

ORIGINAL ARTICLE

FREQUENCY OF PERIPHERAL NEUROPATHY IN PATIENTS WITH DIABETES MELLITUS

Mehwish Iftikhar, Azhar Hussain*, Amina Rizvi

Department of Endocrinology and Metabolism, *Department Medicine Unit-4, Services Hospital, Lahore, Pakistan

Background: The main purpose of this study was to ascertain the frequency of peripheral diabetic neuropathy in diabetic patients and to stratify the different variants of peripheral neuropathy in patients. **Methods:** Two hundred and fifty diabetic patients presenting to diabetic management centre, were included in this cross sectional study. Effect modifier (duration of diabetes) were studied through stratification. Eleven point neuropathic pain scale was used to access the extent of neuropathy. **Results:** The frequency of neuropathy in diabetic patients was 187 (74.8%). Out of 250 patients 116 (46.4 %) patients were found to have burning type of pain and 114 (45.6%) were found to have numbness while 61 (24.4%) had tingling. Out of 250 patients 17 (6.8%) were found to have sharp pain and 55 (22%) had dullness. Out of 250 patients 44 (17.6%) had coldness. Ten patients (4%) out of 250 had sensitive type of pain. frequency of itchy type of pain was 6.4%.

Conclusion: The study showed that painful diabetic neuropathy is present in majority of controlled diabetics and most of them belong to old age. It further showed that majority of sufferer were females. The most common variety of pain encountered was burning type of pain.

Keywords: Diabetes mellitus, Diabetic peripheral neuropathy

J Ayub Med Coll Abbottabad 2014;26(4):584-6

INTRODUCTION

There is disordered metabolism in patients of Diabetes mellitus leading to hyperglycaemia, it can be due to insulin deficiency or peripheral resistance to insulin.¹ The prevalence of diabetes and resultant complications are increasing continuously in many countries, patients with poor glycaemic control end up with higher rate of microvascular complications², other contributing factors are longer duration of diabetes and obesity.³ Diabetes mellitus is a condition that continues to receive much attention from health care providers yet resulting in substantial mortality and morbidity.⁴ Life style modification is also necessary to reduce hazards.⁵

There are two broad categories in which vast majority of diabetic patients are classified that is type-1 having absolute deficiency of insulin, and type-2 diabetes, in which there is presence of insulin resistance and an inadequate increase in insulin secretion to compensate.⁶ The factors that are most important for prognosis are hyperglycaemia, long duration of diabetes mellitus, old age, and increase body mass index. The patients with diabetes are at increased risk of series of complications that cause premature mortality and morbidity.⁷

In diabetes mellitus, involvement of peripheral nervous system may lead to numbness or paraesthesia in a glove and stocking pattern of distribution.⁸ There are certain cellular events that trigger the development of vascular complications in diseases like diabetes and hypertension on background endothelial dysfunction plays a key role.⁹

There are many long term complications of diabetes. Neuropathies are the commonest among them.

Managing chronic sensorimotor distal symmetric polyneuropathy is the most important therapeutic challenge.^{10,11} The clinical presentations of Diabetic peripheral neuropathy (DPN) are diverse that includes troublesome neuropathic pain on one end and there may be insensitive foot on the other end which is also at risk of ulceration. This affects quality of life because of paresthetic symptoms that can be both unfamiliar and painful.¹² In advanced peripheral diabetic neuropathy (PDN) there is elevated vibration and thermal perception thresholds that leads to sensory loss and degeneration of all types of fibres in peripheral nerve. A significant number of diabetic patients also reports abnormal sensations which may include paresthesia, hyperalgesia, allodynia and spontaneous pain.¹³

This study was designed to determine the frequency of painful peripheral neuropathy in diabetes and to stratify the neuropathy into various subtypes.

