

A study of correlation between duration of type II diabetes mellitus and development of diabetic neuropathy by using biothesiometer

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Abstract

Background: Long duration of diabetes mellitus is a major risk factor for development peripheral neuropathy in diabetic patients. **Objective:** to assess the diabetic neuropathy with duration of diabetes mellitus by using biothesiometer **Material and Method:** All 100 patients are divided in to two groups. Group-1 include 28 patients those age less than 50 years among these 13 patients have duration of diabetes 1-3 years and 15 patient have duration of diabetes more than 3 years. Group-2 include 72 patients those age more than or equal 50 years among these 27 patients have duration of diabetes 1-3 year and 45 patients have duration of diabetes more than 3 years. In this study to determining the vibration perception threshold (VPT) on the bony prominences of the metatarsal heads of foot by using Biothesiometer. **Result:** in our study, first result shows that patients having age less than 50 years and duration of DM 2.30 ± 0.83 years have VPT 16.15 ± 11.20 and moderate grade and those patient having duration of DM 6.20 ± 2.76 years have VPT 21.77 ± 9.44 and severe grade. VPT comparison between duration of diabetes 1-3 years and more than 3 years was statistically significant ($p < 0.05$). second result shows that patients having age more than 50 years and duration of DM 1.96 ± 0.94 years have VPT 21.82 ± 9.07 and moderate grade and those patient having duration of DM 8.37 ± 3.67 years have VPT 30.83 ± 12.01 and severe grade. VPT compare between duration of diabetes 1-3 years and more than 3 years was statically significant ($p < 0.05$) **Conclusion:** It was found that if duration of diabetes was 1-3 year, development of neuropathy with moderate grade and if duration of diabetes more than 3 years, development of neuropathy with severe grade by using biothesiometer irrespective of age.

Key Word: Diabetic neuropathy, biothesiometer, VPT.

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INTRODUCTION

The early recognition and appropriate management of Diabetic neuropathy in patient with diabetes mellitus is important because Diabetic neuropathy is the most frequent symptomatic complication of diabetes. Half of

the cases may be asymptomatic and can be recognized only by focused testing, which includes quantitative sensory and autonomic function testing and also nerve conduction studies. In the developing countries diabetes occurs at a younger age (45-65) years than in developed countries. Long standing Diabetes Mellitus is associated with an increased prevalence of micro vascular and macro vascular diseases. The prevalence of peripheral neuropathy is 25.5% in India¹. Based on clinical criteria, the overall prevalence in NIDDM and IDDM patients is approximately 25-30%, increasing to over 40% in the elderly.² The prevalence approaches 50% among those who have had the disease for more than 25 years.² Most patients with diabetic neuropathy are asymptomatic. The prevalence of asymptomatic diabetic neuropathy with subtle changes detected by quantitative testing may approach 60 to even 100% depending on the definition

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and the techniques used.³In this study, already diagnosed patients of type 2 Diabetes Mellitus were taken. From the diabetic patients, who come to Sir T. hospital, Bhavnagar, Gujarat. Such 100 Patients are to be selected for study. All are tested with Biothesiometry. Assessment of Diabetic Neuropathy by this method gives us early diagnosis of Diabetic Neuropathy so it may be helpful in treatment of Diabetes Mellitus, as well as Complication related with Diabetes Mellitus are to be prevented.

AIM

To detect peripheral diabetic neuropathy early and correlate it with the duration of diabetes.

METHODOLOGY

The study was conducted on 100 diagnosed patients of Type 2 Diabetes Mellitus above age of 40 years in Sir. T. Hospital, Bhavnagar, Gujarat. Patients were coming in diabetic clinic OPD were taken for study. The research

protocol was approved by institutional ethical committee of govt. medical college Bhavnagar. All patients are divided in to two groups. Group-1 includes 28 patients those age less than 50 years among these 13 patient have duration of diabetes 1-3 years and 15 patients have duration of diabetes more than 3 years. Group-2 includes 72 patients those age more than or equal 50 years among these 27 patients have duration of diabetes 1-3 year and 45 patients have duration of diabetes more than 3 years. In this study, we had to determine the vibration perception threshold (VPT) on the bony prominences of the metatarsal heads of foot by using Biothesiometer. it gives early diagnosis and accurate assessment of Diabetic Neuropathy. Data was collected and analysed by SPSS software and reported as mean ± SD. It is non invasive procedure. Written consent from patients were taken. The level of significance between group 1 and 2 were taken. p value was less than 0.05

