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NORMATIVE DATA OF LOWER LIMB NERVE CONDUCTION STUDIES IN HEALTHY ADULT POPULATION OF HARYANA

Physiology

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ABSTRACT

Background: The nerve conduction studies are used to diagnose peripheral neuropathy. Every neurophysiology laboratory needs to have its own normative data for its population required in clinical practice to identify the abnormalities.

Aims and Objective: The objective of this study was to get normative data of lower limb nerve conduction in asymptomatic, normal individuals of Haryana population.

Materials and Methods: This study was conducted in randomized selected 120 healthy subjects of both sexes of the general population who were between the ages of 18 and 70 years using PC based Neurostem-2 machine with silver electrode. Nerve conduction properties were evaluated for peroneal and tibial for motor nerve conduction and sural for sensory nerve conduction on both sides using standard techniques of supramaximal percutaneous stimulation with a constant current stimulator and surface recording electrode for both nerves of each subject. Parameters included are distal motor latency (DML), amplitude, and conduction velocity (CV).

Results: In the right peroneal motor nerve, DML was 3.8 ± 0.33, the amplitude was 5.32±0.45, and the CV was 48.3±2.15. In the left peroneal nerve, DML was 3.56± 0.53, the amplitude was 5.49±0.50, and the CV was 48.8±2.03. In the right tibial nerve, DML was 4.1± 0.86, the amplitude was 6.17±0.43, and the CV was 46.95±3.2. In the left tibial nerve, DML was 3.95±0.64, the amplitude was 6.22±0.52, and the CV was 47.2±2.9. The sural sensory nerve parameters for right side were distal latency 2.83± 0.46, the amplitude- 15.25±4.80, conduction velocity-50.68±3.1 while for left side were distal latency-2.79±0.52, the amplitude - 16.32±3.56, the conduction velocity -50.8±3.7.

Conclusions: Normative conduction parameter of the lower limb nerves was established for neurophysiology laboratory of SGT Medical College, Hospital and Research Institute, Gurgaon

KEYWORDS

Lower Limb; Nerve Conduction Study; Peroneal Nerve; Tibial Nerve; Sural Nerve; Haryana Population; Conduction Velocity; Normative Data

BACKGROUND

Nerves carry impulses from one point to another point. Many neuronal abnormalities leads to nerve conduction impairment. Nerve conduction studies are of great value for the diagnosis and prognosis of lower motor neuron lesions for orthopedic surgeons, physicians and neurologists. Nerve conduction studies are noninvasive diagnostic tools to find out nerve conduction impairment and site of lesion. These studies aid in diagnosis and prognosis of patients with disorder of peripheral nervous system – nerve root compression, disorder of peripheral nerves and neuromuscular junction.[1] Motor conduction studies help in distinguishing demyelination and axonal degeneration of peripheral nerves.[2] Many studies have been published from western countries regarding normative data for nerves of upper & lower limbs.[3,4,5,6,7,8] Unfortunately, in India such studies are limited. This study is therefore intended to obtain a set of data from a large scale of healthy Indian in order to establish reference values for local NCV laboratory & to compare Indian values with world wide data.

Aims and objectives

The purpose of this study was to establish normative electrophysiological data for commonly tested lower limb nerves in carefully screened normal healthy adults of Haryana and to compare our values with World-wide published data.

MATERIALS AND METHODS

This cross-sectional study was conducted in the Department of Physiology, SGT Medical College, Hospital and Research Institute, Gurgaon, after getting permission from the Institutional Ethical Committee. This study lasted for 1 year. A total of 120 healthy subjects, 60 male (mean age 44.82 ± 12.8) and 60 female (mean age 40.24 ± 8.8), of age group 18–60 years were included in this study. Exclusion criteria included any metabolic diseases, nerve compression, neuropathy, fracture, radiculopathy, intake of drugs, and any addictions.

Motor nerve conduction studies were performed for peroneal and tibial nerve on both sides using standard techniques of supramaximal percutaneous stimulation with a constant current stimulator and surface recording electrode for both nerves of each subject

Sensory nerve conduction studies were performed for sural nerve on both sides using standard techniques. For sural nerve, distal sensory latency (DSL), velocity, and Sensory nerve action potential amplitude (SNAP) were recorded.

The study was carried out at an ambient room temperature of 25°C. This study was conducted using PC based Neurostem-2 machine with silver electrode. The method used was that of Johnson and Oslen.[9] For the motor study, sensitivity 2–5 Hz, low-frequency filter 2–5 Hz, high-frequency filter 10 kHz, sweep speed 2-5ms/mm, and duration 100 μs were used and for sensory study, filters were at 2 Hz to 3 kHz and sweep speed was 2 ms per division.

Statistical Analysis –

Data of all the subjects was analyzed by SPSS package version 14. The comparison between Rt & Lt Peroneal, Tibial and Sural nerve, data was done.

