RESEARCH ARTICLE ORIGINAL

PREVALENCE OF PERIPHERAL NEUROPATHY IN PATIENTS WITH TYPE 2 DIABETES IN A TERTIARY CARE HOSPITALS-A PROSPECTIVE STUDY

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Abstract

Introduction: Diabetic neuropathy (DN) refers to symptoms and signs of neuropathy in a patient with diabetes in whom other causes of neuropathy have been excluded. Distal symmetrical neuropathy is the commonest form accounting for 75% DN.

Objective : The aim of this study was to determine the prevalence of Diabetic neuropathy among type 2 diabetic patients attending medical OPs in Government and private, Medical Colleges in Tamil Nadu.

Methods : two thousand Five Hundred consecutive type 2 diabetic patients attending a diabetes OPs in were selected for this study. For diagnosis of DN, symptoms, signs, quantitative sensory testing, nerve conduction study, and autonomic testing are used; and two of these five are recommended for clinical diagnosis.

Results : Overall, 29% of the patients had evidence of neuropathy. The prevalence of neuropathy increased with increase in age and duration of diabetes

Conclusion : The overall prevalence of neuropathy in this South Indian type 2 diabetic subjects is 29% and age and duration of diabetes are the risk factors for neuropathy

INTRODUCTION:

Hyperglycaemic neuropathy

Tingling paraesthesia, pain or hyperaesthesia in the feet have long been described in patients with newly diagnosed DM or those with very poor glycaemic control, this being the phenomenon of hyperglycaemic neuropathy. The symptoms, and slowing of nerve conductionvy elocit, are rapidly reversed by improving glucose control.

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Diabetic symmetric distal polyneuropathy

This is the most common diabetic neuropathy and it is characterised by a length related distal distribution of sensory and motor symptoms and signs. As autonomic involvement occurs in many patients with diabetic symmetric distal polyneuropathy (DSDP), and forms an important part of the clinical complex, it is best that both are considered together. It is highly likely that by the time DSDP is diagnosed, the patient with either type 1 or type 2 diabetes will have had a prolonged period (sometimes over years) of abnormal glucose metabolism. This is particularly the case in those with type 2 DM who tend to be "discovered" to be diabetic on presentation with symptoms and signs of a neuropathy. It is also worth remembering that it is usual to find evidence of either retinopathy or nephropathy in any case of DSDP—whether newly diagnosed or long established. Some patients with DSDP have no symptoms, but the most common complaint is of tingling, buzzing or prickling sensations affecting the feet, which may also feel tight or hot or cold. The symptoms are often, but not exclusively, symmetric in distribution. The patient may complain of numbness or "as if my feet are wrapped up in cotton wool". The pains in the feet are often worse at night—although this phenomenon is not unique to DSDP.

Clinical signs

The cardinal sign is absent ankle reflexes. Without this, it is difficult to make a diagnosis of DSDP. Loss of knee reflexes occurs in about two thirds of cases, but loss of any upper limb reflexes occurs in only a quarter of patients with DSDP. Muscle weakness is usually mild and confined to the feet, mainly in the distribution of the common peroneal nerve and more obviously affecting extensor hallucis longus and extensor digitorum brevis compared with dorsiflexion and eversion. Proximal leg weakness can be seen, but this, together with the presence of significant upper limb weakness, should make one suspicious of an alternative diagnosis and only after appropriate investigations are negative can a diagnosis of DSDP be made in these cases.

Clinical assessment in diabetic symmetric distal polyneuropathy (DSDP)

Sensory disturbance is very common. Vibration sense at the toes is most frequently affected. Pin prick, temperature, and light touch sensations are lost in a sock or stocking distribution, and if there is upper limb sensory loss in a glove distribution, the level of impairment in the legs has to have reached mid thigh. If not, look for another explanation for the upper limb sensory loss. Testing of deep pain sensation can be done by applying pressure over the nail of the big toe with the handle of the patella hammer. Any sensory loss puts the diabetic foot at risk of ulceration. Based on the relative loss of sensory modalities, one can arbitrarily divide the neuropathy into "large fibre type" (predominant loss of vibration, light touch, and joint position senses) and "small fibre type" (predominant loss of pain and temperature), but these subgroups are uncommon and represent both ends of the continuum of DSDP.

