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**EVALUATION OF SUBCLINICAL VESTIBULAR DYSFUNCTION IN
TYPE II DIABETES MELLITUS-CORRELATING WITH HbA1C****PRAKASH.M AND SUMATHI.K.****Department of Biochemistry, Sree Balaji Medical College and Hospital, Chennai,
TamilNadu. (Bharath University)***ABSTRACT**

The vestibular system, both central and peripheral, is likely to be affected by micro angiopathy due to diabetes mellitus. Subclinical vestibular dysfunction is defined as those patients who do not have symptoms but evidence of the same in relevant investigations. The aim of the study is to find the proportion of subclinical vestibular dysfunction in type II diabetes and to correlate with glycated Hb values. A case control study of 100 patients with and 100 without diabetes mellitus, but both without any symptoms of vestibular dysfunction were subjected to electronystagmography. Clausen butterfly chart is generated based on the bithermal caloric stimulation and the code is ascertained. HbA1c was estimated for these patients by Ion-Exchange Chromatography. Among the total of 100 patients with diabetes 42% had vestibular dysfunction, 58% were normal. Among the controls 12% had vestibular dysfunction, 88% were normal. It is also found that 30% of diabetic patients with vestibular dysfunction had more than four years duration of diabetes. Also HbA1c value is raised in 78% of diabetics. It is evident that the proportion of vestibular pathology is higher among diabetes mellitus. This needs to attend too strictly because vestibular dysfunction combined with hyper or hypoglycemia, poor sight (old age & DM), infirmity (due to old age) and osteoporosis leads to a higher incidence of "fall" which has significant morbidity and mortality especially among elderly.

KEY WORDS: Diabetes, Vestibular dysfunction, Electronystagmography, HbA1c.**SUMATHI.K**Department of Biochemistry, Sree Balaji Medical College and Hospital,
Chennai, TamilNadu. (Bharath University)**Corresponding author*

INTRODUCTION

While cardiac, retinal, renal and other complications of DM receive much attention, certain others do not. One such complication is disturbances in the balance due to vestibular dysfunction. This of paramount importance because the disturbances in the balance in the form of vestibular dysfunction^{1,2,3} are coupled with old age, infirmity and frequent attacks of giddiness due to high or low blood sugar. The incidence of fall in these elderly is increased significantly due to these coexisting morbidities⁴. A fall in the elderly diabetic is of much importance as they tend to sustain fractures with poor healing ability and prolonged bed rest with immobilization or may even require surgical intervention. This significantly increases the morbidity and mortality among them. This study was designed to study the significance of HbA1C as a predictive marker for the presence of vestibular dysfunction in type II diabetes mellitus. The vestibular system has been evaluated by Electro Nystagmography & HbA1C estimated by Ion Exchange Chromatography. Their significance with each other and in relation to the clinical history of the patient was studied.

MATERIALS AND METHODS

This case control study was done in a tertiary care center including 100 patients with and 100 without diabetes mellitus with age group less than 40 years, without any symptoms of vestibular dysfunction. All were subjected to

electronystagmography and HbA1c was estimated.. Patients with history of any ear symptom, history of otological surgeries, family history of deafness or vertigo, history of exposure to noisy environment for longer duration, ototoxic (vestibulotoxic) drug usage, history of taking treatment for tuberculosis in the past or now, previous history of cerebrovascular accident/ head injuries, Hb < 10gm/dl, history of recent alcohol intake were excluded from this study. For electronystagmography Clausen butterfly chart is generated based on the bithermal caloric stimulation and the code is ascertained. Whole blood sample for HbA_{1c} were collected by venepuncture, taken care to avoid hemolysis, under aseptic precautions. Ion Exchange Chromatography method was used to estimate HbA1c. This study compared the correlation of vestibular dysfunction with the HbA_{1c} values. Statistical analysis was done with SSPS 15 software. Statistical tests used were "Descriptive, Chi-Square test, & Students 't' test".

RESULTS

Among the total of 100 patients with diabetes 42% had vestibular dysfunction, 58% were normal. Among the controls 12% have vestibular dysfunction, 88% were normal. It is also found that 30% of diabetic patients with vestibular dysfunction had more than four years duration of diabetes. Also HbA1c value is raised in 78% of diabetics.

