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Study of epidemilogy of hearing disturbances in patients of diabetes mellitus in a tertiary care Institute of Eastern India

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Abstract

Objectives: .Study of epidemiology of hearing disturbances in type 2 diabetic patients**.**

Methods: Observational Cross sectional study consists of 2 groups. 1st group was with diabetes mellitus .2nd Group was as control with out diabetes mellitus**.**

Results: Mean age among cases were 60.163 ± 10.5668 yrs and mean age among controls were 60.326 ± 9.7168 yrs.). There were 42 male(52.5%) and 38 female(47.5%) among cases and 23 male(53.5%) and 20 female(46.5%) among control. There were 46 patients among cases who have had SNHL(57.5%), and 12 patients among controls(27.9%). P value = 0.002. SNHL were present in 43% of DR patients(81.14%). In comparison there were only 3 patients(11%) who have had SNHL(1.0) out of 27 patients without DR. P value <0.001 and ods ratio = 34.400, 95% confidence is 8.624 to 137.214. Out of 62 diabetic patients who have had diabetic nephropathy(DN), 46 patients had SNHL(74.19%). Out of 18 diabetic patients who had not DN none develop SNHL. P value<0.001.

Conclusion: diabetes mellitus may be considered as risk factor for SNHL.

Keyword: DM-Diabetes Mellitus,Snhl-Sensory Neural Hearing Loss,DN-Diabetec Nephropathy,DR-Diabetic Retinopathy

Introduction

Diabetes mellitus is a metabolic disorder of multiple etiologies, characterized by chronic hyperglycemia together with disturbances of carbohydrate, fat and protein metabolism resulting from defects of insulin secretion, insulin action or both(1) & produces some metabolic emergencies and some chronic complications. The relative contribution of these varies between different types of diabetes. The characteristic clinical presentation is with thirst, polyuria, blurring of vision and weight loss. Often, symptoms are mild or absent and mild hyperglycemia can persist for years with tissue damage developing, although the person may be totally asymptomatic.

Hearing empowers us and enriches our lives. Hearing enables us to socialise, work, interact, communicate and even relax. It helps us to lead our everyday lives without limitations.

Problems with our hearing may lead to feelings of isolation and even depression.

The effect of diabetes mellitus on hearing is known since 1857, when Jordao 5 first showedhearing loss in a patient with incipient diabetic coma. The relationship between diabetes mellitus and hearing function has been studied for a long time,and recently concern is raised about hearing impairment in diabetic patients. Some studies shows a positive correlation between diabetes mellitus and some failed to show any correlation. Still there is currently no adequate consensus on this topic.

Objectives

1.To study the prevalence and types of hearing disturbances in type 2 diabetic patients

Materials and Methods

Study Setting-Dept Of General Medicine IPGME & R, Kolkata from 2013-14

Sample Size: 80 type2 diabetic patients including male and female; 40 non-diabetic

patients including male and female.

Definition Of Population: The study population comprised of patients who will be admitted in the medicine department of IPGME&R,KOLKATA, from the Emergency and Medicine OPD and patients who will attend Medicine OPD.

Time Period: One and half year(February2013 to August 2014.)

Sample Design: Having informed consent for participation from the patient and/or

patient party. The patient will be included in the study according to following criteria-

Inclusion Criteria: Patients with type 2 DM.

Exclusion Criteria

-H/O consumption of ototoxic drugs in past 3 months.

-H/O Chronic secretory otitis media.

-H/O ear surgeries in past.

-H/O hearing disturbances before the diagnosis of DM

-Patients having a noise induced hearing loss

-H/O severe head injury

-Family history of deafness,

-H/O head or neck radiotherapy.

Control Group: Age and sex matched non-diabetic population who does not have any of the exclusion criteria.

Study Design: Observational Cross sectional study.

Method of Data Collection

By oral questionnaire regarding relevant history,bedside clinical examination and general ear examination by simple instrument[e.g,128 Hz tuning fork] ,sending routine blood investigation, blood for HbA1C , urine for ACR, Pure Tone Audiometry and Tympanometry in few cases and putting them in proforma for case record. Pure-tone thresholds are low (500, 1,000, and 2,000 Hz) , mid (3,000, 4,000), and high(6,000, and 8,000 Hz) frequencies.

Parameters and Procedures

1. HISTORY TAKING.
2. GENERAL SURVEY.
3. SYSTEMIC EXAMINATION.
4. ENT EXAMINATION.
5. INVESTIGATIONS-Routine blood investigations, HbA1C, urine for ACR, pure one audiometry, Tympanometry.

