



A STUDY OF PATTERN OF PERIPHERAL NEUROPATHY IN SYMPTOMATIC DIABETICS AND ITS CORRELATION WITH DIABETIC NEUROPATHY SYMPTOM SCORE

Dr. B. Madhukiran reddy	Assistant Professor ,department Of General Medicine, Dr.Pinnamaneni Siddhartha Institute Of Medical Sciences And Research Foundation, Chinnoutpalli
Dr. Y. Sirisha*	Assistant Professor , Department Of General Medicine, Dr.pinnamaneni Siddhartha Institute Of Medical Sciences And Research Foundation, Chinnoutpalli *Corresponding Author
Dr. S. Phanindra Babu	Senior Resident, Department Of General Medicine, Dr.pinnamaneni Siddhartha Institute Of Medical Sciences And Research Foundation, Chinnoutpalli
Dr. P. Shalima	Post Graduate, Department Of General Medicine, Dr.pinnamaneni Siddhartha Institute Of Medical Sciences And Research Foundation, Chinnoutpalli

ABSTRACT **BACKGROUND:** Diabetic peripheral neuropathy is a usual disorder and presents as a diagnostic and therapeutic challenge to physicians . Early identification and screening of neuropathy is necessary to decrease morbidity due to

diabetes mellitus

AIMS AND OBJECTIVES:

- To determine the pattern of NCV in symptomatic diabetic study group
- To determine the correlation of diabetic neuropathy symptom score(DNS) with NCV results

MATERIALS AND METHODS: The study was carried in Dr.PSIMS & RF, on 100 cases of symptomatic diabetics .Diabetic neuropathy symptom score was taken based on symptoms and Nerve conduction studies(NCS) and HbA1c were performed and data was analyzed.

RESULTS: The pattern of NCV among the study population were Axonal-SM (74%), Axonal-PS (16%), Demyelinating (9%), Axonal-PM (1%).There is a significance in the correlation of DNS with various patterns of NCV.

CONCLUSION: There is higher incidence of axonal sensory motor neuropathy in diabetes mellitus . DNS score is an acceptable tool to screen for peripheral neuropathy

KEYWORDS : Diabetes Mellitus,Nerve Conduction Studies,Diabetic Neuropathy Symptom Score

INTRODUCTION

Diabetic neuropathy is a heterogeneous condition that occurs in different forms. It may develop in proximal or distal nerve fibers, may take the form of mononeuritis or entrapments involving small or large fibers and may affect the somatic or autonomic nervous system(1).Distal symmetric polyneuropathy,a chronic, nerve-length-dependent, sensorimotor polyneuropathy(2,3)affects at least one-third of persons with diabetes mellitus and nearly one-quarter of persons with impaired glucose tolerance.The prevalence of neuropathy varies from 1.55% to 100% in patients with type 2 diabetes based on the difference in screening approaches, diagnostic criteria and study population(4).At the time of diagnosis, up to 7.5% of diabetic patients have clinical neuropathy.The scientific rationale studies about the diabetic peripheral neuropathy are less in the Indian context , hence it is essential to know about it because literature regarding research is far from complete and with paucity. Early identification and screening of neuropathy provide a paramount option for the patient with diabetes to actively set the course of suboptimal glycemic control to recommend targets before the onset of significant morbidity currently. this study will evaluate the various patterns of peripheral neuropathy in people with diabetes and their correlation with diabetic neuropathy symptom score.

MATERIALS AND METHODS

A hospital-based cross-sectional study was carried out for a period of 2 years after obtaining approval from the Institutional Ethics Committee at Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Chinnaavutapalli, which is a tertiary care teaching hospital in South India. 100 subjects who were diabetic with symptoms of peripheral neuropathy and aged above 30 years attending the inpatient and outpatient departments of General Medicine and Neurology were considered.

EXCLUSION CRITERIA:

Patients presenting with various other causes of peripheral neuropathy like leprosy, thyroid, vitamin deficiencies, alcohol, drug-induced, infection, paraneoplastic syndromes, connective tissue disorders, other familial/hereditary causes .

Statistical Analysis: Data were entered in MS-Excel and analyzed in SPSS V22. Descriptive statistics represented with percentages, Mean with SD. ANOVA was used to find significance. The p-value 0.05 was considered to be statistically significant.

METHODOLOGY:

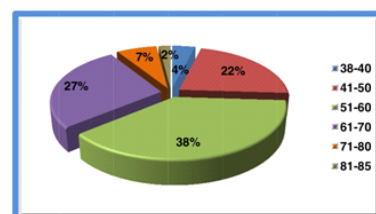
A detailed history elicited about symptoms of peripheral neuropathy wastaken and diabetic neuropathy symptom score (DNS) was documented.Following a detailed assessment of the subjects, those who fulfilled the criteria were included in the study.The following tests were performed on the selected subjects: FBS, PPBS, HbA1c, Nerve Conduction Velocity Studies.

RESULTS

1.DISTRIBUTION OF AGE IN STUDY

Age	Frequency	Percent
38-40	4	4.0
41-50	22	22.0
51-60	38	38.0
61-70	27	27.0
71-80	7	7.0
81-85	2	2.0
Total	100	100.0

Graph-1: Distribution of age



In this study, a majority of the subjects were in the age group of 51-60years (38%) ,followed by 61-70years (27%), 41-50years (22%), 71-80years (7%), 38-40years (4%), 81-85years (2%).