Table 1

Sample	No. of Patients with diabetes mellitus	No. of Patients without diabetes mellitus
Male	31	48
Female	69	52

Table 2

Vestibular complication in diabetics of the subjects involved

Sex	Presence of Vestibulopathy	Absence of Vestibulopathy
Female	33	36
Male	9	22

Table 3

Age	Presence of Vestibulopathy	Absence of Vestibulopathy	Chi-Square test	p-Value
>35 years	33	32	} 5.86	0.01
<35 years	9	26		

ODDS RATIO ---- 2.98

There is significant result of having vestibulopathy in diabetics of age group >35 years as shown in table-3.

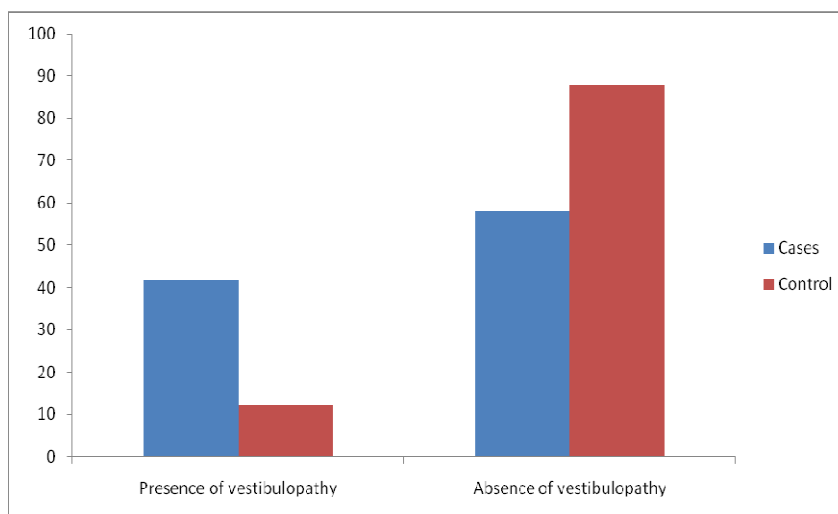
Table-4

Duration of Diabetes	Presence of Vestibulopathy	Absence of Vestibulopathy	Chi-Square test	p-Value
>4 years	20	10	} 10.7	0.001
<4 years	22	48		

ODDS RATIO ---- 4.26

p-value is significant with diabetic vestibulopathy having longer duration

**Bar Diagram comparing presence of vestibulopathy in controls & cases.
42% of diabetics had vestibulopathy which is significant.**



DISCUSSION

This case control study was done to predict subclinical vestibulopathy at the earlier stage of diabetes so as to take necessary actions to prevent the occurrence of vestibulopathy by having a good glycemic control. The similar study was done in 40years & above to diagnose prevalence of vestibulopathy in diabetes mellitus by Klagenberg et al & Gawron et al^{1,2}. Klagenberg et al & Karlin Fabianne klagenberg et al, in their study reported 60% prevalence of vestibular disease in diabetes in contrast to 42% of diabetics having vestibular disease in our study^{1,5}. In our study, diabetic population of

age group greater than 35 years, 51% had vestibulopathy which is significant whereas in diabetics of age group less than 35 it was only 26% similar to the study done by. Li J, et al³. There is no significant sexual difference in occurrence of vestibulopathy in diabetes in this study. It was also found that those patients with longer duration of diabetes had increased percentage of pathology than the lesser duration. In this study, 67% of diabetics of greater than 4 years duration had vestibulopathy which is significant whereas it was 31% in case of diabetics with less than 4 years duration. Similar finding was produced by Agarwal et al in his study⁴. The pathophysiology

of vestibulopathy in diabetics is well documented by many studies^[1,2,3]. The causative effect could be due to microangiopathy of the vessels of the inner ear^(6,7,8), distorsion of macular hair cells & neuropathy of the vestibular nerve⁹. This study evidenced the positive correlation between vestibular dysfunction leading to imbalance in diabetic population compared with the non-diabetics as shown by Lasisi et al in his study¹⁰. This is similar to the study done by Agarwal et. Al⁴. The cause may be due to the effects of complex glycation end products in the inner ear. So the degree of control of hyperglycemia is essential to prevent the occurrence of vestibulopathy at the earlier stage.

CONCLUSION

This study correlates the significance of HbA_{1c} in vestibular disorder in diabetes mellitus. It is evident that the proportion of vestibular pathology is higher among DM. It is concluded that 42% of diabetics screened had vestibular dysfunction diagnosed by electronystagmography which is significant. So screening is needed for diabetic patients to find out subclinical vestibular dysfunction so as to prevent the occurrence of vestibulopathy & in future to study the relationship between vestibular disorder and diabetes.

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