RESULTS

The study was conducted on 120 subjects. Normative data of lower limb motor and sensory conduction in Haryana population were derived [Table 1].

Table 1: Normative data of lower limb motor conduction in Haryana population

		Distal latency (ms)	Amplitude (mv)	Velocity (m/s)
Peroneal Nerve	Right side	3.81 ± 0.33	5.32 ± 0.45	48.3 ± 2.15
	Left side	3.56 ± 0.53	5.49 ± 0.50	48.8 ± 2.03
Tibial Nerve	Right side	4.1 ± 0.86	6.17 ± 0.43	46.95 ± 3.2
	Left side	3.95 ± 0.64	6.22 ± 0.52	47.2 ± 2.9

Sural nerve	Right side	2.83 ± 0.46	15.25 ± 4.80	50.68 ± 3.1
	Left side	2.79 ± 0.52	16.32 ± 3.56	50.8 ± 3.7

DISCUSSION

Electro-diagnostic studies allow to find the site of damage and progress of the disease. NCV, distal motor latency (DML), and amplitude of motor action potential have useful diagnostic values in peripheral neuropathy. For nerve conduction studies, previous studies have shown differences in nerve conduction study function related to ethnicity and demographic factors so reference values should be established from the local population .[10]

In this study, normative data of nerve conduction studies parameter for were derived in adult healthy Haryana population. These values can be used as reference data to find abnormalities in the given population. The results of this study were compared with the results of previous studies. DL and amplitude of peroneal, tibial and sural nerve found in this study are in close proximity with the findings of Kimura.[11] Kimura reported relatively similar values for the tibial motor nerve including conduction velocity = 48.5 ± 3.6, amplitude = 3.8 ± 1.9 and latency = 3.9 ± 1.For motor peroneal nerve the values were 48.3 ± 3.9, 5.1 ± 2.3 and 3.7 ± 0.86, respectively. For the sensory sural nerve the values were 52.5 ± 5.6, 20.9 ± 8.0 and 2.7 ± 0.3, respectively).

In our study in accordance with Ramji Sing, various parameter of NCV have no Rt & Lt side difference in NCV values.[12] Another study conducted by Navin Gupta (2008) also demonstrated that there is no significance difference in MNCV of right & left nerve.[13]

CONCLUSION

Normative baseline parameters for Peroneal nerve, Tibial nerve and Sural nerve were established in Haryana population. This data can be used in diagnosing the patients with peripheral neuropathy.

REFERENCES

1. Mallik A, Weir AI. Nerve conduction studies: Essentials and pitfalls in practice. J Neurol Neurosurg Psychiatry 2005;76 Suppl 2:ii23-31.
2. Kouyoumdjian JA, Zanetta DM, Morita MP. Evaluation of age, body mass index, and wrist index as risk factors for carpal tunnel syndrome severity. Muscle Nerve 2002;25:93-7.
3. Hennessy WJ, Falco FJ, Braddom RL: Median & ulnar nerve conduction studies: Normative data for young adults. Arch Phys Med Rehabilation 1994;75:259-264.
4. Falco FJ, Hennessey WJ, Braddom RL, & Goldberg G: standardized nerve condution studies in upper limb of healthy elderly. AM J Phys Med Rehabil 1994;75:265-269.
5. Hennessey WJ, Falco FJ, Goldberg G, Braddom RL: gender & arm length: Influence on nerve condution parameters in the rehabil 1994;75:265-269.
6. Kumar BR, Gill HS: Motor Nerve conduction velocities amongst healthy subjects. J Assoc Physicians India 1985;33:345-348.
7. Perez MC, Sosa A, & Lopez Acevedo CE: Nerve conduction velocities: Normal Values for Median & Ulnar nerves. Bola soc Med PR 1986; 78: 191-96.
8. Johnson EW, Sipski M, Lammertse T: Median & radial sensory Latencies to digit I: Normal Values & usefulness in carpal tunnel syndrome. Arch Phys Med Rehabil 1987;68:140-141.
9. Johnson EW, Olsen KJ. Clinical value of motor nerve conduction velocity determination. J Am Med Assoc 1960;172:2030-5.
10. Shahabuddin S, Badar D, Moizuddin KM, Sami LB, Solepure AB. Normative values for nerve conduction study among healthy subjects from Aurangabad. Int J Rec Trends Sci Technol 2013;8:55-61
11. Kimura J: electrodiagnosis in disease of nerve & muscle: Principles & practice, 3rd ed,2001 P.P 131-168
12. Ramji sing et al: effect of Body mass index on parameters of nerve conduction study in Indian population. 2012; 56(1):88-93
13. Navin Gupta, Sharmila Sanyal & Rashmi Babbar. Sensory nerve condution velocity is greater in left handed persons. Ind J Physiol Pharmac 2008;52:189-192.