese medicine

INTRODUCTION

Hypertension (HTN), commonly referred to as high blood pressure, is defined by persistently elevated pressure within the blood vessels, typically $\geq 140/90$ mmHg.¹ It represents an increasing global public health challenge. HTN is anticipated to affect 1.13 billion individuals worldwide, and this figure is expected to rise by 15-20

percent by 2025. HTN affects more than 60% of adults aged 60 years or older.² The first national-level NCD survey conducted in 2018-2019 reported that the prevalence of hypertension is 28.5% in India.³ The major causes of hypertension found in adults were smoking and chewing tobacco, alcohol consumption, obesity, sedentary activities, and excessive salt intake.⁴ Long-term hypertension leads to complications like ventricular hypertrophy, heart failure, accelerated atherosclerosis,

cerebrovascular disease and stroke, renal failure, and retinopathy.⁵ Conventional management includes thiazide or thiazide-like diuretics, angiotensin-converting enzyme inhibitors or angiotensin receptor blockers, and calcium channel blockers. Lifestyle changes such as weight loss, dietary sodium reduction, potassium supplementation, a balanced eating pattern, physical activity, and moderation of alcohol use help in the management of hypertension.⁶ The National Center for Complementary and Integrative Health defines Complementary and alternative medicine as a collection of various medical and healthcare systems, practices, and products typically not included in standard medical care.⁷

Acupuncture is a medical treatment and ideology that relies on the application of tiny needles or pressure to particular places on the body. This therapeutic technique is based on traditional Chinese medicine (TCM), with philosophical foundations derived from confucianism and taoism.⁸ Previous literature states that acupuncture is effective in treating hypertension.⁹ However, no studies have explored the potency of LU9, LI11, and UB17 in reducing blood pressure. Hence, this case series aims to explore the effect of LU9, LI11, and UB17 in reducing blood pressure in hypertensive patients.

CASE SERIES

Case 1

A 58-year-old male presented to the outpatient department (OPD) with an 8-year history of hypertension. He had been receiving amlodipine 5 mg once daily (calcium channel blocker) for hypertension, with no changes to his medication regimen during the study period. At presentation, his blood pressure was 162/89 mmHg, respiratory rate was 21 breaths/min, height was 157 cm, weight was 60 kg, and body mass index (BMI) was 24.34 kg/m².

Case 2

A 55-year-old female presented to the inpatient department (IPD) with a 12-year history of hypertension and weight gain. She had been receiving amlodipine 5 mg once daily (a calcium channel blocker) for hypertension, and her medication regimen remained unchanged throughout the intervention period. At presentation, her blood pressure was 175/78 mmHg, respiratory rate was 18 breaths/min, height was 150 cm, weight was 90.6 kg, and BMI was 40 kg/m².

Case 3

A 61-year-old male presented to the OPD with a 3-year history of systemic hypertension. He had been receiving telmisartan 40 mg once daily (angiotensin II receptor blocker) for hypertension, with no modification to the prescribed treatment during the intervention period. At presentation, his blood pressure was 173/88 mmHg,

respiratory rate was 23 breaths/min, height was 154 cm, weight was 74 kg, and BMI was 31.2 kg/m².

Clinical findings

Across all three patients, the general physical examination was largely unremarkable, except for pallor and clubbing, which were observed in two of the three cases. None of the patients exhibited icterus, cyanosis, lymphadenopathy, or oedema. Abdominal examination revealed no tenderness or organomegaly, while auscultation demonstrated normal bowel and heart sounds in all patients. The only consistent abnormal clinical finding was elevated blood pressure at presentation, with values ranging from 162/89 to 175/78 mmHg across the three cases.

Timeline

All patients received one acupuncture session daily for five consecutive days. Blood pressure and derived cardiovascular parameters were assessed at three predefined time points: at baseline before needling on day 1, immediately after needle removal on day 1, and following completion of the five-day treatment course on day 5. The assessment schedule is illustrated in Figure 1.

Diagnostic assessment

The diagnosis of essential hypertension in all three patients was established clinically based on a sustained history of blood pressure readings at or above 140/90 mmHg together with ongoing antihypertensive medication use. No additional laboratory or imaging investigations were undertaken as part of this case series, and diagnostic assessment relied on presenting history, physical examination, and serial blood pressure measurements.

Therapeutic intervention

Following written and verbal informed consent from all three participants, acupuncture needling was carried out at LU9, LI11, and UB17. Patients were seated comfortably, and blood pressure was measured before needling, immediately after needle withdrawal, and again 30 minutes later. Needles were inserted perpendicularly to a depth of 0.5 cun at each point.

