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Original article:

Evaluation of Incidence of Different Forms of Neuropathies in Type 2 Diabetes Patients: An Institutional Based Study

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Abstract

Background: Diabetic neuropathy is a common disorder and is defined as signs and symptoms of peripheral nerve dysfunction in a patient with diabetes mellitus in whom other causes of peripheral nerve dysfunction have been excluded. Hence; we planned the present study to assess of incidence of different forms of neuropathies in type 2 diabetes patients.

Materials & Methods: The present research included assessment of prevalence of different Forms of Neuropathies in Type 2 Diabetes Patients. A total of 100 patients with type 2 diabetes were included in the present study. Detailed clinical, biochemical and medical records of all the subjects was obtained. Height, weight, body mass index (BMI) of all the patients was obtained. Patients were categorized as hypertensive if there SBP (Systolic blood pressure) ≥140 mmHg or DBP (Diastolic blood pressure) ≥90 mmHg. HbA1c value of all the patients was also evaluated. Based on the clinical examination findings and results of biochemical and hemodynamic tests, presence of absence of different forms of neuropathies was assessed. All the results were analyzed by SPSS software.

Results: Total prevalence of neuropathies among diabetic patients found in the present study was 29 percent. Among these patients, 26 patients had peripheral neuropathy. Proximal neuropathy and Autonomic neuropathy were found in 2 and 1 patient respectively.

Conclusion: Neuropathies are present in significant proportion among diabetic patients, among which, peripheral neuropathy the most is commonly encountered.

Key words: Diabetic, Neuropathy, Peripheral.

INTRODUCTION

Diabetic neuropathy (DN) is a common disorder and is defined as signs and symptoms of peripheral nerve dysfunction in a patient with diabetes mellitus (DM) in whom other causes of peripheral nerve dysfunction have been excluded. There is a higher prevalence of DM in India (4.3%) compared with the West (1%–2%).[1-3] Probably Asian Indians are more prone for insulin resistance and cardiovascular mortality. The incidence of DN in India is not well known but in a study from South India 19.1% type II diabetic patients had peripheral neuropathy.4 DN is one of the commonest causes of peripheral neuropathy. It accounts for hospitalisation more frequently than other complications of diabetes and also is the most frequent cause of non-traumatic amputation.[4, 5]

Although there is a great advance in understanding the pathophysiological mechanisms leading to the development of diabetic complications, there is not yet a plausible hypothesis to explain why some patients develop the painful

form of disease while others do not. In general, researchers seek to elucidate neuropathy underlying mechanisms as a bigger event, and include pain and other sensorial manifestations as direct consequences of neuropathy. However, interestingly, pain intensity normally is not associated with neuropathy severity, and can occur even in the absence of nerve injuries.[6- 8]

Hence; we planned the present study to assess of incidence of different forms of neuropathies in type 2 diabetes patients.

MATERIALS & METHODS

The present research was conducted in the department of Department of Physiology of Dr. S.N. Medical College, Jodhpur, Rajasthan, India. It included assessment of prevalence of different Forms of Neuropathies in Type 2 Diabetes Patients. Subjects who were diagnosed with suffering from type 2 DM, irrespective of the duration, were included in the present study. Diagnosis of DM in these subjects was confirmed based on American diabetes association (ADA) guidelines, according to which, any subject with random blood sugar >200 mg/dL or fasting blood sugar >126 mg/dL is considered as type 2 diabetic. Written consent from all the patients was obtained before the starting of the study after explaining in detail the entire research protocol. A total of 100 patients with type 2 diabetes were included in the present study. Detailed clinical, biochemical and medical records of all the subjects was obtained. Height, weight, body mass index (BMI) of all the patients was obtained. Data in relation to the hemodynamic parameters was obtained. In sitting position, blood pressure of all the patients was obtained using mercury sphygmomanometer. Patients were categorized as hypertensive if there SBP (Systolic blood pressure) ≥140 mmHg or DBP (Diastolic blood pressure) ≥90 mmHg. HbA1c value of all the patients was also evaluated. Based on the clinical examination findings and results of biochemical and hemodynamic tests, presence of absence of different forms of neuropathies was assessed. All the results were analyzed by SPSS software. Univariate regression curve was used for evaluation of level of significance.

