

## RESEARCH ARTICLE

**Comparison of visual evoked potential changes with the duration of Type 2 diabetes mellitus**

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Received: November 11, 2017; Accepted: February 23, 2018

**ABSTRACT**

**Background:** Many studies proved that the visual evoked potential (VEP) nerve conduction studies in the diabetes mellitus (DM) patients helped to detect the early changes in nerve conduction. But with relation to the duration of the disease and the VEP nerve conduction studies in the DM patients were understudied. **Aims and Objectives:** To compare the VEP changes with the duration of the disease. **Materials and Methods:** For this study, Type 2 DM ( $n = 135$ ) and physical characteristics with different disease duration were recruited. VEP was conducted for each patient using recorder and medicare system polyrite. **Result:** The VEP latency P100 was higher in Group-II ( $111.6 \pm 7.5$ ) than the other groups ( $109.90 \pm 9.3$ ;  $111.7 \pm 6.3$ ). **Conclusion:** Keeping tight control on glycemic level and detecting the early nerve conduction changes using VEP will be useful. Avoiding sedentary life and proper diet would help the diabetes patients to have a better lifestyle.


**KEY WORDS:** Visual Evoked Potential; Type 2 Diabetes Mellitus; Nerve Conduction Study**INTRODUCTION**

The Type 2 diabetes is a complex disease, and it affects all the organs in the body. It causes progressive deterioration of  $\beta$ -cell function and also insulin resistance.<sup>[1]</sup> The variables such as the sex, age at the onset of disease, duration of the disease, age of patients influence blood glucose level directly, and HbA<sub>1c</sub> indirectly.<sup>[2]</sup> Degenerative changes are accelerated by poor glycemic control and age-related pathology with duration of disease.<sup>[3,4]</sup> Patients with diabetes mellitus are suffering with subclinical both sensory and motor neuronal loss due to consequences of hyperglycemic status. Sensory neuronal loss is apparently seen in chronic uncontrolled glycemic status. A correlation between peripheral and central

neuropathy related to their duration have been observed in many reports.<sup>[5]</sup>

**MATERIALS AND METHODS**

This study was conducted in the Department of Physiology, Sree Balaji Medical College and Hospital. For this study, we recruited the patients who attended the outpatient of the Diabetology clinic, Sree Balaji Medical College and Hospital. A total number of 135 diabetic patients of age  $44.6 \pm 6.7$  years were recruited. The procedure to be performed was explained in detail in the local language to each subject. Informed consent was obtained from all the subjects who participated in this study. This study was approved by the Institutional Ethical Committee. Detailed history was taken from the patients. Patients with cataract, glaucoma, vitreous opacities, optic atrophy, and hypertension were excluded from this study. The subjects were divided into three groups based on the duration of the disease. The patients were divided into three groups. The groups are patients belonging to <5 years duration (Group-I), 5–10 years duration (Group-II), and 10–15 years duration

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DOI: 10.5455/njppp.2018.8.1143323022018	

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(Group-III). For all the subjects, visual evoked potential (VEP) was done using recorder and medicare system polyrite. The data were analyzed and expressed in mean  $\pm$  standard deviation. Student *t*-test was used for statistical analysis.

## RESULT

The findings of the results are recorded in Tables 1 and 2 and Figure 1.

## DISCUSSION

In this study, it was found that subjects of Group-II (5–10 years) had prolonged the VEP latency P100 then the other two study groups (Groups-I and III). In Group-III

**Table 1: Physical characteristic feature in study population**

Parameters	Patients (n=135)
Age (years)	44.6 $\pm$ 6.7
Height (mts)	1.54
Weight (kg)	65.4 $\pm$ 11.4

Values are expressed as a mean  $\pm$  standard deviation

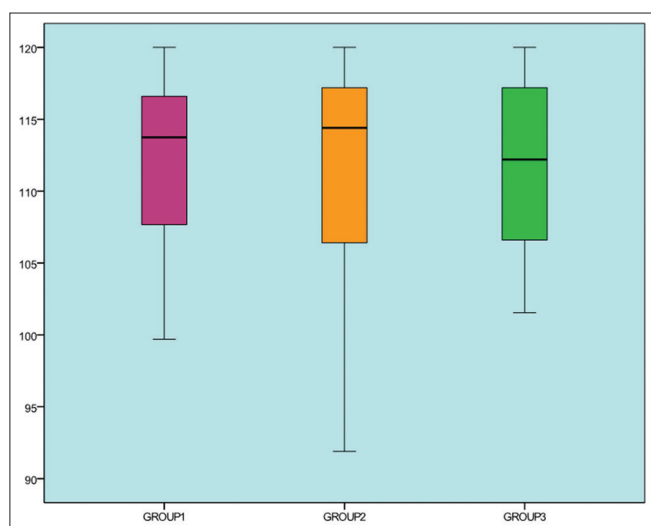
**Table 2: Comparison of VEP and duration of disease in diabetic patients**

Duration of DM	VEP
	P100 Rt and Lt avg.
Group-I	109.9 $\pm$ 9.3
Group-II	111.6 $\pm$ 7.5
Group-III	111.7 $\pm$ 6.3

Values are expressed as a mean  $\pm$  standard deviation.

Group-I: 0–5 years; Group-II: 5–10 years; Group-III: 10–15 years.

DM: Diabetes mellitus, VEP: Visual evoked potential



**Figure 1:** Comparison between the duration of the disease and the visual evoked potential

(10–15 years) it was observed that there was no significant delay in latency P100 of VEP.

The similar findings were found in a study done by Szabela *et al.*<sup>[6]</sup> In contrary with the above findings, Dolu *et al.* and Martinelli *et al.*<sup>[7]</sup> observed delay in the latency with increased duration of diabetes for which the latter pointed out the cause to be decreased velocity of the nerve conduction in the optic nerve.

According to Parisi *et al.*, as the duration of diabetes increased in diabetic patients the retinal macular and visual pathway is impaired differently with no impairment in retina.<sup>[8]</sup> Ghirlanda *et al.* stated that the impairment in these diabetics starts in the nerve conduction of the optic nerve and there is selective neurosensory deficit in the retinal layers (inner). However, the photoreceptors are unaffected with shorter duration of disease.<sup>[9]</sup> Chandrasekhar *et al.* have concluded that with an increased year of exposure of diabetes the subject's mean amplitude decreases and the mean P100 latency increases.<sup>[10]</sup>

## Limitations

1. The study was conducted on less number of subjects.
2. HbA1C was not done.

## CONCLUSION

By means of VEP nerve conduction study, we can detect the early changes in the optic pathway, which will be very useful in avoiding the pathological changes to occur. Patients should also be educated about the adverse effect of hyperglycemia. Awareness about sedentary lifestyle and food habits should be given to diabetes patients.

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**How to cite this article:** Sudha D, Chandraselvi E, Saikumar P. Comparison of visual evoked potential changes with the duration of Type 2 diabetes mellitus. *Natl J Physiol Pharm Pharmacol* 2018;8:917-919.

**Source of Support:** Nil, **Conflict of Interest:** None declared.