Although diabetes is a common condition, there is the possibility that there may be another cause for the distal neuropathy. Good history taking (alcohol, family history of neuropathy, drug history, etc) and a few basic blood tests (table 4) should be enough to secure the diagnosis of DSDP. Development of DSDP is more common with longstanding diabetes, being male and tall. It is usually, if not invariably, associated with retinopathy and/or nephropathy. In a patient with DM who has developed symptoms and signs of a distal polyneuropathy, check the blood tests outlined in table 4, and if these are all normal then the diagnosis of DSDP is secure.

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Where there are atypical clinical features further investigations including nerve conduction studies will be required, and one may also consider a nerve (and muscle) biopsy.

Aetiology

There is still some way to go before being able to put together a unifying hypothesis for the pathogenesis of DSDP. From experimental diabetic neuropathy, a wide range of metabolic changes have been found with some factors interconnecting The fact that none of these metabolic derangements has reproduced the pathological changes seen in human DSDP, has promoted the search for a vascular aetiology.

Many questions remain unanswered, particularly those relating to how metabolic changes within the nerve of a diabetic patient might predispose it to vascular injury. When we are closer to finding the answer, the search for more specific effective treatments can begin.

Treatment

Strict glucose control from the time of diagnosis of DM is the most important aspect of treatment. This has been clearly demonstrated in type I DM where tight glycaemic control reduces the risk of developing DSDP by 69% at five years. The same has not yet been shown for type 2 DM, but one might suspect similar outcomes. Once established, DSDP is irreversible and slowly progressive. At this stage, strict glucose control provides no clinically significant improvement from the patient's perspective, despite modest improvement in vibration threshold and nerve conduction velocities.

From the research studies that identified metabolic abnormalities, a variety of potential treatments have been investigated—for example, aldose reductase inhibitors, myo-inositol supplementation, α lipoic acid, and administration of nerve growth factor—but none have had sufficient impact on DSDP to be approved as a specific long term treatment.

The treatment of pain associated with DSDP has received considerable attention over the last decade, but this still poses one of the most difficult aspects of management, as there is no single effective treatment. The list of approved drugs is increasing but often based on evidence from short term trials.

Limb mononeuropathies

Diabetic nerves seem to be more susceptible to compression injury, although exactly why this is the case is not well understood. The treatment of entrapment neuropathy (carpal tunnel syndrome, ulnar neuropathy or common peroneal neuropathy) should follow the same management guidelines as in a non-diabetic patient. If the nerve compression is symptomatically troublesome, and especially if there is associated muscle weakness, decompression is needed. The results of decompressive surgery are not as good as in non-diabetic patients.

The diabetic neuropathies are common and remain a major source of morbidity. Optimal treatment at this time requires good control of blood sugar, managing symptoms, and fastidious attention to foot care. The disappointing lack of benefit of other treatments may be related to the fact that most were trialled in patients with established neuropathy. It is probable that future pharmacological treatments for the more common DSDP will have to be directed at early neuropathy. This may provide the impetus to rekindle the neurologist's interest and involvement in the diagnosis and management of diabetic neuropathy

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RESULTS

Socio-demographic, clinical and laboratory data of the study participant

Gender

Male 1321 Female 1179

Marital status

Single/divorced and widowed 12% Married 88%

Working status

Unemployed 34 .Employed 27% Retired 37%

Physical activity

Regular 9% Not regular 28.% No physical activity 62.%

Family history of diabetes 46%

Body mass index (BMI) (kg/m2)

a Normal 8.5 % Over weight 30% Obese 61%

Duration of diabetes (year)

< 5 33% 5–10 35% ≥ 10 31%

ASSOCIATED DISEASES

Hypertension 57%

Dyslipidemia 48%

Retinopathy 19%

Nephropathy 9%

Cardiovascular disease 38%

Type of treatment

Insulin only 12%

Oral hypoglycemia agents only 82.%

Oral hypoglycemia agents and insulin 6%

Statin therapy 88%

HbA1C (%)

Controlled < 7% 42% Uncontrolled ≥ 7% 58%

TOTAL NUMBER OF PATIENTS SCREENED 2500

AGE	MALE	FEMALE	
30-40	**345**	**224**	**569**
40-50	**448**	**657**	**1105**
50-60	**321**	**197**	**518**
Above 60	**207**	**101**	**308**
Total	**1321**	**1179**	**2500**

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TOTAL NUMBER OF PATIENTS PRESENTED WITH NEUROPATHU 723(29%)

