



The prevalence of neurological complications among Adult Sudanese diabetic patients

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Abstract

The objective of this study was to identify the prevalence of neurological complications among adult Sudanese diabetic patients attending the outpatient clinics of El Shaab Teaching Hospital in Khartoum.

Methods: This is a descriptive cross sectional hospital based study, it was conducted at El Shaab Teaching Hospital, Khartoum, Sudan during the period from February 2004 to October 2006. Results: 100 diabetic patients were included in the study, 62 were male and 38 females. More than 85% were above the age of 35 years and 56% were in the age group 35- 64. The patients were from different tribes and different states. Sixty percent of the patients were from the northern Sudanese states while the rest of patients were from eastern and western states. Seventy seven percent of the patients had type 2 diabetes mellitus and 78.4% of them had diabetes for more than one year. Hypertension was found in 28% of our patients. The study revealed that 60% of the diabetic patients have neurological manifestations. The main neurological complication found was peripheral sensory-motor neuropathy.

Conclusion: There is significant positive correlation between age, duration of diabetes, glycaemic control and occurrence of the neurological complications.

INTRODUCTION

Diabetes mellitus is the most common endocrine disease with a spectrum of syndromes, characterized by chronic hyperglycemia that is due to insulin deficiency, resistance or both. It is characterized by long term neurological complications like 1) Atherothrombotic and lacunar strokes 2) Convulsive disorder in the setting of both hypo and hyperglycemia 3) Coma 4) Cranial neuropathies 5) Acute proximal muscle weakness and the most famous complication of diabetic neuropathy. Of all the neurological

complications of diabetes, peripheral neuropathy is by far the commonest and has been extensively studied. The involvement of central nervous system can be due to more than one factor. The underlying damage may be due to involvement of the large and small blood vessels as also due to metabolic derangement caused by prolonged hypoglycemia, anoxia or ketoacidosis. The pathogenesis of diabetic neuropathy is multiple. In addition to the vascular lesions and segmental demyelination there are abnormalities of both axoplasmic transport and the mechanism generating the action current and perhaps also the



nodal membranes. Symptomatic disabling neuropathy affects nearly 50 % of diabetic patients. It is usually symmetrical, but could be focal, and often involve the autonomic nervous system as well. The prevalence of symmetrical neuropathy is similar in type1 and type2 diabetes mellitus where focal neuropathy is more common in older type 2 diabetic patients. Diabetic neuropathy is classified according to the area affected as follows: polyneuropathy, mononeuropathy, distal symmetrical isolated peripheral nerve lesion, chronic sensori-motor, cranial, acute sensory, radiculopathy, proximal motor, Autonomic neuropathy and distal sensorimotor neuropathy, this syndrome is characterized by axonal loss is the most common manifestation of diabetes mellitus, the process involves all somatic nerves, but has distinct predilection to distal sites. Diabetes can affect the nervous system in several ways.

Objective: To study the prevalence of neurological complications among adult Sudanese diabetic patients attending Elshab teaching hospital, during the period from February 2002 to October 2004.

PATIENTS AND METHOD

The study was a prospective hospital based cross sectional one. It was conducted at Elshab Teaching hospital. Elshaab Teaching Hospital is a tertiary hospital, receives patients from all the country (Sudan), which is located in the centre of Khartoum town. It is a big hospital with 215 beds. There are two neurological units with 50 beds and intensive care unit , two neurosurgical units with 50 beds, five chest units with 55 beds and 4 cardiac units with 60 beds. The study population includes Diabetic patients referred to the hospital during the period from Feb. 2003 to Feb. 2004. At first 115 diabetic patients were included in the study but 15 patients were dropped due to difficulty of follow up , patients with chronic diseases were excluded , the rest of the patients (100) were followed by the author until the end of the study. All the patients were Sudanese; those below 18 years of age were excluded. All gave their verbal consent to participate in the study. A full detailed history was taken from each patient and a proper systemic and neurological examination was performed by the author. The presenting symptoms include duration of diabetes mellitus, whether the patient is hypertensive or

not, history of polyuria, polydipsia, weight loss, skin itching, dizziness, impotence, diarrhea, muscle cramps, symptoms referable to cranial nerves involvement , upper and lower limbs weakness, headache, loss of consciousness, convulsion, blurring of vision, numbness, family history of diabetes, history of hyperlipidemia and history of smoking. Physical examination was grouped into: General, systemic including body mass index, measurement of the blood pressure sitting and standing, measurement of valsava ratio. Neurological examinations were further arranged into: higher mental function, cranial nerves, upper limbs, trunk, and lower limbs examination. Neuropathy was diagnosed when the patient complained of burning or loss of sensation, pain or tingling in addition to impaired or absent tendon reflexes, decreased sensitivity to light touch and pinprick, impaired vibration and position senses in addition to abnormalities detected by nerve conduction studies of the median, ulnar, lateral peroneal and sural nerves. Fundoscopy was performed by the author for all patients, those who presented evidence of retinopathy were reevaluated by an ophthalmist. EMG was done for those who showed an evidence of myopathy, CT brain for patients presented with hemiplegia or convulsion. The following investigations were done for each patient: Urine analysis for micro and macro albuminuria, R.B.S, plasma lipid, total blood count, L.F.Ts, blood urea and electrolytes. Data entry and the analysis: Data was introduced into the computer from a master sheet recording using software program. Data enter and analyzed using the student t test.

