Research Article

Study of neurological complications in relation to diabetes mellitus control and duration

Jaydev Mod, Karthik Natarajan, Ronak Modi, Mansur Ali, Hiren Parmar

Department of Medicine, Smt NHL Municipal Medical College, Ahmedabad, Gujarat, India.
Correspondence to: Hiren Parmar, E-mail: drhirenparmar@gmail.com

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Abstract

Background: Diabetes mellitus (DM) is a leading cause of morbidity and mortality in all age groups in both developed and developing countries. It is associated with significant morbidity and reduces life complications. Among all complications, neurological complications are the chief destroyer and affect patients in the years of their greatest economical and social productivity.

Objectives: To evaluate all neurological complications of DM, to correlate the duration of DM with this neurological complication, and prevalence of the complications on the basis of control of DM.

Materials and Methods: This study was conducted in a tertiary-care hospital. Fifty patients with DM were studied. Their detailed history, physical examination, and laboratory investigations were noted.

Result: In this study, total 50 patients [31 males (62%) and 19 females (38%)] were studied. In this study, 64% patients with neurological complication had DM for more than 10 years. Patients with DM having HbA1c value of >7.1 indicate poor control of DM.

Conclusion: Chronic neurological complications are observed more commonly in patients with type 2 DM as compared to those with type 1 DM. Neurological complications are more common with uncontrolled DM, which reflects poor glycemic control that in turn has an impact on neurological complications of DM.

KEY WORDS: Diabetes mellitus, diabetic neuropathy, HbA1C

Introduction

Diabetes mellitus (DM) is a leading cause of morbidity and mortality in all age groups in both developed and developing countries.[1] It is associated with significant morbidity and reduces life complications.[2] Among all complications, neurological complications are the chief destroyer and affect patients in the years of their greatest economical and social productivity. In our country because of poor understanding of complications and other social and economic factors, neurological complication has become one of the most feared complications.

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The aims and objectives of this study were the following:

- Evaluation of all neurological complications of DM.
- Correlation of the duration of DM with this neurological complication.
- Prevalence of the complication on the basis of DM control.

Materials and Methods

This study was conducted in a tertiary-care hospital. Fifty patients with DM were studied and their detailed history and physical examination were noted. Laboratory tests such as FBS, PPBS, glycosylated Hb,[3] RFT, and urine for albumin were performed. Other tests such as ECG, chest X-ray, and 2D echo were performed. Specific tests such as EMG,[4] NCV,[5] CT scan of brain, and MRI brain with angiography were performed as required. All the results of these investigations were recorded in the pro forma. All the patients were studied for the presence or absence of neurological complications such as cerebrovascular disease, peripheral neuropathy, cranial neuropathies, entrapment neuropathy, and myopathy.

Table 1: Duration of DM

Duration (year)	No. of patients with neurological complication	Percentage
1–5	4	8
6–10	14	28
11–15	16	32
>5	16	32

DM, diabetes mellitus.

Table 2: Diabetes mellitus control

Glycosylated Hb	No. of patients with neurological complication
<7	6
7.1–8	11
8.1–9	17
> 9	16
Total	50

Result

In this study, total 50 patients [31 males (62%) and 19 females (38%)] were studied. Of these, 7 patients had type 1 DM (14%) and 43 had type 2 DM (86%). The study indicates that chronic neurological complications are more common in patients with type 2 DM than those with type 1 DM. However, as study sample is very small, study conducted with a larger sample can throw more light on the type of DM and neurological complication.

Thus, Table 1 shows that neurological complication increases with the duration of DM. In the study, 64% patients with neurological complications had DM for more than 10 years. Thus, neurological complications are directly related to duration of DM.

As shown in Table 2, patients with DM having hemoglobin A1c (HbA1c) value of >7.1 indicate poor control of DM. Such patients developed more neurological complications. However, other associated factors such as hypertension, dyslipidemia, alcohol consumption, and smoking also contribute significantly in development of neurological complications. A study with larger sample can throw more light on the association of DM control and neurological complication.

Discussion

It has been proposed by various workers that DM control and duration may provide a good clue to the development of neurological complications.[6] In our study, we tried to establish a relationship between control and duration of DM with neurological complications. The San Luis Valley study[7] on DM shows that as the duration of DM increases, the incidence of neurological complications also increases. Similar findings were also seen in this study [Table 3]. The possible mechanism suggested for neurological complication in DM[8] is as follows:

Table 3: Comparison of this study with the San Luis Valley study

Duration of DM (year)	San Luis Valley study (%)	This study (%)
1–5	16.8	8
6–10	17.7	28
11–15	33.3	32
>15	51.9	32

DM, diabetes mellitus.

- Hyperglycemia
- Local nerve ischemia
- Neuropathic factor deficiency
- Some immune mechanism

Our study showed similar results with 12% patients had HbA1c value of <7; 88% patients had uncontrolled DM in form of HbA1c value of >7 and frequently presented with neurological complications. Thus, poor glycemic control has major impact on neurological complications of DM.[9]

Conclusion

Chronic neurological complications are observed more commonly in patients with type 2 DM as compared to type 1 DM.[10] As the duration of DM increases, the incidence of neurological complications also increase.[11] Neurological complications are more common with uncontrolled DM, which reflects poor glycemic control that in turn has an impact on neurological complications of DM.[12]

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