VOLUME-7, ISSUE-1, JANUARY-2018 • PRINT ISSN No 2277 - 8160

Original Research Paper

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STUDY OF SENSORINEURAL HEARING LOSS (SNHL) AMONG PATIENTS OF TYPE 2 DIABETES MELLITUS (DM)

Tarun — Assistant Professor, Department of Medicine, BPS GMC for Women, Khanpur Kalan, Sonepat, Haryana.

Naveen Sharma* — Assistant Professor, Department of Otorhinolaryngology, BPS GMC for Women , Khanpur Kalan, Sonepat, Haryana. *Corresponding Author

Uma Garg — Professor, Department of Otorhinolaryngology, BPS GMC for Women, Khanpur Kalan, Sonepat, Haryana.

ABSTRACT Diabetes mellitus is a multisystemic disease associated with many complications. One of the known complications is hearing impairment. This study done in a tertiary care hospital aims to evaluate the association between Type 2 Diabetes mellitus and hearing loss. A total of 100 subjects (50 known diabetics and 50 age and sex matched controls) were studied. Results showed that the mean threshold of hearing was higher in diabetics. High prevalence of hearing loss in Diabetes mellitus supports the need of audiometric evaluation in such patients so that early intervention can be done.

KEYWORDS : Diabetes mellitus, complications, hearing loss, pure tone audiometry.

Introduction-

Diabetes mellitus (DM) is a chronic non-communicable disease which is on the rise globally especially in India. It is an endocrine disorder characterized by hyperglycemia either due to insulin deficiency or insulin resistance. The DM is classified into type 1 DM and type 2 DM , the type 2 DM being the more prevalent form.Type 2 DM is usually characterized by insulin resistance. The total number of diabetics in India is predicted to rise to almost 70 million by 2025[1]. Diabetes mellitus is associated with numerous complications namely cardiovascular, neurological and infectious[2-4]. One of the known complication is hearing loss. In DM, the hearing loss is predominantly Sensori Neural Hearing Loss (SNHL), usually bilateral. Suggested pathogenesis for these complications includes microangiopathy, hyperglycemia of CSF or perilymph , auditory neuropathy, encephalopathy or hastening of presbycusis[5]. hearing loss affects the quality of life of patients thus warranting prevention , early diagnosis and treatment. In view of large burden of disease in our country, the present study was undertaken to evaluate the effect of DM on hearing loss.

Materials and methods -

The present study was conducted in the Department of Otorhinolaryngology in collaboration with Department of General Medicine, BPS GMC for Women, Khanpur Kalan, Sonepat. Study involved 100 subjects which were divided into 2 groups.

Group 1- 50 diagnosed patients of DM (Type 2) , attending the Medicine OPD.

Group 2- 50 age and sex matched healthy volunteers which were selected from staff members of BPS GMC for Women Khanpur Kalan , Sonepat.

Inclusion criteria- Patients in age group of 20-45 years having DM (Type 2) of either sex diagnosed as per standard criteria in Medicine OPD.

Exclusion criteria- 1. Patients < 20 years and > 45 years of age

2. Patients having history of smoking , history of intake of ototoxic drugs, family history of deafness, head injury, meningoencephalitis and history of chronic noise exposure.
3. Patients having otitis externa, conductive hearing loss , chronic suppurative otitis media, anatomical external, middle and inner ear disorders.

All patients underwent detailed evaluation including history , general physical examination and complete ENT examination. Pure tone audiometry was done for assessment of hearing. Air and bone conduction thresholds were measured at 250 to 8000 Hz. The data collected was analysed statistically.

Results -

In our study , in DM group 29 patients (58%) were female and 21 were males (42%). Mean age of patients in DM group was 40.6 years and 40 years in control group. History of hearing loss was taken to know about its onset (sudden or gradual) , duration and laterality (unilateral or bilateral). All patients had gradual onset of hearing loss. According to audiometric assessment done by Pure Tone Audiometry (PTA) , SNHL was present in 30 patients (60 %) , of DM group and in 10 subjects among controls ($p<0.001$). Out of these 30 , 22 had mild hearing loss and 8 had moderate hearing loss. Amongst controls 6 had mild and 4 had moderate hearing loss. In DM patients , 24 had bilateral hearing loss and 6 had unilateral hearing loss. In controls , 8 had bilateral and 2 had unilateral hearing loss.