RESULTS

A total of 100 type 2 diabetic patients were included in the present study. Mean age of the diabetic subjects was 48.2 years. Among these diabetic subjects, 65 were males while the remaining 35 were females. Mean duration of diabetes in 45 percent of the subjects was more than 2 years. Total prevalence of neuropathies among diabetic patients found in the present study was 29 percent. Among these patients, 26 patients had peripheral neuropathy. Proximal neuropathy and Autonomic neuropathy were found in 2 and 1 patient respectively.

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Graph 1: Data of all the patients

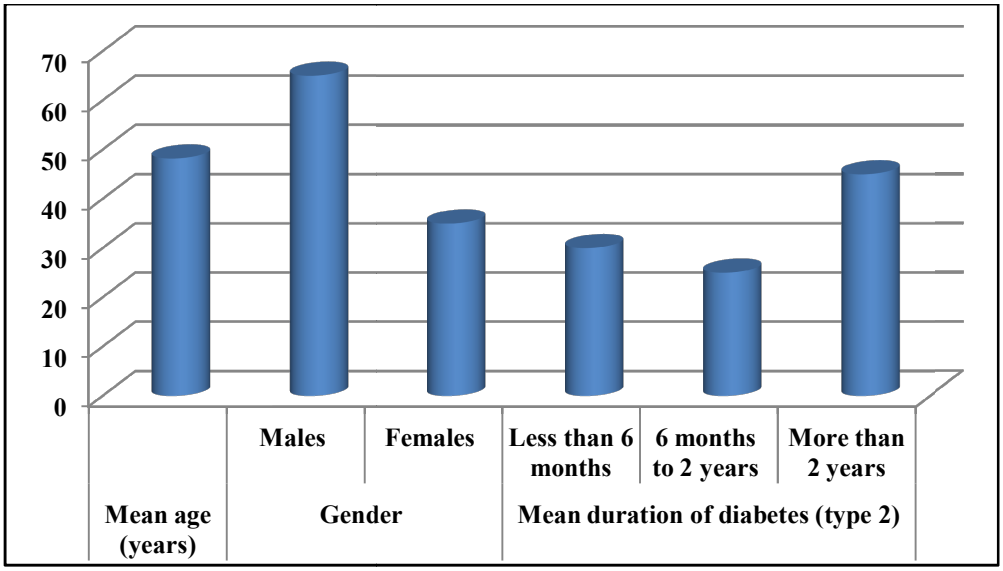
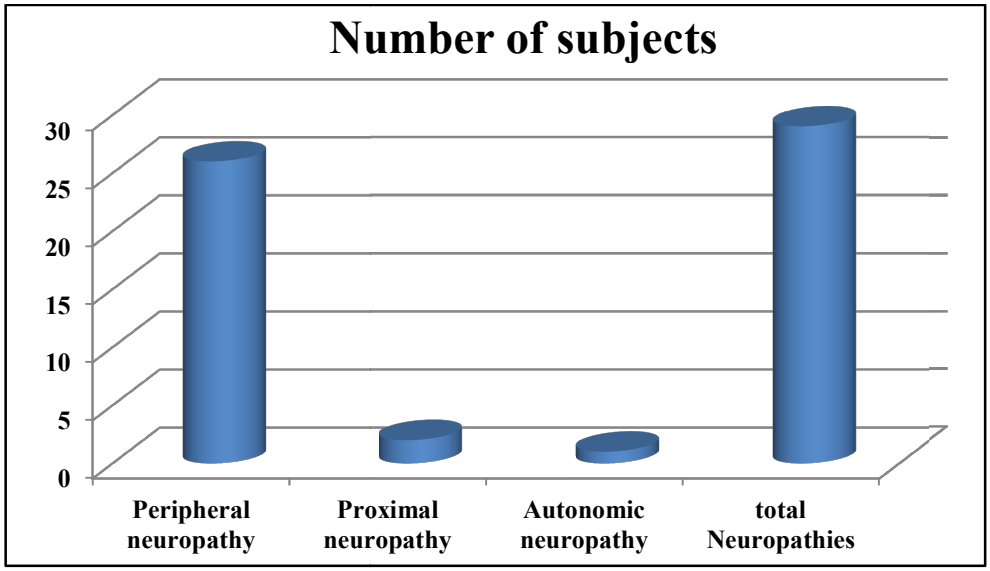


Table 1: Prevalence of different forms of neuropathies

Form of neuropathy	Number of subjects
Peripheral neuropathy	26
Proximal neuropathy	2
Autonomic neuropathy	1
Total Neuropathies	29