Statistical Analysis Plan: Data will be analysed with appropriate statistical tests and methods to determine the significance and power of study.

Result & Analysis

In this study, a total of 80 patients with diabetes mellitus and 43 patients without diabetes mellitus were selected in the age group of 42-89 yrs for diabetic patients(cases) & of 43-84 yrs for non-diabetic patients(controls) according to inclusion & exclusion criteria. They were designated as group 1 and group 2 respectively. All the patients were subjected to detailed history taking, clinical examination

and different investigations with special emphasis on indirect ophthalmoscopy, HbA1C, urine ACR and pure tone audiometry. Collected data were analysed using suitable statistical methods and interpreted in following manner.

Mean age among cases were 60.163 ± 10.5668 yrs and mean age among controls were 60.326± 9.7168 yrs. P value = 0.564 means that there were no significant age difference betweenpatients of two groups(case & control). There were 42 male(52.5%) and 38 female(47.5%) among cases and 23 male(53.5%) and 20 female(46.5%) among control with a total male patient being 65(52.8%) and total female patient were 58(47.2%). P value = 0.917, means there were no significant difference in number of male & female patients between the two groups in our study.

There were 46 patients among cases who have had SNHL(57.5%), and 12 patients among controls(27.9%) with a total of 58 patients have had SNHL out of 123 total patients. P value = 0.002 means SNHL is more prevalent in diabetic patients and it is statistically significant.

Odds ratio = 3.495 with a 95% confidence interval 0f 1.570 to 7.781 means diabetes mellitusmay be considered as a risk factor for hearing impairment.

There were 17 patients among cases and 7 patients among controls with slight SNHL(1.0), 10patients among cases and 5 patients among controls with moderate SNHL(2.0), 13 patients with severe SNHL(3.0) and 6 patients with profound SNHL(4.0) among cases but there were no patients with severe or profound SNHL among controls. (P value = 0.058) means severity of SNHL is not related to presence or absence of diabetes mellitus.

There were only 10 patientsM(18.86%) who did not had SNHL(0) in presence of DR(1.0) out of 53 DR patients, SNHL were present in 43% of DR patients(81.14%). In comparison there were only 3 patients(11%) who have had SNHL(1.0) out of 27 patients without DR among cases, SNHL were absent in remaining 24 patients(89%). P value <0.001 and ods ratio = 34.400, 95% confidence is 8.624 to 137.214. This means that SNHL were sigficantly more in presence of DR and DR may be considered as risk factor for SNHL.

Out of 62 diabetic patients who have had diabetic nephropathy(DN), 46 patients had SNHL(74.19%) and 16 patients did not have SNHL(25.81%). Out of 18 diabetic patients who had not DN none develop SNHL. P value<0.001 means presence of DN is associated with SNHL.

Discussion

Our study is a hospital based, observational, cross-sectional, comparative study to evaluate for any correlation between diabetes mellitus(DM) and sensory-neural hearing loss(SNHL). A total of 80 patients who had DM(according to ADA definition of DM) were included in our study as case group and simultaneously, a total of 43 patients who had not DM designated as group 2.

There were 46 patients among cases who have had SNHL(57.5%), and 12 patients among controls(27.9%) in our study. P.C.Chamyal advocated 40% sensorineural hearing loss prevalence in diabetics, involving higher frequencies.(2) Prevalence of hearing loss was 20% in hearing children in a study by Dr Puvazhagi(3). In this study prevalence was just 20% probably because of age of study population.

A study by Aggarwal shows a 64% prevalence of SNHL in diabetic patients(4). Mozaffar et al shows a 45% prevalence of SNHL in diabetic(5). Study by Harner SG et al, disputed any relationship between DM & SNHL (6)

Out of 62 diabetic patients who have had diabetic nephropathy(DN), 46 patients were SNHL(74.19%) and 16 patients did not had SNHL(25.81%). Out of 18

diabetic patients who had not DN none develop SNHL. Statistical analysis to find out any correlation between DR severity and SNHL severity severity of SNHL increases with severity of DR. Study by Kurien et al shows a significant association between complications of DM (DR & DN) & SNHL.(7). Similar results were shown by Bamanie et al(8).

Conclusion

In our study prevalence of SNHL is 57.15% which significantly more than control population and diabetes mellitus may be considered as risk factor for SNHL. High frequency involved 1 st then mid and low frequency. Duration of DM, DR, DN are strongly associated with occurrence of SNHL.

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