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A study of Peripheral Neuropathy in Diabetes in a Tertiary Hospital in Kerala:

Dr Admi V R Karaniyil

Assistant Professor, Department of General Surgery, Azeezia Medical College, Meeyannoor, Kollam, Kerala.

Abstract:

Background:

According to the Diabetes Atlas 2014 published by the International Diabetes Federation, the number of people with diabetes in world currently around 387 million (8.3% prevalence) of which 179 million were undiagnosed cases (46.3%) and rest 208 million of diagnosed cases. It is expected to rise by 205 million to reach 592 million by 2025. India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the ―diabetes capital of the world‖ contributing 66 million of diagnosed diabetic cases with a prevalence of 8.63%.Every 7 seconds 1 person dies from diabetes accounts for 4.9 million deaths in 2014 . The greatest number of people with diabetes are between 40 and 59 years of ageDiabetes expenditure reached USD 612 billion in 2014.In India 94.96 USD per person spent for diabetes related treatment5 . The lifetime risk of a person with diabetes developing a foot ulcer may be as high as 25%, whereas the annual incidence of foot ulcers is 2% 6,7. Up to 50% of older patients with type 2 diabetes have one or more risk factors for foot ulceration

Aims and Objectives:

To study the peripheral neuropathies and their associated signs, symptoms and other demographic influencers.

Materials and Methods:

Over a period of 18 months, an observational study of 120 patients admitted with diabetic foot in the present Medical College.

Results:

Our study showed a high prevalence of neuropathy (81.7%), peripheral vascular disease (70.8%) and infection (77.5%).

Conclusion:

Common symptoms, signs and other co-morbidities are discussed in this study.

Keywords: Peripheral Neuropathies, Co-morbid, Habits, Tertiary Hospital.

Introduction:

Peripheral neuropathies are among the commonest of all the long term diabetic complications and are the main initiating factor for diabetic foot ulceration (DFU). Epidemiological data on symptomatic diabetic neuropathy which is a common scenario in surgical practice in India remain poor due to inconsistent definitions, poor ascertainment, and a lack of population based studies. This study was aimed to stratify the diabetic foot patients according to the distribution of commonly associated co-morbidities and other factors. Over a period of 18 months, an

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observational study of 120 patients admitted with diabetic foot in the present Medical College. Patients were stratified. Our study showed a high prevalence of neuropathy (81.7%), peripheral vascular disease (70.8%) and infection (77.5%). Diabetes is reaching epidemic proportions and with it carries the increased risk of complications. Disease of the foot is among one of the most feared complications of diabetes. Diabetic foot may be defined as infection, ulceration, or destruction of deep tissues of the foot associated with neuropathy and /or peripheral arterial disease in the lower extremity of people with diabetes[1] . According to the Diabetes Atlas 2014 published by the International Diabetes Federation, the number of people with diabetes in world currently around 387 million (8.3% prevalence) of which 179 million were undiagnosed cases (46.3%) and rest 208 million of diagnosed cases. It is expected to rise by 205 million to reach 592 million by 2025. India leads the world with largest number of diabetic subjects earning the dubious distinction of being termed the ―diabetes capital of the world‖ contributing 66 million of diagnosed diabetic cases with a prevalence of 8.63% .Every 7 seconds 1 person dies from diabetes accounts for 4.9 million deaths in 2014 . The greatest number of people with diabetes are between 40 and 59 years of age. Diabetes expenditure reached USD 612 billion in 2014.In India 94.96 USD per person spent for diabetes related treatment[2] . The lifetime risk of a person with diabetes developing a foot ulcer may be as high as 25%, whereas the annual incidence of foot ulcers is 2% [3,4]. Up to 50% of older patients with type 2 diabetes have one or more risk factors for foot ulceration [5].

Aims and Objectives:

To study the diabetic peripheral neuropathy

Materials and Methods:

Study Design: Observational Study

Study Setting:

- Outpatient / Inpatients of Department of General Surgery, Azeezia Medical College, Meeyannoor, Kollam, Kerala

Duration Of Study:

- January 2019- July 2020

Sample Size:

- The following simple formula (Daniel,1999) can be used

$$n = \frac{Z^2 P(1-P)}{d^2}$$

n = sample size

Z = statistic for a level of confidence

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p = expected prevalence of peripheral neuropathy

d = precision (20% 0f prevalence when β error is 20%)

Z value is 1.96 when α error is 5%

In a recent study by Gershater MA et al [56] among diabetic foot patients the prevalence of neuropathic foot is about 60%.