MATERIAL AND METHODS

It was a cross sectional survey that was carried out in Diabetes Management Centre, Services Hospital, Lahore. Two hundred and fifty patients of diabetes mellitus were included in this study, and total duration of study was six months. Sampling was done through non probability purposive sampling. All diabetic patients with 5 years duration of diabetes or more and age 16–60 of any gender were included. Their HbA1C was between 6–8. All those with history of exposure to lead, insecticides and history of any trauma leading to neurological deficit that can compromise assessment of sensory system along with history of renal failure (presenting with creatinine level more than 1.5mg/dl) were excluded.

Effect modifier was studied through stratification. Data collected with help of *pro forma* and SPSS-12 was used to analyse the data.

Descriptive statistics were calculated. Quantitative variables of study were age and duration of diabetes. These were presented as mean and standard deviation. Frequency and percentage of presence and absence of neuropathy were calculated and its variants were presented by frequency and percentage.

RESULTS

A total of 250 patients with diabetes mellitus diagnosed for or more than 5 years were selected from the Diabetes Management Centre of Services Hospital Lahore.

Results showed that amongst the 250 patients, Overall percentage of females was more than that of males. Regarding age distribution of patients, there were few patients at the extremes of age groups shown, with the minimum age of 18 and maximum age of 60. Mean age was 49.52±7.933 years, and the majority of diabetic patients were between age group 50–60 years.

The frequency of neuropathy in diabetic patients was 187 (74.8%) out of the total 250 patients studied. Table-1 shows frequency of variants of neuropathy out of 187 patients that had neuropathy. 116 (62.0%) had burning pain, 114 (60.9%) had numbness, 61 (32.6%) had tingling, 55 (29.4%) had dull pain, 44 (23.5%) had cold pain, 17 (9.0%) had sharp pain, 16 (8.5%) had itchy pain, 10 (5.3%) had sensitive pain.

Table-2 shows frequency of neuropathy with respect to gender, it shows out of 94 males 67 (71.2%) had neuropathy, Out of 156 females 120 (76.9%) had neuropathy.

Table-3 shows effect of duration of diabetes on neuropathy. In group-A (duration of disease 5–10 years), 70 patients out of 115 had neuropathy. In group-B (duration of disease 11–20 years), 95 out of 112 patients had neuropathy and in group-C (above 20years), 22 out of 23 patients had neuropathy.

Regarding relation of age groups with neuropathy there were four groups in group-1 (16–29 years) all of 4 patients had neuropathy, in group-2 (30–39 years), 16(84.2%) out of 19 had it, in group-3 (40–49 years), 54 (68.3%) out of 79 had it, in group-4 (50–60 years), 113(76%) out of 148 patients had it. the relation of age group and different variants of neuropathy was also calculated, in group-1, 3 (75%) had burning, 1 (25%) had numbness, 0 (0%) had tingling, 1 (25%) had dull pain, 2 (50%) had cold pain, 0 (0%) had sharp pain, 0 (0%) had itchy pain and 0 (0%) had sensitive pain. In group-2, 12 (75%) had burning, 12 (75%) had numbness, 7 (43.7%) had tingling, 4 (25%) had dull pain, 5 (31.25%) had cold pain, 3 (18.7%) had

sharp pain, 0 (0%) had itchy pain and 1 (6.25%) had sensitive pain. In group-3, 32 (59.2%) had burning, 28 (51.8%) had numbness, 15 (27.7%) had tingling, 10 (18.5%) had dull pain, 10 (18.5%) had cold pain, 3 (1.8%) had sharp pain, 4 (7.40%) had itchy pain and 12 (10.6%) had sensitive pain. In group-4, 69 (61.06%) had burning, 73 (64.60%) had numbness, 39 (34.5%) had tingling, 40 (35.39%) had dull pain, 27 (23.8%) had cold pain, 13 (11.50%) had sharp pain, 12 (10.6%) had itchy pain and 7 (6.19%) had sensitive pain.