Normal Values and Interpretation ⁴

Patient's age up to 50 year		Patient's age above 50 year	
Values in volts	Interpretation	Values in volts	Interpretation
< = 10	Normal	<=15	Normal
11 to 15	Mild neuropathy	16 to20	Mild
16 to 20	Moderate neuropathy	21 to 25	Moderate neuropathy
>=21	Severe neuropathy	>=25	Severe neuropathy

RESULT

Table 1: Showing parameter of patients of type 2 diabetes mellitus having age less than 50 years

Age(years)	Duration Of DM(Years)	No. Of patient	VPT	Grading Of Neuropathy	
42.07±6.19	2.30±0.83	13	16.15±11.20	Moderate	P< 0.05
40.33±6.04	6.20±2.76	15	21.77±9.44	Severe	

(all values in mean± SD)

The table 1 show patients having age less than 50 years and duration of DM 2.30±0.83 years have VPT 16.15±11.20 and moderate grade and those patient having duration of DM 6.20±2.76 years have VPT 21.77±9.44 and severe grade. VPT comparison between duration of diabetes 1-3 years and more than 3 years was statistically significant(p<0.05)

Table 2: Showing parameter of patients of type 2 diabetes mellitus having age more than 50 years

Age(years)	Duration of dm(years)	No. Of patient	Vpt	Grading of neuropathy	
58.44±6.57	1.96±0.94	27	21.82±9.07	Moderate	P<0.05
59.20±7.00	8.37±3.67	45	30.83±12.01	severe	

(all values in mean ± SD)

The table 2 show patients having age more than 50 years and duration of DM 1.96±0.94 years have VPT 21.82±9.07 and moderate grade and those patient having duration of DM 8.37±3.67 years have VPT 30.83±12.01 and severe grade. VPT comparison between duration of diabetes 1-3 years and more than 3 years was statistically significant(p<0.05)

DISCUSSION

In present study, It was found that VPT was significantly higher in those patients have duration of diabetes more than 3 years than patients have duration of diabetes 1-3 year. if, Duration of diabetes is more, then it causes more damage of nervefibers. Damage of nervefibers leads to neuropathy. Diabetic Peripheral Neuropathy (DPN) is one

of the microvascular complications of diabetes, and is responsible for most of the amputations in diabetes. Biothesiometer can detect sensory neuropathy even if the patient does not have any symptoms of neuropathy. In our study patients with age less than 50 years, mean VPT was 16.15±11.20, grade of neuropathy was moderate in patient with mean duration of diabetes was 2.30±0.83 and

mean VPT was 21.77 ± 9.44 , grade of neuropathy is severe in patient with mean duration of diabetes was 6.20 ± 2.76 . A similar finding were observed by Lakshmana Kumar N *et al*⁵ Measurement of Vibration Perception Threshold (VPT) is useful in assessment of peripheral neuropathy. Rani PK *et al*⁶ found that Prevalence and risk factors for severity of diabetic neuropathy in type 2 diabetes mellitus. Dipika bansal *et al*⁷ In a prospective follow-up study of 1-year duration carried out to examine the ability of VPT to predict the development of diabetic foot ulceration, it was found that among diabetic patients with a VPT score of >25 mV, 19.8% had the incidence of foot ulceration. Pradeepa R *et al*⁸ in cross-sectional population-based study shows that, among urban south Indian Type 2 diabetic subjects, the prevalence of diabetic neuropathy is 26.1% and that diabetic neuropathy is significantly associated with age, glycated haemoglobin and duration of diabetes. The present study tune with all above studies suggest that duration of diabetes affect on development of diabetic neuropathy in type 2 diabetes mellitus.

CONCLUSION

In our study, it was found that if duration of diabetes was 1-3 years, development of neuropathy with moderate grade and if duration of diabetes more than 3 years development of neuropathy with severe grade by using biothesiometer irrespective of age. Assessment of Diabetic Neuropathy by these methods gives us early diagnosis of Diabetic Neuropathy so it may be helpful in

treatment of Diabetes Mellitus, as well as Complication related with Diabetes Mellitus are to be prevented.

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