So substitute the value in the above equation

$$n = \frac{(1.96)^2\ 0.6\ (1-0.6)}{(0.2)^2} = 66.66 = 67$$

So sample size is minimum of 67 patients.

Sample size after 18 months of study= 120 subjects.

Inclusion Criteria:

All patients between 40 to 70 years with diabetic foot attending IP/OP departments of General Surgery and Plastic Surgery.

Exclusion criteria:

- Patients with Type Idiabetes
- Patients with leg ulcers other than diabetic etiology- Traumatic ulcers, Infective ulcers without diabetes ,Malignant ulcers ,Venousulcers
- Patients who do not give consent forstudy.
- Patients with other causes for peripheralneuropathy

Study Procedure:

Conducted study on 120 patients getting admitted with diabetic foot in outpatient / Inpatients of General Surgical Department. All patients diagnosed as diabetic foot by clinical examination and relevant investigations are enrolled into study. Patient is diagnosed as diabetic by his FBS {≥126 mg/dl (7.0 mmol/l)}, PPBS (≥200 mg/dl), HBA1c values[93] and diabetic history . Diabetic foot is determined by ulceration or any two signs of infection as per IWGDF guidelines[8] in these patients. Subjects who satisfied inclusion criteria were selected for the study and a written consent was taken. All patients enrolled in the study were interviewed and examined by the investigator with the help of a proforma. History regarding their symptoms and a thorough clinical examination will be done. For each of the recruited subjects, a thorough history regarding age, sex, duration and nature of treatment of Diabetes and associated systemic diseases like hypertension dyslipedemia were taken. History also included the details of, personal habits like smoking status & alcohol intake (regular intake, occasional intake, no intake) . History was also taken about ulcer duration,

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vascular symptoms like claudication pain, rest pain, autonomic symptoms like sweating.

Results:

A total of 120 patients were studied. Results obtained are analysed below.

Table 1: Age distribution

Age group	Frequency	Percent
41-50	21	17.5
51-60	42	35
61-70	57	47.5
Total	120	100

Table 2: Sex distribution

Sex	Frequency	Percent
Males	96	80.0
Females	24	20.0
Total	120	100.0

Table 3: Distribution according to duration of diabetes.

Duration of diabetes	Frequency	Percent
1-5yrs	16	13.3
6-10yrs	39	32.5
11-20yrs	53	44.2
>20yrs	12	10.0
Total	120	100.0

Table 4: Distribution according to duration of hypertension

Duration of hypertension	Frequency	Percent
no	21	17.5
<1yr	17	14.2
1-5yrs	32	26.7
6-10yrs	35	29.2
11-20yrs	13	10.8
>20yrs	2	1.7
Total	120	100.0

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Table 5: Distribution according to duration of dyslipidemia

Duration of dyslipidemia	Frequency	Percent
no	26	21.7
<1yr	36	30.0
1-5yrs	28	23.3
6-10yrs	25	20.8
11-20yrs	5	4.2
Total	120	100.0

Table 6: Distribution according to method of diabetic control

Method of diabetic control	Frequency	Percent
No treatment	14	11.7
Diet control	19	15.8
OHA	48	40.0
Insulin	39	32.5
Total	120	100.0

Table 7: Distribution according to peripheral vascular status

Peripheral vascular status	Frequency	Percent
Non-ischemic foot	35	29.2
Ischemic foot	85	70.8
Total	120	100.0

Table 8: Distribution according to smoking status

Smoking status(pack years)	Frequency	Percent
No smoking	40	33.3
1-10	12	10.0
11-20	33	27.5
21-40	16	13.3
>40	19	15.8
Total	120	100.0

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Table 9: Distribution according to alcohol intake

Alcohol intake	Frequency	Percent
No intake	44	36.7
Occasional	40	33.3
Regular	36	30.0
Total	120	100.0