Graph 2: Prevalence of different forms of neuropathies among diabetic patients



DISCUSSION

In the present study, the total prevalence of neuropathies among diabetic patients found in the present study was 29 percent. Among these patients, 26 patients had peripheral neuropathy. Proximal neuropathy and Autonomic neuropathy were found in 2 and 1 patient respectively. In one of the previous studies, authors assessed the prevalence of diabetic peripheral neuropathy (DPN), compare the prevalence between known diabetes mellitus (KDM) and newly detected diabetes mellitus (NDDM), identified risk factors associated, its prevalence pattern and assessed if any sex-specific differences are present. Patients with duration of diabetes ≤6 months were considered to be NDDM. DPN was diagnosed by the combination of more than one abnormal result of 10-g monofilament, pinprick sensations and ankle reflexes, and categorized according to the severity level using vibration perception threshold. The study included 1,637 KDM and 369 NDDM patients. A total of 586 participants were found to have DPN, accounting for 29.2% prevalence. The higher prevalence was observed in KDM compared with NDDM 33.7% vs 9.2%. Prevalence of mild, moderate, and severe neuropathies was 8.06, 14.55 and 6.63%, respectively. Regression analysis showed age ($P < 0.001$), duration of diabetes, dyslipidemia, glycated hemoglobin, the presence of other microvascular complications, macrovascular complications and alcoholic status to be associated. No sex-specific differences were observed in the mean age at diagnosis of diabetes, mean age at the diagnosis of neuropathy, and duration taken for the DPN development among females and males. The study showed a high prevalence (29.2%) of DPN among north Indian type 2 diabetes mellitus patients.[9] Jaiswal M et al assessed the prevalence of and risk factors for diabetic peripheral neuropathy (DPN) in youth with type 1 diabetes (T1D) and type 2 diabetes (T2D) enrolled in the SEARCH for Diabetes in Youth (SEARCH) study. The Michigan Neuropathy Screening Instrument (MNSI) was used to assess DPN in 1,734 youth with T1D (mean ± SD age 18 ± 4 years, T1D duration 7.2 ± 1.2 years, and HbA1c 9.1 ± 1.9%) and 258 youth with T2D (age 22 ± 3.5 years, T2D duration 7.9 ± 2 years, and HbA1c 9.4 ± 2.3%) who were enrolled in the SEARCH study and had ≥5 years of diabetes duration. DPN was defined as an MNSI exam score of >2. Glycemic control over time was estimated as area under the curve for HbA1c. The prevalence of DPN was 7% in youth with T1D and 22% in youth with T2D. Risk factors for DPN in youth with T1D were older age, longer diabetes duration, smoking, increased diastolic blood pressure, obesity, increased LDL cholesterol and triglycerides, and lower HDL cholesterol (HDL-c). In youth with T2D, risk factors were older age, male sex, longer diabetes duration, smoking, and lower HDL-c. Glycemic control over time was worse among those with DPN compared with those without for youth with T1D but not for youth with T2D. The high rates of DPN among youth with diabetes are a cause of concern and suggest a need for early screening and better risk factor management.[10] Mørkrid K et al estimated the prevalence and risk factors for diabetic peripheral neuropathy (DPN) in type 2 diabetic outpatients at the BIRDEM hospital, Bangladesh. Type 2 diabetic outpatients, diagnosed 5-11 years prior to the investigation were randomly selected for the study. DPN was assessed using the Neuropathy Symptom Score (NSS) and Neuropathy Disability Score (NDS). Data about demographics, blood pressure, height, weight, waist and hip circumference, and random blood and urine samples were collected. Two hundred and ninety four (139 men, 155 women) type 2 diabetic outpatients were studied. The overall DPN prevalence was 19.7 %; male (20.9%), female (18.7 %). The prevalence increased with age (from 11.1% in the 23-40 year-old group to 32.3% in the 60-80 year-old group) and duration of diabetes (from 14.1% in patients with five

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years to 29.2% in patients with 9-11 years duration). Age > 60 years, low/normal WHR, income < 800 TK and insulin treatment were independent, significant risk factors. Longer duration of diabetes, and higher HbA1c were marginally independent, significant risk factors for DPN. They observed a DPN prevalence of 19.7%. Higher age, low socioeconomic status, treatment with insulin, longer duration of diabetes and poor glycemic control were risk factors for DPN.[11]

CONCLUSION

Under the light of above mentioned data, the authors conclude that neuropathies are present in significant proportion among diabetic patients, among which, peripheral neuropathy the most is commonly encountered. However; further studies are recommended.

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