Table-1: Frequency of variants of Neuropathy (n=187)

Variant	Patients with particular variant	percentage
Burning	116	62.0
Numbness	114	60.9
Tingling	61	32.6
Dull pain	55	29.4
Cold pain	44	23.5
Sharp pain	17	9.0
Itchy pain	16	8.5
Sensitive pain	10	5.3

Table-2: Frequency of neuropathy with respect to gender

PDN Neuropathy	Male		Females	
	Number	Percentage	Number	Percentage
Neuropathy	67	35.0	120	64.1
Burning	43	64.0	73	60.8
Numbness	43	64.0	71	59.0
Tingling	22	32.8	39	32.5
Dull pain	22	32.8	33	27.5
Cold pain	20	29.8	24	20.0
Sharp pain	4	5.9	13	10.8
Itchy pain	5	7.4	11	9.1
Sensitive pain	4	5.9	6	5.0

Table-3: Effect of duration of diabetes on neuropathy

Neuropathy	Duration of diabetes (Years)		
	5–10	11–20	>20
Present	70 (60.8%)	95 (84.8%)	22 (95.6%)
Absent	45 (39.1%)	17 (15%)	1 (4.3%)
Total	115	112	23

DISCUSSION

In diabetes mellitus, involvement of peripheral nervous system may lead to numbness or paraesthesia in a glove and stocking pattern of distribution⁸, it is believed that diabetes is a major cause of many complications like blindness, end-stage renal disease and lower leg amputation despite the introduction of many treatment strategies these all contribute to the excess morbidity as well as mortality in diabetic patients.¹⁴

In our study the mean age of the patients was 49.52±7.933 years. As compared with the study of Elaine Cristina Salzedas Muniz *et al*² the average age of the patients was 60.9 years, which is slightly more than found in our study. The two main approaches to DPN therapy are currently in use. First, to alleviate the

persistent painful symptoms in the upper and lower limbs by use of the tricyclic antidepressants, anticonvulsants, opioids, and opioid-like agents; these are supported by multiple randomized controlled trials (RCTs) and meta-analyses as far as efficacy is concerned.¹⁵

The second group of therapies consists of mainly experimental treatments, which are approved for use in number of countries for example the antioxidant-lipoic acid¹⁶, although not available in the U.S. another example is the aldose-reductase inhibitor epalrestat, being only available in Japan.¹⁷

In our study the frequency of peripheral neuropathy was found to be 74.8% as compared with the international study by Feray Soyupek *et al*¹⁸ that showed the frequency of peripheral neuropathy was 80.4% which is also comparable.

In our study burning pain was present in 46.4% of patients as compared to frequency of 19.44%. In the same study frequency of numbness was 45.6% and 39.73%. Frequency of tingling was found to be 24.4% and 35.62%.

In various international studies frequency of paresthesia has been calculated in patients with diabetes but in our study we have further stratified into different varieties like coldness, sharp pain, itchy pain, dullness and sensitive pain. Present study is hospital based, done in tertiary care hospital which covers large population.

Sample size taken in this study was also large and all the possible confounders addressed to prevent bias. Moreover this study was easy to perform as *pro forma* was used for survey, it was also economical.

However still multicentre trials needed to know the exact frequency of neuropathy in diabetics these would also be helpful to know the frequency in different populations. And there is need to cover extreme of ages.

Further research is required to better understand the different factors that influence neuropathy. This will enable us to introduce new treatment and diagnostic modalities which can reduce morbidity and mortality related to diabetic microvascular complications.