Table 10: Distribution according to claudication pain

Claudication pain	Frequency	Percent
Nil	62	51.7
Present	58	48.3
Total	120	100.0

Table 11: Distribution according to Rest Pain

Rest pain	Frequency	Percent
No	88	73.3
Yes	32	26.7
Total	120	100.0

Table 12: Distribution according to foot ulcer

Foot ulcer	Frequency	Percent
No	25	20.8
Yes	95	79.2
Total	120	100.0

Table 13: Distribution according to presence of infection

Signs of infection	Frequency	Percent
No	27	22.5
Yes	93	77.5
Total	120	100.0

77.5% of studied population had signs of infection.

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Table 14: Distribution according to foot deformity

Foot Deformity	Frequency	Percent
no	103	85.8
yes	17	14.2
Total	120	100.0

Table 15: Distribution according to sweating

Sweating	Frequency	Percent
No	22	18.3
Yes	98	81.7
Total	120	100.0

Table 16. Distribution according to fasting glucose values

FBS	Frequency	Percent
<126	4	3.3
126-200	80	66.7
201-300	33	27.5
>301	3	2.5
Total	120	100.0

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Table 17. Distribution according to post prandial glucose values

PPBS	Frequency	Percent
<200	16	13.3
200-300	77	64.2
301-400	23	19.2
>401	4	3.3
Total	120	100.0

Table 18: Distribution according to HbA1c values.

Diabetic control by HbA1c	Frequency	Percent
< 6.5 (good)	14	11.6
6.5-10 (fair)	71	59.16
≥10 (poor)	35	29.16

Discussion:

Diabetic foot problems are the commonest reason for hospitalization of diabetic patients (about 30% of admissions) and absorb some 20% of the total health-care costs of the disease more than all other diabetic complication[6,7]. In India prevalence of foot ulcers in diabetic patients in clinic population is 3%, which is much lower than reported in the western world. A possible reasoning for the low prevalence in Indians is younger age and shorter duration of diabetes.[8]The prevalence of diabetes is different in different parts of India because of wide variation in demographic profile. Various studies shows this difference (Chennai Urban Population Study[9] - prevalence of type 2 Diabetes is 12% in population above the age of 20 years, and The Indian Industrial Populations Study Group[10] shows prevalence of different urban areas– Bangalore (men 12.1%, women 9.1%), Hyderabad (men 15.1%, women 11.9%), and Trivandrum (men 17.4%, women 15.3%). There is also rural urban variation in prevalence of Diabetes (PODIS - Prevalence of Diabetes in India Study, shows Prevalence of 5.9% in Urban and 2.7% in rural India) [11]. This urban – rural difference in the prevalence of diabetes mellitus within the same ethnic group (Indians) is attributed primarily to the _modern' lifestyle that urban Indians follow when compared to the traditional' lifestyle of rural Indians. The prevalence of Type 2 Diabetes and its complications are also increasing in Kerala. This may be attributed to the rapid economical, nutritional and demographic transition experienced in Kerala. Also Kerala has the highest proportion of elderly in India[12] .

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A very high prevalence of diabetes (16.3%) reported in Thiruvanathapuram in Kerala State in the year 1999 by Kutty et al[13]. The crude- and age-adjusted prevalence of DM in Kerala by another study was 14.6 % and 12.5 % respectively[14]. risk factors, as investigated by several teams[15,16], include age, sex (being male), diabetes duration and type, insulin use, past history of diabetic foot ulcer (DFU) and amputation, glycaemia level and poor glycaemic control, dyslipidaemia, sensory and autonomic neuropathy (foot insensitivity to the 5.07 monofilament), absence of reflex and limited joint motion, muscle weakness, callus formation, Charcot deformity, hammer/claw toe deformity, arterial insufficiency etc. Smoking, hypertension, and hyperlipidemia are considered as risk factors due to their effects on the increased occurrence of peripheral arterial occlusive disease in diabetics, which typically involves the tibial and peroneal arteries, but leaves the dorsalis pedis artery unaffected .

Conclusion:

Common symptoms, signs and other co-morbidities are discussed in this study. This study is intended to be useful to practising physicians and to look out for signs and symptoms that have been discussed in this study.

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