- **Generalised neuropathy – (92%) M(313) F(352) T(665)**
  - **– hyperglycaemic neuropathy (42%) M(113) F(190) T(303)**
  - **– symmetric distal poly neuropathy(28%) M(102) F(100) T(202)**
  - **– acute painful sensory neuropathy (22%) M(98) F(62) T(160)**
- **Focal and multifocal neuropathy**
  - **–cranial neuropathies (1%)M(5) F(2) T(7)**
  - **–focal limb neuropathies (5%) M(22) F(14) T(36)**
  - **–thoracolumbar radiculopathy (1%) M(3) F(5) T(8)**
  - **–lumbosacral radiculopathy (1%) M(3) F(2) T(5)**

Responses to Michigan neuropathy screening instrument questionnaire in patients with diabetic peripheral neuropathy

Symptom (%)

: History questionnaire Did your legs/feet numb? (81.8%)

Do you have burning pain in your legs/feet? (74.2%)

Are your feet too sensitive to touch? (39.1%)

Do you have prickling feelings in your legs/feet? (61.1%)

Does it hurt when the bed covers touch your legs/feet? (25%)

Can you diferentiate hot water from cold water in the tub/ shower? (14.9%)

Have you had open sore on your foot? (21.5%)

Has your doctor ever told you that you have neuropathy? (20.3%)

Are your symptoms worse at night? (69.7%)

Do your legs/feet hurt when you walk? (75.3%)

Are you able to sense your legs/feet when you walk? (9.6%)

Is the skin on your legs/feet so dry that it cracks open? (19.7%)

Have you had an amputation? (3.3%)

Physical assessment

Ankle refexes abnormality (71%)

Vibration perception abnormality (66%)

Monoflament test abnormality (78%)

Discussion

Though in text books it is described as longer the duration of hyperglycaemia the neuropathies are more frequent but 22% (160) patients presented with pain and paraesthesia are detected as new diabetic patients ,many(23)of them had pain in the right shoulder joint presenting as periarthritis of the shoulder , suspected and confirmed as new diabetic patients

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According to recent statistics published by the International Diabetes Federation of Diabetes Atlas, India having 63 million people with diabetes accounts for 17% of the total diabetic population[1]. This is a prospective, cross-sectional study carried out in a public tertiary care set-up in south Indian population for the assessment of DPN prevalence and its risk factors among patients with type 2 diabetes mellitus. The prevalence of DPN was found to be 29% in the present study. The estimates of DPN prevalence vary widely from 9.6 to 78% in different populations. This could be attributed to different types of diabetes (e.g. type 1 and type 2 diabetes), genetic predisposition, age of onset of diabetes, existing healthcare facilities, sample selection, different diagnostic criteria used (pin-prick perception, clinical signs and symptoms, and quantitative sensory tests or electrodiagnostic tests)

The present study is one of the few studies reporting DPN prevalence (considered to be a long-term microvascular complication) among KnownDM and Newly detected DM patients We found DPN prevalence in NDDM to be 9.1%. This is much lower than reports from other studies in Indian patients by Pradeepa *et al*(19.5%) and Rani *et al*. (14.4%), respectively . With a variety of drugs available the best way to approach the treatment of pain in DSDP is to have a sequence of preferred choice drugs (often dictated by personal experience), and where possible to stick to monotherapy. The use of opiates do have a role where antidepressants and anticonvulsants have failed or provided only modest pain control. Tramadol (up to 400 mg/day) is the best opiate to start with.gabapentin, methylcobalamine are useful with tight glycemic control and life style modification is the key facters.early identification of peripheral neuropathy we can save the legs and life of the patients.

The overall prevalence of DPN based on 29%. The most frequently reported symptoms were numbness (32.3%) and pain with walking (29.7%), while the least reported symptoms were the history of amputation (1.3%) and loss of sensation in legs/feet while walking (3.8%). Logistic regression analysis revealed that unemploy- ment, cardiovascular disease, dyslipidemia, diabetic retinopathy and long standing DM (diabetes of ≥ 5 years) were signifcantly associated with DPN

Conclusion:

Peripheral Neuropathy is highly prevalent among SOUTH INDIAN TYPE 2 DIABETIC PATIENTS . DPN was signifcantly associated with duration of DM, dyslipidemia, diabetic retinopathy, cardiovascular disease, and unemployment. Early detection and appropriate intervention are mandatory to save the legs and save the life among high-risk groups.

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