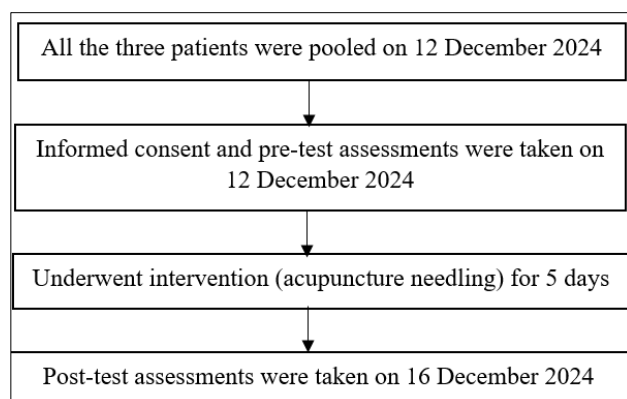
Manual stimulation was delivered by rotating the needle clockwise for 30 seconds, followed by anticlockwise rotation for 30 seconds, beginning with the left-sided points (LU9, LI11, UB17), then repeating on the right side, thereby constituting one full stimulation cycle; five such cycles were completed within each 30-minute session.

Stainless steel needles were used throughout, and a naturopathic physician supervised every session. The intervention was administered daily for five consecutive days, and no adverse events occurred during or after treatment.

Table 1: Cardiovascular parameters recorded at baseline, immediately post-needling, and after five days of acupuncture therapy.

Time points	Parameters	Case 1	Case 2	Case 3
Pre (day 1)	SBP	155	172	173
	DBP	93	79	89
	PR	76	78	74
	PP	60	93	84
	MP	123	110	117
	RPP	117.8	134.16	128.02
	DP	93.48	85.8	86.58
Immediate (after needling)	SBP	141	165	166
	DBP	83	75	85
	PR	77	75	72
	PP	58	90	81
	MP	102.33	105	112
	RPP	108.57	123.75	119.52
	DP	78.54	78.75	80.64
Post (day 5)	SBP	132	135	153
	DBP	76	72	79
	PR	69	69	69
	PP	56	63	74
	MP	94.66	93	103.6
	RPP	91.08	93.15	105.57
	DP	64.86	64.17	71.07

PR=pulse rate (beats per minute); SBP=systolic blood pressure (mmHg); DBP=diastolic blood pressure (mmHg); PP=pulse pressure; MP=mean pressure; RPP=rate-pressure product; DP=double product. These were derived using the following formulas: $PP=(SBP - DBP)$; $MP=DP+\frac{1}{3}PP$; $RPP=(\text{heart rate } [HR] \times SBP)/100$; and $DP=(HR \times MP)/100$ (10)

**Figure 1: Timeline.**

Follow-up and outcome measures

Blood pressure and derived cardiovascular indices were recorded at three time points: baseline, immediately after needling, and following completion of the five-day course, for each patient, as summarised in Table 1. All three patients showed a consistent downward trend in systolic and diastolic blood pressure, along with parallel reductions in pulse pressure, mean arterial pressure, rate-pressure

product, and double product from baseline to the end of treatment.

DISCUSSION

This case series aimed to explore the effect of LU9, LI11, and UB17 in reducing blood pressure in hypertensive patients. There was a notable reduction in blood pressure in hypertensive individuals. This reduction would be attributed to the following mechanism.

Parameters such as SBP, DBP, PR, PP, MP, RPP, and DP were reduced. In hypertensive individuals, the arterial baroreflex mechanism resets to maintain higher blood pressure through reduced vagal regulation of HR and perhaps increased sympathetic outflow to the heart and resistance.¹⁰ Reduction in SBP may be due to effects on baroreceptor reflexes or reduced HR/PR. Reduced RPP and Do-P may lead to decreased PR and BP. RPP and Do-P are key indirect markers of myocardial oxygen consumption and cardiac stress. Reducing these variables in this study suggests reduced strain on the heart. RPP can be a basic indicator of total HRV.¹¹ Our findings suggest improved autonomic regulation of the heart, as evidenced by lower RPP levels. Acupuncture helps increase baroreflex sensitivity.¹² Lower baroreflex sensitivity is associated with hypertension.¹³ Increased baroreflex sensitivity helps raise venous capacitance and arterial conductance¹⁴, thus reducing blood pressure.

The antihypertensive effects of acupuncture are produced by stimulating acupoints, which activate a direct pathway from the nucleus tractus solitarius to the rostral ventrolateral medulla.¹⁵ Additionally, stimulation of the acupuncture points influences the autonomic nervous system and significantly enhances parasympathetic activity while reducing sympathetic activity.¹⁶ On the other hand, acupuncture needle stimulation helps to increase the nitrous oxide (NO) concentration, which is said to be a vasodilator. It also plays an important role in the regulation of sympathetic nervous system activity (SNA) by inhibiting sympathetic nervous system activity, thereby decreasing blood pressure.¹⁷ Thus, acupuncture helps to reduce blood pressure in hypertensive individuals.

Strengths

To the best of available knowledge, this is the first case series to examine LU9, LI11, and UB17 together for blood pressure reduction in hypertensive patients, with no side effects reported by any participant.

Limitations

Heart rate variability, which could have provided additional support for these findings, was not assessed in this series. Larger, methodologically robust observational and controlled studies incorporating such advanced physiological markers are needed to confirm these preliminary results.

CONCLUSION

This case series suggests that acupuncture at LU9, LI11, and UB17 may reduce blood pressure and improve hemodynamic parameters when used alongside conventional antihypertensive therapy. Larger controlled studies with longer follow-up are warranted to confirm these preliminary findings

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