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Nerve Conduction Study of Radial Nerve in Type2 Diabetes Mellitus Patients in The Age Group 30-65years

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ABSTRACT

Nerve conduction study measures the speed of electrical impulse in a nerve.NCS represent the least variable and non invasive method for assessing neuropathy.This study will help to mark the difference between all the parameters of nerve conduction study with both motor and sensory radial nerve of type2 diabetes mellitus patients.

Objectives: To evaluate latency,amplitude,velocity of radial nerve in type2 diabetes mellitus patients. The study intends to findout the effect of type2 diabetes on the radial nerve of the upper extrimities.

Materials and method: The study include 574 subjects,both male and female within the age group 30-65 years ,informed written consent was taken from all the subjects.the subjects were divided into two groups 1 and 2.Group 1 subjects includes duration of diabetes less than equal to 5 years and group 2 subjects includes duration of diabetes more than 5 years. Anthropometric variables were recorded.Motor and sensory nerve conduction parameters of bilateral radial nerve were recorded by using a four channel RMS nerve conduction machine .

Results: it was found that there was a significant ($p<0.05$) for proximal motor latency of both right and left radial nerve with the duration of diabetes. There was a non significant change in distal latency ($p>0.05$) among the diabetic duration less than equal to 5 years or more.There was a non significant change in the amplitude ($p>0.05$) for both motor and sensory among the diabetes patients less than equal to 5 years and more than 5 years.

Conclusion: We conclude that implementing early electrodiagnostic testing for assessment of peripheral neuropathy is best detected by taking particular note the velocity of the nerve conduction of radial nerve which is significantly more prone to fall below the average value for normal healthy individuals even in newly diagnosed diabetes mellitus

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1. INTRODUCTION

Diabetes mellitus (DM) is a chronic ,complex and non communicable endocrine disorder characterized by hyperglycemia and disruption in lipid,protein and carbohydrate metabolism resulting from either insufficient insulin production or diminished tissue sensitivity to insulin.

Diabetic neuropathy is most often observed microvascular consequence. Timely identification and diagnosis of diabetic neuropathy are essential for averting long term complication and enhancing patients outcomes.identify the symptoms and check the prognosis nerve conduction study plays a major role.nnv

2. MATERIALS AND METHOD

After approval from the institutional Ethics committee of Santosh medical college and hospital,Ghajiabad,the study was started. The research includes 574 subjects,both male and female,within the age group of 30-65 years were recruited for this cross sectional observational study. After taking informed written consent ,the subjects were divided into two groups ,1and 2. where group1 include duration of diabetes less than equal to 5 years and group 2 includes diabetes more than 5

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years with a fasting blood sugar level ≥ 126mg/dl and postprandial blood sugar level ≥ 200 mg/dl.The entired recording was done by using a four channel RMS Nerve conduction machine.

Latency,amplitude,and velocity were recorded. The data was tabulated in Microsoft excel.Analysis was done by using spss version 27. P value of all parameters between two groups of patients t-test were used.For correlation Spearman rank test were used.p values <0.05,was considered as significant.

Results- A total of 574 diabetes mellitus patients fulfilling the inclusion and exclusion criteria were selected the study after giving consent. There were 336 males (58.5%) and 238 females (41.5%) among the study subjects .

Table-1 shown frequency of gender with Percent

Gender		
	Frequency	Percent
Male	336	58.5
Female	238	41.5
Total	574	100.0

On analysis distribution of the study population reveals a higher proportion of male patients(58.5%,n=336)compared to female patients(41.5%,n=238) among the total 574 patients with type2 diabetes mellitus.

