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Subclinical peripheral neuropathy in type 1 diabetic patients: A Case Control Study.

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Introduction

The most common kind of neuropathy, known medically as diabetic neuropathy (DN), is also one of the most devastating complications of diabetes over the long term. The symptoms are more severe in those with type 1 diabetes mellitus because to the rapid course of the illness in that form of diabetes; nonetheless, all kinds of diabetes are impacted. The term "subclinical neuropathy" refers to a condition in which a person has an electrophysiological impairment of nerve function but does not exhibit any clinical indications of peripheral nerve sickness.

Indore has a limited understanding of subclinical neuropathy associated with type 1 diabetes. Electrophysiological tests are the electrodiagnostic approaches for the assessment of DN that are used the most often, even in the time when there are no symptoms present. In addition to being sensitive, accurate, objective, repeatable, and closely associated with the underlying changes in nerve structure, they also possess the qualities of being correct. They were also used to identify the location of a pathophysiological lesion and to characterise its sort and degree when such a lesion was not obvious on a clinical exam. This was done with the use of magnetic resonance imaging (MRI) and computed tomography (CT).

The objective of this study was to investigate the association between demographic and clinical risk factors and neurophysiological parameters, as well as to evaluate the peripheral nervous system utilising nerve conduction studies (NCS) in individuals with type 1 diabetes who did not exhibit any clinical symptoms or indicators of diabetic neuropathy (DN).

Methodology

For the purpose of this analysis, a case-control study style was used. These people were selected from the patient population at the Index Medical College in Indore to participate in the study. The regional ethics board gave its approval for the study to be conducted. Every patient or guardian who participated in this research provided their written consent for the investigation.One hundred people with type 1 diabetes who had no other known risk factors for polyneuropathy were selected for the study. They ranged in age from 20 to 40 years old at the time. Group A included fifty patients who had been diagnosed with type 1 diabetes for a duration of less than three years, while group B included fifty patients who had been diagnosed with type 1 diabetes for a duration of more than three years.In this particular research, the healthy comparison group consisted of fifty participants of the same age who were of both sexes. They did not exhibit any signs or symptoms that would indicate a problem with their central nervous system, metabolic system, or any other system in their bodies.

Before getting started, we made sure that all of the participants understood the nature of the study and our objectives by providing them with background information.

Every patient had a comprehensive neurological and general examination, which included an in-depth collecting of medical history. Individuals who had obvious reasons of their neuropathy, such as a history of drinking or diabetes that was not under control, were excluded from the investigation. Thyroid disease, cancer, chronic kidney and liver disease, toxic exposure, and the use of medicines and chemicals that are neurotoxic may all lead to sickness.A number of laboratory examinations, including haemoglobin glycosylation (HbA1c), fasting and 2-h postprandial blood glucose, liver function, renal function, lipid profile, erythrocyte sedimentation rate, and thyroid profile, were carried out.In the laboratory, the levels of haemoglobin A1c were determined by the use of the fast ion exchange resin separation method. The American Diabetes Association's cutoffs for HbA1c were used in this line of research. According to the American Diabetes Association, readings below 6% indicate well-controlled diabetes, readings between 6-8% indicate mild control, and readings above 9% indicate poor control. These cutoffs were applied to the HbA1c results.All of the individuals had NCS at the neurology outpatient clinic, where the Micromed equipment was used on the median, ulnar, peroneal, tibial, and sural nerves. Experiments on motor conduction were carried out via surface disc electrodes, with the active electrode being placed on the muscle and the nerves that accompanied the muscle being stimulated at supramaximal levels. We made use of a sensory-based NCS.We examined patients and controls based on these criteria and compared them. It was determined to be abnormal when a patient's

conduction velocity, latency, or amplitude to deviate considerably from the mean and two standard deviations of normal individuals when compared to those of other patients. Electrophysiological criteria determine whether or not DN is present: if two or more nerves exhibit at least one aberrant parameter compared to age-matched controls, the diagnosis is made. In order to find any links, the patient's age, the length of their disease, their HbA1c, and their lipid profile were analysed alongside the electrophysiological data.

Results

Ninety participants, 60 patients and 30 controls, were included in this study. All patients were clinically asymptomatic for peripheral neuropathy.

The data were collected, summarized, and statistically analyzed, and the results were presented in tables, graphs, and figures as follows.

The clinical characteristics and laboratory results of patients and controls are shown in [Table 1]. The patients were classified according to the duration of disease into two groups (A and B). There were significant differences with regard to HbA1c, total cholesterol, and triglycerides. There was no statistically significant difference as regards age of onset of diabetes. As regards NCS ([Table 2] and [Table 3]), there were statistically significant differences between controls and patients, especially in group B. The frequency of subclinical neuropathy in diabetic patients with duration greater than 5 years and in patients with duration of 5 years or less was 76.6 and 46.6%, respectively. This difference was statistically significant (P=0.03). Thirty-seven patients (61.7%) had subclinical

neuropathy in which the lower limb was more affected and the most frequently affected nerve was the sural nerve

Conclusion

The findings of this investigation revealed that diabetic individuals have an extremely high incidence of neuropathy that is not yet clinically apparent. Patients who had poor metabolic control and a disease duration of more than three years had the most pronounced symptoms of this condition. This high frequency demonstrates how important NCS is for the early diagnosis of neuropathy in T1D patients. Controlling HbA1c levels in a meticulous manner is a prerequisite for both the prevention and treatment of diabetic peripheral neuropathy.

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