Table 1.

Variable		Diabetics (n=50)	Controls (n=50)
SNHL	Present	30 (60%)	10 (20%)
	Absent	20 (40%)	40 (80%)
Laterality	Unilateral	06 (20%)	02 (20%)
	Bilateral	24 (80%)	08 (80%)

Table 2. Classification of severity of SNHL -

Category	Hearing loss (in db)	Severity
Mild	26-40	1
Moderate	41-55	2
Moderately severe	56-70	3
Severe	71-90	4
Profound	>90	5

Table 3.

Hearing loss (in db)	Diabetics	Controls
Mild (26-40)	22 (73.3%)	06(60%)
Moderate (41-55)	08 (26.6%)	04(40%)
Moderately severe (56-70)	0	0
Severe (71-90)	0	0
Profound (> 90)	0	0

Mean duration of DM in patients with SNHL was 3.8 years and 6.1 years in diabetics without SNHL. Glycaemic control of patients was

measured by HBA_1C value and Fasting blood glucose levels taken at two separate occasions. Only three patients had uncontrolled DM indicated by HBA_1C value> 8 % and raised fasting blood glucose

These patients with uncontrolled DM also had complications namely diabetic ketoacidosis, nephropathy and cataract with retinopathy , but of these three only patient with cataract and retinopathy had mild hearing loss , rest two had normal hearing.

Discussion –

Diabetes mellitus is a chronic disorder affecting many organs of the body. It causes several complications and one of the known complications is hearing impairment in form of sensorineural hearing loss. The relationship between diabetes and hearing loss is known for years but exact pathogenesis is still under debate. There are conflicting studies in literature pointing towards its effect on cochlea , neural pathways or both. With this background the present study was done to study incidence of SNHL in patients of DM Type 2 , its severity and laterality , effect of duration of disease on hearing loss and effect of glycemic control on SNHL. In present study , the association of DM with SNHL was studied in a group of known diabetics and age and sex matched healthy controls. Our study showed more incidence of SNHL in diabetic patients (60 %) than control group (10%) which is statistically significant also ($p<0.001$). Similar results were obtained in studies by Mozaffari et al [6], Kakarlapudi et al[7]. Austin et al [8] and Fristina et al[9] also observed that individuals with Type 2 DM have significant hearing impairment than normal controls.

In our study, SNHL was bilateral in more subjects in both groups. Bilaterality of SNHL in DM group suggests some metabolic basis for development of SNHL.

In patients with SNHL, majority had mild (73.3%) to moderate (26.6%) hearing loss. Similar observations were made in studies by Gulati et al[10] and Tay et al[11].

Mean duration of DM in patients with SNHL was 3.8 years and in patients without SNHL was 6.1 years suggesting no relation between duration of diabetes and hearing loss. Out of DM patients only 3 had uncontrolled diabetes with complications namely diabetic ketoacidosis , nephropathy and cataract with retinopathy , out of these only one had hearing loss that too mild only suggesting that the glucose metabolism may not be the only factor related to development of SNHL. Similar findings were reported by Maia et al[12].

Summary and conclusion-

Diabetes mellitus is an endocrine affecting multiple organs and systems of the body. It is known to cause many complications one of which is hearing loss. Various studies have indicated towards association of DM and SNHL. Present study also points towards the same as prevalence of SNHL was found to be significantly higher in diabetic patients. The same can be concluded as we excluded the effects of ageing , smoking , ototoxic drugs and noise exposure. But we did not find any relation between duration of diabetes , glycemic control and severity of SNHL. The study warrants a need for routine hearing screening in diabetic patients to decrease morbidity and to improve quality of life by early intervention.

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