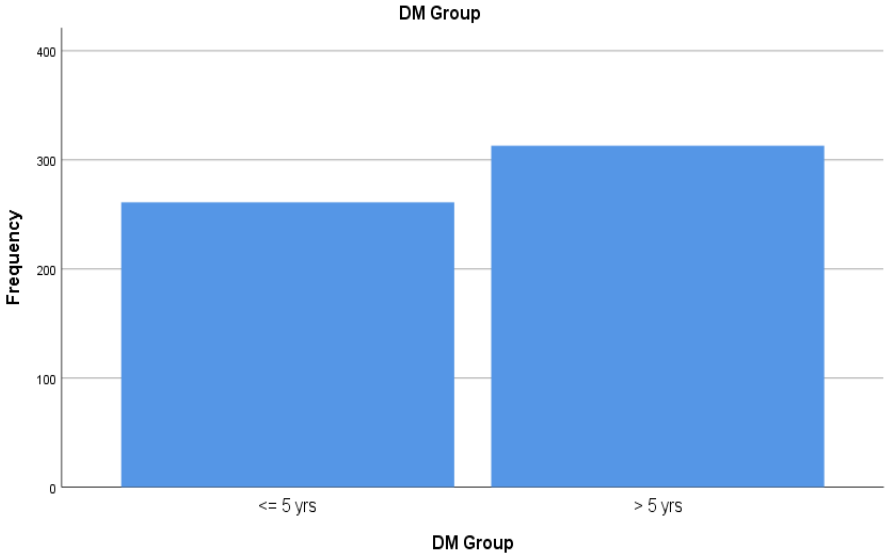

Figure-1, Bar diagram shows frequency of type2 diabetes patients with duration of being affected with diabetes

Table-2,Gender comparison between groups of diabetes mellitus patients

		DM Group		Total	x^2	p – value
		≤ 5 yrs	> 5 yrs			
.Gender	Male	144 (42.9 %)	192 (57.1 %)	336 (100 %)	2.232	0.135
	Female	117 (49.2 %)	121 (50.8 %)	238 (100 %)		
Total		261 (45.5 %)	313 (54.5 %)	574 (100 %)		

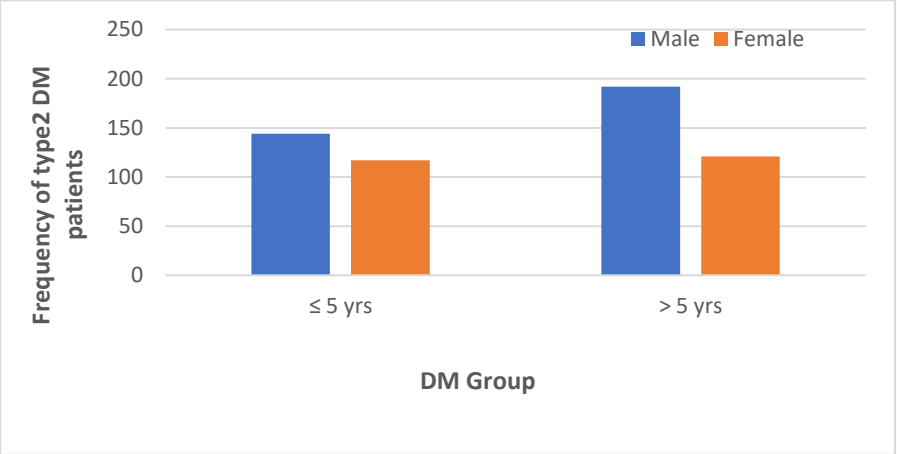

Figure -2 Bar diagram of Gender comparison between groups of diabetes mellitus patients

The distribution of patients based on duration of diabetes and gender shows that 144 patients (42.9%)had a duration of diabetes ≤5 years where as 192patients (57.1%)had a duration of diabetes >5 years.

117 female patients (49.2%) had a duration of diabetes ≤5years where as 121 female patients(50.8%) had a diabetes > five-year duration.

Chi-square test was done to find out the association between gender and duration of diabetes.it was found no significant association between gender and duration of diabetes (p=0.135).

Table-3 ,(Number of patients between the duration of diabetes and latency,amplitude,velocity of radial nerve both motor and sensory)

Group Statistics					
Motor	**DM Group**	**N**	**Mean**	**Std. Deviation**	**p-value**
rt-radial-latency-distal	<= 5 yrs	261	2.4869	0.86052	**0.218 > 0.05 (Not Significant)**
	> 5 yrs	313	2.5646	0.64749	
rt-radial-latency-proximal	<= 5 yrs	261	5.4318	0.74391	**0.011 < 0.05 (Significant)**
	> 5 yrs	313	5.6019	0.84302	
rt-radial-amplitude-distal	<= 5 yrs	261	7.871	1.8192	**0.188 > 0.05 (Not Significant)**
	> 5 yrs	313	7.6524	2.10007	
rt-radial-amplitude-proximal	<= 5 yrs	261	6.9334	1.8527	**0.932 > 0.05 (Not Significant)**
	> 5 yrs	313	6.9196	1.98676	
rt-radial-velocity	<= 5 yrs	261	50.1675	13.52474	**0.346 > 0.05**