CONCLUSION

The study showed that painful diabetic neuropathy is present in majority of controlled diabetics and most of them belong to old age. It further showed that majority of sufferer were females. The most common variety of pain encountered was burning type of pain. The study

provide a basis for future research of longer duration in a bigger group of patients

REFERENCES

1. Umesh M. Diabetes mellitus and hypoglycemia. In: Tierney LM, McPhee SJ, Papadakis MA, editors. Current medical diagnosis and treatment. 48th ed. New York: Mc Graw- Hill; 2009.p. 1032–73.
2. Muniz EC, Rocha RM, Reis ML, Santos VL, Grossi SA. Neuropathic and ischemic changes of the foot in Brazilian patients with diabetes. *Ostomy Wound Manag* 2003;49:60–70.
3. Hashim R, Ahmed KF, Ahmed KD, Shaukat A. Prevalence of Microvascular complications of Diabetic patients. *J Coll Physicians Surg Pak* 1999;9(3):120–2.
4. Kirwin JL, Cunningham RJ, Sequist TD. Pharmacist recommendations to improve the quality of diabetes care: a randomized controlled trial. *J Manag Care Pharm* 2010;16:104–13.
5. Mehboob F, Majeed MZ, Zaman SM. An impact of life style and obesity on diabetes. Hypertension and Hyperlipidemia. *J Fatima Jinnah Medical Coll Lahore* 2007;1(3–4):59–63.
6. Gale EAM, Anderson JV. Diabetes mellitus and other disorders of metabolism. In: Kumar P, Clark M, editors. Clinical medicine, editors. 6th ed. Edinburgh, United Kingdom: WB Saunders; 2005.p.1101–51.
7. Wilson JD. Approach to the patient with endocrine and metabolic disorders. In: Fauci AS, Braunwald E, Isselbacher KJ, Wilson JD, Martin JB, Kasper DL, editors. Harrison's principles of internal medicine. 14th ed. New York: Mc Graw-Hill; 1998.p. 2074–5.
8. Mendill JR, Sehan Z. Painful sensory neuropathy. *N Engl J Med* 2003;348:1243–55.
9. Wong WT, Wong SL, Tian XY, Huang Y. Endothelial dysfunction: the common consequence in diabetes and hypertension. *Cardiovasc Pharmacol* 2010;55:300–7.
10. Boulton AJM, Malik RA, Arezzo JC, Sosenko NJ. Diabetic somatic neuropathies: technical review. *Diabetes Care* 2005;427:1458–86.
11. Boulton AJM, Vinik AI, Arezzo JC, Bril V, Feldman EL, Freeman R, *et al*. Diabetic neuropathies: a statement by the American Diabetes Association. *Diabetes Care* 2005;28:956–62.
12. Vileikyte L, Rubin RR, Leventhal H: Psychological aspects of neuropathic foot complications: an overview. *Diabete Metab Res Rev* 2004;20:S13–18.
13. Obrosova IG. Diabetic painful and insensate neuropathy: pathogenesis and potential treatments. *Neurotherapeutics* 2009;6:638–47.
14. Girach A, Vignati L. Diabetic microvascular complications-can the presence of one predict the development of another? *J Diabetes Complications*. 2006;20:228–37.
15. Vinik AI, Mehrabyan A. Diabetic neuropathies. *M Clin N Am* 2004;88:947–9.
16. Ziegler D, Nowak H, Kempler P, Vargha P, Low PA. Treatment of symptomatic diabetic polyneuropathy with the antioxidant alpha-lipoic acid: a meta-analysis. *Diabet Med* 2004;21:114–21.
17. Argoff CE; Cole BE, Fishbain DA; Irving GA. Diabetic peripheral neuropathic pain: clinical and quality-of-life issues. *Mayo Clin Proc* 2006; 81: S3-S11.
18. Soyupek F, Ceceli E, Suslu FE, Yorgancıoğlu R. Neurologic and radiologic abnormalities of the foot in diabetic patients. *J Back Musculoskelet Rehabil* 2007;20:55–60.

Address for Correspondence:

Dr. Mehwish Iftikhar, Department of Endocrinology and Metabolism, Services Hospital, Lahore, Pakistan.

Cell: +92-300-4291641, **Tel:** +92-423-7564286, +92-423-7592000

Email: drmehwish@live.com