

Significance of hs-CRP in vestibular dysfunction in type II diabetes mellitus

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Abstract

Background: The most common morbid complication of Type-2 diabetes mellitus is vestibulopathy. Microangiopathy & Oxidative stress due to diabetes mellitus is one of the causative factor of this vestibular dysfunction.

Aim and Objectives: The aim of the study is to find the significance of hs-CRP in vestibular dysfunction in type 2 diabetes mellitus.

Materials and Methods: A cross-sectional study of 100 diabetic patients were tested for vestibular function by electronystagmography. Clausen butterfly chart is generated based on the bithermal caloric stimulation and the code is ascertained & Serum hsCRP was estimated for these patients by immunoturbidometry. Data analysis done using SPSS package.

Results: 65% of diabetic population with hsCRP>3mg/L had vestibular dysfunction which is significant. It is also found that 70% of diabetic patients with greater than 4 years duration had vestibular dysfunction

Conclusion: From this study it is concluded that the proportion of diabetic vestibulopathy is higher in those having hsCRP of >3mg/L. So it is advisable to do screening for all diabetics by estimating hsCRP & vestibular dysfunction particularly those having hsCRP >3mg/L so as to prevent the morbid complication diabetic vestibulopathy.

Keywords: Diabetic Vestibulopathy, Electronystagmography, hsCRP, Clausen butterfly chart.

Introduction

Generally the patients are taking care of renal, retinal & cardiac complication of diabetes which increases the mortality rate in the population. But they should be aware of some of the morbid complication of diabetes particularly affecting inner ear. One of the commonest complication of diabetes mellitus is vestibulopathy affecting the inner ear^{1,2,3}. This will lead to disturbances in the body balance affecting the day-to-day activities in the diabetic population. Due to this imbalance the diabetics usually suffer from frequent attacks of giddiness leading to fall causing fractures leading to immobilization⁴. Sometimes the patients may need surgery to correct the fractures. This study was done to tell about the significance of hsCRP used as a predictive marker for the presence of diabetic vestibulopathy. Electro Nystagmography is used to estimate the vestibular function & Immunoturbidometry is the method used to estimate hsCRP. This study correlates the significance of hsCRP in vestibular dysfunction in relation to the clinical history of the patients.

Material and Methods

This cross sectional study was done after institutional ethical clearance in the out-patient department of Sree Balaji Medical College and Hospital. Eligible participants were given a questionnaire for diabetic history with other causes to rule out preexisting vestibular dysfunction. 100 eligible patients were taken up for the study after obtaining an informed written consent. This cross sectional study was done in 100 diabetic patients without any

symptoms of vestibular dysfunction of age group less than 40 years in a tertiary care center. Vestibular function was estimated for all the diabetic patients by electronystagmography and hsCRP was estimated. Patients with history of exposure to noisy environment, history of any ear symptom, family history of deafness or vertigo, history of otological surgeries, ototoxic (vestibulotoxic) drug usage, history of taking treatment for tuberculosis, Hb < 10gm/dl, previous history of head injuries, history of recent alcohol intake were excluded from this study.

Using bithermal caloric stimulation, Clausen butterfly chart is produced thereby ascertaining the code. Serum samples for hsCRP were collected by venepuncture, taken care to avoid hemolysis, under aseptic precautions. Immunoturbidometry was the method used to estimate hsCRP. Correlation of vestibular dysfunction with the hsCRP was done in this study.

Result

Statistical Analysis: The information's on 100 diabetic patients were analyzed using SPSS 15.0 and the results are presented in frequency, percentage, Mean, Standard Error of mean, Range along with the inferential statistics of ChiSquare, Odds ratio & 95% confidence interval. With Type I error 5% and Type II error 20%, the level of significance was 5%. The values within parantheses represent percentage.

In the present study there were sixty nine females and thirty one male patients with an age ranging from 25 years to 40 years. Where only twelve had the family history of diabetes and majority 65 were between 36 yrs

to 40 yrs with 70 of them having a duration of diabetes of less than 4years.

Table 1: Hypothetical Parameters with Outcome of the study

Parameter	Vestibulopathy		χ^2 - value (P- value)	Odds Ratio (95% CI)
	Present	Absent		
Age				
36–40 years	33	32	5.86*	2.97*
25–35 years	9	26	(0.01)	(1.21 to 7.33)
Duration of Diabetes				
4 years	20	10	10.7*	4.36*
<4 years	22	48	(0.001)	(1.75 to 10.86)
hsCRP				
3mg/L	35	19	25.08*	10.2*
< 3 mg/L	7	39	(0.000)	(3.85 to 7.33)

*Significant

Presence of Central Pathology was observed among 42 with a overall hsCRP mean±SE as 3.2±0.15. Out of 69 females, 37(53.6%) of them and among 31 males, 17(54.8%) had hsCRP greater than 3mg/L. Where Age and sex showed insignificant association with this parameter.

We observed the presence of vestibulopathy among 42 patients and 33(78.6%) females as well with the family history of diabetes did not show any significant association with the outcome of the study.