	> 5 yrs	313	51.2054	12.77334	**(Not Significant)**
lt-radial-latency-distal	<= 5 yrs	261	2.7084	0.71173	**0.907 > 0.05 (Not Significant)**
	> 5 yrs	313	2.7155	0.75161	
lt-radial-latency-proximal	<= 5 yrs	261	5.6531	0.95615	**0.009 < 0.05 (Significant)**
	> 5 yrs	313	5.8665	0.98842	
lt-radial-amplitude-distal	<= 5 yrs	261	7.6921	1.99704	**0.426 > 0.05 (Not Significant)**
	> 5 yrs	313	7.5546	2.10989	
lt-radial-amplitude-proximal	<= 5 yrs	261	6.4857	2.1711	**0.633 > 0.05 (Not Significant)**
	> 5 yrs	313	6.3935	2.40756	
lt-radial-velocity	<= 5 yrs	261	51.4006	14.80316	**0.101 > 0.05 (Not Significant)**
	> 5 yrs	313	49.4706	13.36241	
Sensory					
lt-radial-latency	<= 5 yrs	261	1.8023	0.76236	**0.081 > 0.05 (Not Significant)**
	> 5 yrs	313	1.6975	0.67268	
lt-radial-amplitude	<= 5 yrs	261	12.6613	8.08066	**0.077 > 0.05 (Not Significant)**
	> 5 yrs	313	14.1939	11.88923	
lt-radial-velocity	<= 5 yrs	261	47.4479	19.33897	**0.436 > 0.05 (Not Significant)**
	> 5 yrs	313	48.6356	16.70772	
rt-radial-latency	<= 5 yrs	261	1.7714	0.59577	**0.118 > 0.05 (Not Significant)**
	> 5 yrs	313	1.6966	0.54683	
rt-radial-amplitude	<= 5 yrs	261	11.4376	7.98616	**0.112 > 0.05 (Not Significant)**
	> 5 yrs	313	12.7295	10.88236	
rt-radial-velocity	<= 5 yrs	261	46.2397	16.62701	**0.095 > 0.05 (Not Significant)**
	> 5 yrs	313	48.4692	15.31989	

p-value is < 0.05 then it is Significant

p-value is > 0.05 then it is Not Significant

3. DISCUSSION

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Upon granting their consent, 574 cases of diabetes mellitus that satisfied the inclusion criteria were enrolled in present study. The research comprised 238 females (41.5%) and 336 males (58.5%) .in this study,it was compared all the parameters of nerve conduction study with the duration of diabetes .

The study showed there was a statistically significant of proximal latency of both right and left radial nerve with a p value 0.011 and 0.009 which was less than 0.05 with two groups of DOD.(<=5 and >5 years) .

A study by kumar,s.,et al (2017) was found that the motor nerve latency of the radial nerve was significantly prolonged in diabetes patients with diabetes duration > 5years compared to those with a of diabetes duration <=5years.

Sharma et al.(2015) this study found no significant correlation between the diabetes duration and the radial motor proximal latency in diabetes patients (type 2) which was not similar with present studies.

4. CONCLUSION

The objective of this study was to evaluate how type2 diabetes mellitus affects nerve conduction in the radial nerves .Nerve conduction studies provided important insights about nerve function and help diagnose and monitor nerve the damage.

Our analysis of nerve conduction studies revealed notable findings . The radial nerves proximal latency of both right and left showed a significant prolongation in cases of longer duration of diabetes. This suggests that nerve impairment can progress silently ,often before obvious clinical symptoms appear .As such ,early electrophysiological changes in the radial nerve may function as an early warning sign for diabetic neuropathy.

The above study shows that nerve conduction tests can be used as a indicator of diabetes peripheral neuropathy We conclude that implementing early electrodiagnostic testing for assessment of peripheral neuropathy is best detected by taking particular note the velocity of the nerve conduction of radial nerve which is significantly more prone to fall below the average value for normal healthy individuals even in newly diagnosed diabetes mellitus. A limited nerve conduction assessment of radial velocity could therefore be a valuable tool for early peripheral neuropathy. The patients, who are shown to have early onset neuropathy, should be educated and instructed for proper hand care, which could limit progression and prevent secondary complication of diabetic neuropathy.

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