2.MEAN DURATION OF DIABETES AND MEAN HbA1C IN STUDY POPULATION

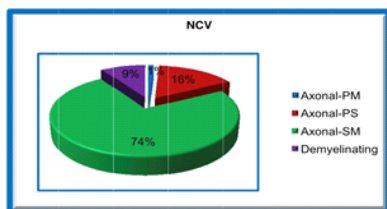
Descriptive Statistics					
Variable	N	Minimum	Maximum	Mean	SD
Duration	100	2.0	25.0	11.84	5.46

Descriptive Statistics					
Variable	N	Minimum	Maximum	Mean	SD
HbA _{1c}	100	6.8	18.6	10.76	2.34

Mean duration of diabetes in study population was 11.84 years,with minimum of 2years and maximum of 25 years.The mean HbA1c of the study population was 10.76

3.PATTERNS OF NCV

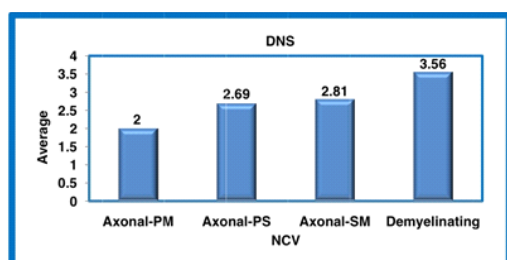
NCV	Frequency	Percent
Axonal-PM	1	1.0
Axonal-PS	16	16.0
Axonal-SM	74	74.0
Demyelinating	9	9.0
Total	100	100.0



In this study, the patterns of NCV among the study population were Axonal-SM (74%), Axonal-PS (16%), Demyelinating (9%), Axonal-PM (1%).

4.CORRELATION OF PATTERN OF NCV WITH DIABETIC NEUROPATHY SYMPTOM SCORE

Variable	NCV	N	Minimum	Maximum	Mean	SD	P-value
DNS	Axonal-PM	1	2.0	2.0	2.00		0.003
	Axonal-PS	16	2.0	3.0	2.69	0.48	
	Axonal-SM	74	1.0	4.0	2.81	0.63	
	Demyelinating	9	3.0	4.0	3.56	0.53	



In this study the mean DNS is comparatively similar in various patterns of NCV .There is a significance in the correlation of DNS with various patterns of NCV. (p-value 0.003).

DISCUSSION

One of the most commonly occurring microvascular complication accounting for 28% of all the complications in people with diabetes is Diabetic neuropathy. It is a progressive process that has a long asymptomatic stage. Diabetes duration of more than 10 years increases the risk for diabetic peripheral neuropathy in adolescents and young adults with type 1 and type 2 diabetes,In the present study, the minimum duration of diabetes is 2years, the maximum duration of diabetes is 25years, and the mean duration is 11.84 with a standard deviation of 5.46, which is comparatively similar to the studies conducted by Mohan G et al et al.(5)(10.79±5.38), Islam MR et al.(6) (12.44±5.14), Battula P et al.(7) (8.06±6.10) and Nisar MU et al.(8) (9±6.76).

Increased HbA1c level is closely associated with DPN in type 2 diabetic patients.In the present study, the minimum HbA1c is 6.8%, maximum HbA1c is 18.6%, and the mean HbA1c is 10.76 with a standard deviation of 2.34,which is comparatively similar to the study conducted by Mohan G et al (5) (9.51±2.16), Aaron Charles Lobo et al.(9) (10.532±10.64), Islam MR et al.(6) (10.49±1.50).

One of the major risk factors for the development of diabetic foot complications is distal symmetric sensorimotor polyneuropathy (PNP) (10,11). . For the diagnosis of DPN, nerve conduction studies have been accepted as an essential part as it has many benefits(12,13)In the present study, the patterns of NCV among the study population were Axonal-SM (74%), Axonal-PS (16%), Demyelinating (9%), Axonal-PM (1%).

In a study conducted by Mohan G et al (5), the sensorimotor type was seen in a maximum number of patients, i.e., 64 (64%) followed by pure sensory in 18 (18%) and pure motor in 2 (2%) patients. 16 (16%) patients were normal on NCV.

Practically,NCV cannot be used as a screening test of diabetic peripheral neuropathy and alternative bedside screening methods like diabetic neurological examination(DNE) scores and Diabetic neuropathy symptom scores,ankle reflex, Semmes-Weinstein monofilament and vibration perception threshold (VPT) are routinely used.The DNS score is a four-item validated symptom score, with high predictive value to screen for PNP in diabetes . Symptoms of unsteadiness in walking, neuropathic pain, paraesthesia, and numbness are elicited. The presence of one symptom is scored as 1 point; the maximum score is 4 points. A score of 1 or higher is defined as positive for PNP.When comparison of nerve conduction studies is made with detection scores in each group, though NCS detected more cases of neuropathy than the scores, there is a significant association between clinical scores and NCS or its major components.In the present study, correlation of DNS with various patterns of NCV showed a statistical significance with a p-value of 0.003.With a reportedly high degree of discriminative value and sensitivity, the DNS score is an acceptable tool that has only four items, making it practically useful(15).

CONCLUSION

- The study demonstrated that axonal neuropathy was more common than demyelinating (9%) In uncontrolled diabetes mellitus
- Among axonal neuropathy, sensorimotor pattern (74%) was the most prevalent type followed by pure sensory (16%) and pure motor (1%) types of neuropathy.
- There is a significance in the correlation of DNS with various patterns of NCV ,and it is an acceptable tool to screen for peripheral neuropathy , making it practically useful

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