ORIGINAL ARTICLE

Relation of Various Anthropometric Measures and Nerve Conduction Velocity in Median Nerve

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ABSTRACT

Background: Nerve conduction studies help to assess the different abnormalities of peripheral nervous system. It aids clinicians to distinguish the two main sets of peripheral diseases: axonal degeneration and demyelination Nerve conduction studies (NCS) which evaluate peripheral nerve functions and their parameters are known to differ with anthropometric measurements.

Aims and Objectives: To study the effect of height, weight and Body Mass Index (BMI) on Compound Muscle Action Potential(CMAP) of median nerve.

Materials And Methods: One hundred and twenty two, healthy first year medical students of Fatimah Jinnah Medical University were included in this study. The anthropometric factors (height, weight and BMI)was measured using standard technique. The compound muscle action potential (CMAP)of median nerve was recorded on power lab system.

Result: The correlation between conduction velocity of median nerve and weight is very low that is -0.0921 and height is 0.074 and negative effect with BMI that is -0.121

Conclusion: Height weight and BMI did not show a significant correlation with the motor nerve conduction velocity (MNCV) of median nerve.

Key Words: NCS Nerve conduction studies, CMAP Compound muscle action potential. MNCV Motor nerve conduction velocity

INTRODUCTION

Nerve conduction studies help to evaluate the different abnormalities of peripheral nervous system.[1,2] It aids clinicians to distinguish the two main sets of peripheral diseases: axonal degeneration and demyelination. Nerve conduction studies (NCS) assist in defining the degree and dispersal of neuronal lesions[3]. They can also localize the site and distribution of the lesion[4,5]. In the upper limb the two significant nerves are Median and Ulnar nerve. Activity as well as sensation of the hand depend on them. Decline in these modalities may occur by trapping of these nerves. For example in carpal tunnel syndrome there is compression of nerves causing difficulty in muscle movement and altered sensation, which can be diagnosed. Diabetic and other neuropathies can also be evaluated. Nerve conduction study (NCS) helps in pinpointing the site of the lesion [6]NCS consist mainly of the evaluation of three types of nerves: sensory, motor and mixed. In the peripheral nerves of the upper and lower limbs Motor NCS assesses CMAP and the sensory NCS include the evaluation of the sensory nerve action potentials (SNAP). The median, ulnar, radial, common peroneal, tibial and the sural nerves are the commonly studied nerves. In CMAP the routinely calculated parameters are latency, duration, amplitude, conduction velocity and late response. For SNAP, latency, amplitude and conduction velocity are usually measured[2]. Different studies have been done to find a relation between anthrometric measures like BMI, height and conduction velocity. Most of these studies have been performed on western population and much less has been documented on Asians. The present study was done to find the effect of height and BMI on CMAP of median nerve in Pakistani adolescents.

AIMS AND OBJECTIVES

To study the effect of height weight and BMI on CMAP of median nerve of female medical students.

MATERIALS AND METHODS

Inclusion Criteria: One hundred and twenty two, first year medical students aged 19±2 years belonging to Fatimah Jinnah Medical University were included in this study after approval of their consent.

Exclusion Criteria: All those suffering from any neurological disorder or history of drug abuse were not included in the study .

A detailed history and physical examination of subjects was done. History of any drug abuse was also ruled out which may affect the conduction velocity. Random sampling technique was used to record their age, weight, height, BMI and Compound Motor Action Potential (CMAP) of Median nerve. CMAP was recorded on power lab system. Subjects were instructed to relax completely during the recording.

Median nerve was stimulated at the elbow, by placing the stimulator bar on the skin over the anterior cubital fossa and two disposable electrodes on abductor pollicis brevis. The stimulator bar was placed on the wrist to stimulate median nerve at the wrist. A measuring tape was used to assess the length of the nerve. The current of the stimulator was at first set at zero and then slowly augmented, with consecutive stimuli. With the increasing stimulus strength, a CMAP appeared, that grew bigger in size to a point when the CMAP no longer amplified in size. Conduction velocity was measured from the difference in latencies between the responses evoked by nerve stimulation at wrist and elbow.