The patients above 35 years had 2.97 times (65%) the risk of developing vestibulopathy compared to the younger age group [$\chi^2 = 5.86, P=0.01$] as shown in the Fig. 1 below. The duration of diabetes above 4 years significantly increases the risk to 4 times (70%) as that of patients with lesser duration [$\chi^2 = 10.7, P=0.001$] as shown in Fig. 2. The patients with hsCRP greater than 3mg/L had 10.2 times risk of developing vestibulopathy compared to patients with hsCRP lesser than 3mg/L [$\chi^2 = 25.08, P=0.000$] as shown in Fig. 3.

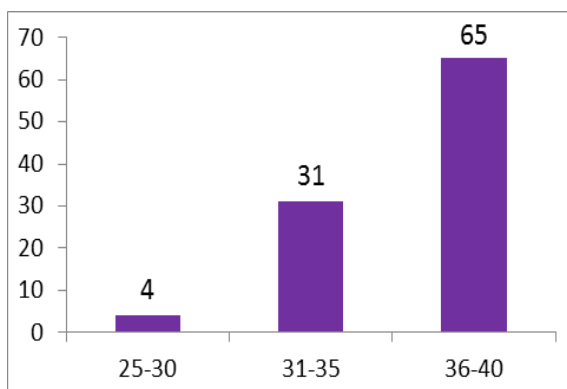


Fig. 1: Age distribution (%)

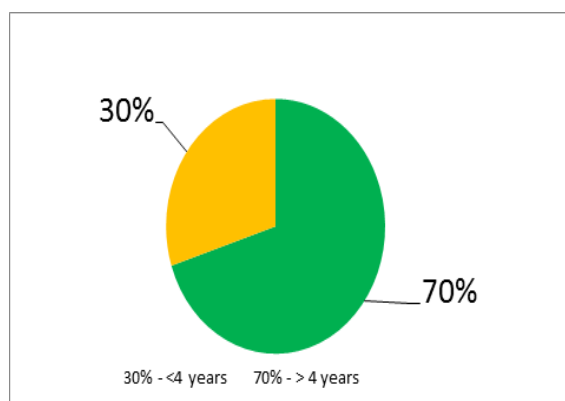


Fig. 2: Duration of diabetes (Yrs)

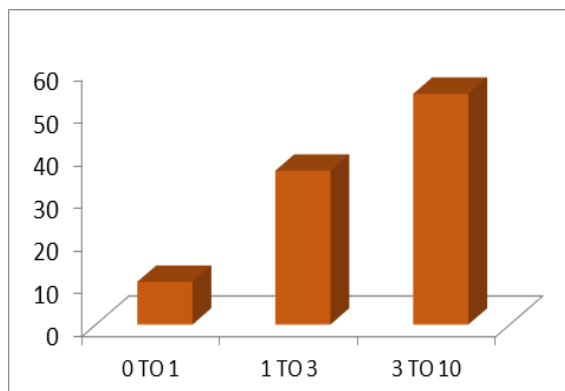


Fig. 3: HSCRP (%)

Discussion

This was a cross sectional study done to evaluate the vestibulopathy in 100 diabetic patients of age group between 25 years and 40 years attending diabetic outpatient department of Sree Balaji Medical College & Hospital, Chennai.

Gawron et al & Klagenberg et al^{1,2} did the same study in the age group of 40 years & above stating the common occurrence of vestibular dysfunction in diabetes mellitus. In this study, those diabetic patients with age greater than 35 years had 2.97 times risk to develop morbid complication of vestibulopathy

compared to young diabetics of age less than 35 years. This study was similar to the study done by Li J, et al³.

It was 60% prevalence of vestibulopathy in diabetics in a study done by Karlin Fabianne whereas it was only 42% in our study^{1,5}.

From this study it was found that had 70% of vestibulopathy were under greater than 4 years duration of diabetics. Henceforth increased percentage of vestibular dysfunction was recorded with increased duration of diabetes. There was 4 times increased risk of developing vestibulopathy with increasing duration of diabetes. Agarwal et al in his study proved the same finding study⁴.

The cause of vestibulopathy in diabetics could be due to microangiopathy, neuropathy & oxidative stress^{6,7,8,9}. Diabetes mellitus being an inflammatory disease promote the generation of reactive oxygen species. C reactive protein being an acute phase reactant and so this study correlates the levels of hsCRP with oxidative stress in diabetic vestibulopathy.^{10,11} In this study there was 10.2 times risk in diabetic patients having hsCRP > 3mg/L to develop vestibulopathy.

This study also proved the increased prevalence of vestibulopathy in diabetic population as shown by Agarwal et. al & Lasisi et al^{4,12}. This study also suggest the estimation of hsCRP levels as essential tool to identify the risk of development of vestibulopathy in diabetics.

Conclusion

From this study it is concluded that the incidence of vestibulopathy is higher in those diabetic with hsCRP of >3mg/L. So screening of the patients with diabetics particularly those not under glycemic control & with longer duration of diabetes by evaluating vestibular function & estimating hsCRP. It is also advisable for the diabetics to have their glycemic status under good control thereby preventing the occurrence of this morbid complication.

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