RESULTS

The study showed that 60% of the patients were male, and 40% were female. Those who have type 2 diabetes mellitus were 77 patients while 23 patients have type 1 diabetes mellitus. It was shown that 76% of the patients were resident in Khartoum, 12% in central, 5% in the north, 4% in the east, and 3% in the west. It appeared that patients of age group distribution 15-24 years constitute 9%, 25-34 years were 6%, 35-44 years equivalent to 10%, 45-54 years were 25%. 55-64 years were 21%, and more than 65 years were 29%. It was found that 21 patients had diabetes for 1-4 years and 13 patients for 5-10 years while 66 patients had diabetes for more than 10 years. Almost 71% of the patients had family history of

diabetes. Polyuria was observed in 79%, polydipsia in 78%, weight loss in 62%. Itching in 22%, diarrhea in 24% of our patients. Sweating disturbances were found in 24% of the patients, palpitations in 19%, numbness in 21%, impotence in 15%, dizziness in 5% and urinary symptoms were found in 5% of the patients. It was found that 62% of the patients were reported to have diabetic neuropathy, most of them had diabetes for more than 10 years (65%) and most of them were not on regular medication or regular follow up. Fifty percent of patients with diabetic neuropathy were reported to have symmetrical mainly sensory polyneuropathy (distal), while motor neuropathy was reported in 16% and autonomic neuropathy in 15% of the patients. The study showed that 10% of our diabetic patients had proximal myopathy. Diabetic amyotrophy was found in 9% of the patients. Diabetic retinopathy was described in 15% of our patients, 10% had simple background retinopathy, 4% had proliferative retinopathy, while 1% had maculopathy. It was found that 6% of the patients had cataract. Mononeuropathy was described in 12%. Ten percent of our patients showed an evidence of cranial nerve lesions, the most common cranial nerves affected were the third, the fourth and the sixth cranial nerves respectively. Other neurological complications detected include hemiplegia, paraplegia, and epilepsy, 13%, 4% and 2% respectively. Coexisting hypertension was found in 28% of our patients. It was noticed that 40% of our patients were on regular treatment, while 60% were found to be not on regular treatment, 63% on oral hypoglycemic medication, 23% on insulin and 4% on dietary control.

DISCUSSION

The study showed that male to female ratio was found to be 3 to 2, this is similar to what was written in the literature¹. According to the age distribution 75% of our patients were of age above 45 years and more than 66% of the patients had diabetes for more than 10 years. Because the study was conducted in Elshaab Teaching Hospital most of the patients were from Khartoum. Two thirds of the patients had family history of diabetes, although the exact aetiology of both types of diabetes is not known until now, this may be due to the fact that both environmental and genetic factors play an important role in the increased liability to develop the full-blown

picture of diabetes. 2-3-4 Polyuria, polydipsia and loss of weight were the most common symptoms among our diabetic patients; this was consistent with the literature.¹⁵⁻¹⁶ Diarrhea, palpitation, disturbance of sweating and impotence are symptoms associated with autonomic nervous system involvement.⁵⁻⁶ Diabetic diarrhea although troublesome, is not associated with evidence of malabsorption and can be self-limiting. Before we consider diarrhoea as a manifestation of autonomic nervous system involvement we should exclude the most common causes like giardiasis. Gastroparesis diabeticorum when symptomatic, is distressing, difficult to treat and may even impair the glycemic control when the delayed gastric emptying causes alterations of meal absorption.^{7A} A problem appears when gastroparesis diabeticorum is treated mistakenly as giardiasis or peptic ulcer. Erectile dysfunction is common among our diabetic patients and often the only symptoms of diabetic autonomic neuropathy. In our society it seems that erectile dysfunction is far more common than the reported figures, this is due to embarrassment of patients and reluctance of doctors to discuss sexual matters with them. Postural hypotension is a disabling symptoms and some time there is a need to differentiate it from hypoglycemic dizziness. The percentage of diabetic patients who have peripheral neuropathy is higher than what was mentioned in the literature most properly due to poor control of glycemic status and long standing diabetes.⁸⁻⁹⁻¹⁰ Symmetrical sensory polyneuropathy is the commonest type of peripheral neuropathy. The prevalence of symmetrical neuropathy is similar in type 1 and type 2 diabetes mellitus whereas focal neuropathy is more common in older type 2 diabetic patients. Diabetic autonomic neuropathy was detected in 15% of our diabetic patients while diabetic amyotrophy and proximal myopathy were detected in 10% and 9% respectively, both of them associated with long standing diabetes and poor control. Diabetes is one of the commonest causes of blindness, we found that simple background retinopathy is more common (10%) than proliferative diabetic retinopathy (4%) and maculopathy. Cataract is another eye complication, it was found in 6% of our patients. Premature cataract occurs in diabetic patients and seems to correlate with both duration of diabetes and the severity of hyperglycemia. Non enzymatic glycosylation of the lens protein is twice as high in diabetic patients as in age matched non diabetic

persons and may contribute to premature occurrence of cataracts. Diabetes accelerates the formation of senile cataract, and rarely snowflake cataract may develop rapidly during the period of very poor glycaemic control at any age. 11-12 Multiple cranial nerve involvement is one of the neurological complications associated with diabetes, the most common cranial nerves involved were the third, the fourth, and the sixth respectively, this is similar to what was mentioned in the literature. 13-14 Diabetes is a well known recognized cause of cerebrovascular accident, during our study 13 patients were admitted to Elshaab teaching hospital with hemiplegia, 10 had cerebral infarction and 3 had cerebral haemorrhage. Four patients were admitted with paraplegia due to potts disease, as we know there is a strong relation between tuberculosis and diabetes mellitus, and 2 patients had epilepsy. Most of our patients were not on regular treatment (60%), this explains the increased incidence of neurological complications. We think that good control of glycaemic status can play an important role in preventing neurological complications associated with diabetes mellitus. Also regular follow up of diabetic patients can detect early complications like simple background diabetic retinopathy so we can prevent further deterioration.

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