STATISTICAL ANALYSIS

The data was entered on Microsoft Excel sheet. Statistical Analysis was done using SPSS version17. Pearson Correlation Coefficient test was used to find the correlation of Height, weight and BMI with Conduction velocity of Median nerve in the subjects.

RESULT

The Mean conduction velocity of the subjects was 67.34±30.79m/sec. Mean weight of the students was 52±7.78kg . Mean BMI was 20.40±2.80 kg/m^2(table1)

Table 1:

Conduct Velocity		Weight		Height In M		BMI	
Mean	67.34918	Mean	52.03306	Mean	2.84	Mean	20.39558
Standard Error	2.788249	Standard Error	0.708171	Standard Error	1.24301	Standard Error	0.25606
Median	62.4	Median	52	Median	1.6	Median	20
Mode	50	Mode	50	Mode	1.57	Mode	19.1
Standard Deviation	30.79721	Standard Deviation	7.78988	Standard Deviation	13.67311	Standard Deviation	2.804998
Sample Variance	948.4683	Sample Variance	60.68223	Sample Variance	186.9539	Sample Variance	7.868015
Kurtosis	19.3054	Kurtosis	0.086473	Kurtosis	120.996	Kurtosis	0.304074
Skewness	3.853005	Skewness	0.417978	Skewness	10.99973	Skewness	0.279385
Range	235	Range	38	Range	150.58	Range	14.3
Minimum	25	Minimum	35	Minimum	1.42	Minimum	13.2
Maximum	260	Maximum	73	Maximum	152	Maximum	27.5
Sum	8216.6	Sum	6296	Sum	343.64	Sum	2447.47
Count	122	Count	121	Count	121	Count	120

Table 2: Correlations between various anthropometric measures and conduction velocity

Correlations				
	BMI	**Condvel**	**Weight**	**Height in M**
BMI	1			
Condvel	-0.12118	1		
Weight	0.875223	-0.09219	1	
height in Cm	-0.11645	0.07485	0.383736	1

The correlation between conduction velocity of median nerve and weight is very low that is -0.0921 and height is 0.074 and negative effect with BMI that is -0.121(table 2)

DISCUSSION

Nerve conduction study is a thoroughly authenticated and vital method used in clinical

practice[1,2,3,]. Many researches on this topic are published, which include the elements that influence nerve velocities. These aspects can be divided into physical factors and biological factors (age, height, gender) [10,15,16]. We highlighted the effect of biological factors, height, weight and BMI on Nerve conduction velocity. Findings of the present study revealed that height, weight and BMI did not show significant correlation with Motor nerve conduction velocity of median nerve. In line with the present study Soudmand et al[13] found that no substantial relationship could be found in both motor and sensory Median nerve. NCV and height. Awang et al[14] could not establish any relation of NCVs in Median and Ulnar nerves in various height groups. A positive correlation between height and NCV of median nerve was observed by Thakur D et al [15.] This study was carried out on 34 (age: 31.24±11.57 years) healthy male and female adults. Weight and BMI showed negative correlation with MNCV in median nerve.

Buschbacher[7]conducted a study on the effect of body mass index on NCV and found that there was no association between BMI and nerve conduction velocity of Median nerve. On the other hand weight and BMI did not have a significant influence on nerve conduction parameters in Indian population as detected by Pawaret al[16]. Stetson (1982) also documented a study on 105 healthy adults[17]showing results in line with the present study.

Contrary to the reports of our study, Awang MS et al[14] observed that in Median nerve, both motor and sensory conduction declined in their velocities with increasing BMI. This may be attributed to difference in method of determination of conduction velocity and technical expertise of the examiner.

CONCLUSION

Height did not show a major correlation with the motor nerve conduction velocity(MNCV) of Median nerve. Moreover, no correlation was seen between BMI, weight and MNCV of median nerve.

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