

A Prospective, Randomized Parallel Control Study to Evaluate the Nerve Conduction Velocity in Patients with Essential Hypertension

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Research Article

Abstract: Background – Hypertension has been identified as a risk factor associated with neuropathy and micro vascular diseases. Data on nerve conduction velocity in patients with essential hypertension is inconsistent. Some studies have observed a reduction in the nerve conduction velocity in essential hypertension but subsequent studies failed to demonstrate such difference.

Objectives - The aim of the study was to evaluate the motor and sensory conduction velocity of median nerve in patients with essential hypertension. **Methods** - The study was carried out in the Department of Medicine, Government Medical College Aurangabad. n =30 patients of essential hypertension between the ages of 40-60 years of either sex along with 30 age and sex matched normotensives as controls were enrolled for the study. Patients with diabetes, renal insufficiency, alcoholism, vascular diseases, or other conditions known to cause peripheral neuropathy were excluded from the study. The motor and the sensory conduction velocity of median nerve were studied using standard techniques. **Statistical Analysis** – Student's 't' test was used for the intergroup comparison. **Results** - The sensory nerve conduction velocity (m/s) in normotensives group was 60 ± 2.82 and hypertensive group was 60.32 ± 2.78 . The motor nerve conduction velocity in normotensives was 58.60 ± 4.10 and in hypertensive group was 57.75 ± 4.30 . When compared, these findings motor and sensory nerve conduction velocity in normotensives and hypertensive were not statistically significant ($p > 0.05$). **Conclusion** - Extensive studies will be required considering all grades of hypertension for confirmative analysis.

Key Words: Essential hypertension, nerve conduction velocity.

Introduction

Hypertension has been identified as a risk factor associated with neuropathy and micro vascular diseases.^{1,2} Data on nerve conduction velocity in patients with essential hypertension is inconsistent.³ Some studies have observed a reduction in the nerve conduction velocity in essential hypertension but subsequent studies failed to demonstrate such difference.^{4,5} If hypertension alone can indeed induce a reduction of nerve conduction velocity, then it would be prudent to take a new looks at previous studies of uremic and diabetic polyneuropathy, since hypertension is frequently but variably associated with both of these conditions and potentially aggravate an underlying neuropathy.⁶ The aim of the study was to

identify the effect of essential hypertension alone (without associated diabetes mellitus) on motor and sensory nerve conduction velocity of median nerve.

Method

The study was conducted in Department of Medicine, Government Medical College, Aurangabad. The study protocol was approved by the institutional ethical committee (IEC). A written informed consent was obtained from each participant. n= 30 patients with primary hypertension between the ages of 40 to 60 years , of either sex along with 30 age and sex matched normotensive subjects as controls were enrolled for the study. The hypertensives were selected from the outpatient department (O.P.D.) of the hospital and the controls were normotensive volunteers.

Selection of hypertensive subjects

The criteria of considering patient hypertensive was a blood pressure $> 140/ 90$ mm Hg⁷ based on the average of 2 or more readings taken during each of his/her visits to the outpatient department (O.P.D.). These subjects were not on any antihypertensive medication and they were not acutely ill. The controls were healthy volunteers with systolic blood pressure (SBP) < 120 mm of Hg and diastolic blood pressure (DBP) < 80 mm of Hg⁷.

Exclusion criteria

Subjects with any associated diseases like diabetes mellitus, ischemic heart diseases, cerebrovascular diseases, renal diseases and peripheral vascular diseases or other conditions which are known to cause peripheral neuropathy were excluded from the study.

Recording of nerve conduction velocity

Nerve conduction velocities were performed of 'RMS N ISO 9001:2000' system using "RMS Emg Ep MK2" software. Motor and sensory conduction velocity of the left median nerve was measured. Instrument setting a) for motor studies Sensitivity: 2-5mv/mm, Low frequency filter: 2-5Hz High frequency filter: 10 KHz.

b) For sensory studies Sensitivity: 10-20 microv/mm, Low frequency: 5-10Hz, High frequency filter: 2-3 KHz sweep speed: 1-2 ms/mm.

Statistical analysis

Student's 't' test was applied to compare the values between the study and control groups using MS excel

Result

Out of 30 hypertensive patients 8 were females and 22 were males. 2 patients had severe hypertension, rest were of moderate hypertension. The duration of hypertension ranged from 1-3 years. The motor nerve conduction velocity (m/s) in normotensives was 58.60 ± 4.10 and in hypertensive group was 57.75 ± 4.30 . The sensory nerve conduction velocity (m/s) in normotensives group was 60 ± 2.82 and hypertensive group was 60.32 ± 2.78 . (Table no. 1)

Table 1: Motor and sensory nerve conduction velocities in Controls and hypertensives

	Motor	Sensory
Controls	58.60 ± 4.10	60 ± 2.82
hypertensives	57.75 ± 4.30	60.32 ± 2.78

When compared, motor and sensory nerve conduction velocity in normotensives and hypertensives were not statistically significant ($p > 0.05$).

Discussion

In the present study, we examined the motor and sensory conduction velocity of median nerve in patients with essential hypertension. No statistical significant differences were found in sensory and motor nerve conduction velocity of hypertensives as compared to controls. Viskoper et al³ have claimed a reduction in nerve conduction velocity in patients with essential hypertension. They postulated that hypertension could cause vasospasm of blood vessels supplying the nerves and that this alone could decrease nerve conduction velocity. Motor conduction velocity in the upper limb was found to be decreased in hypertensives as compared to normotensives.⁸ Improvement in nerve conduction velocity was observed after treatment with antihypertensive in patients of diabetes mellitus.⁹

The results of our study is in accordance with the studies of

Negler W¹⁰ et al who failed to demonstrate the effect of hypertension on nerve conduction velocity.

They proposed that hypertension may be producing axonal degeneration but not affecting myelination thereby preserving nerve conduction velocity.

Conclusion

Essential hypertension per se does not affect the nerve conduction velocity and finding of reduced nerve conduction velocity in hypertensive patients should alert the physician to the possibility of associated diseases like diabetes mellitus, alcoholism or concomitant peripheral vascular diseases. Extensive studies are required to study the effect of hypertension alone on nerve conduction velocity, taking into consideration the severity, duration and treatment of hypertension.

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