International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsciencejournal.com
Volume 4; Issue 3; March 2018; Page No. 191-193

Study of diabetes patient in respect to sensorineural hearing loss in PMCH patients

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Abstract
The relationship between diabetes mellitus and hearing function has been studied for a long time, yet there is currently no adequate consensus on this topic. Therefore there is a need for further studies not only to investigate hearing loss in diabetics but also to see the effect of progression of disease on severity of hearing loss. Hence this study was planned to assess the prevalence of sensor neural hearing loss in diabetes mellitus.
This study was conducted in patients admitted in PMCH. Total 100 patients detected with diabetes were enrolled into the study.
Present study is a hospital-based cross-sectional study conducted on 100 diabetic patients attending medicine OPD. These patients were recruited to ENT Department for clinical and audio logical evaluation. The prevalence of SNHL was more in patients having uncontrolled diabetic status compared to patients having controlled diabetic status. Severity was also high among uncontrolled diabetic group.

Keywords: Sensorineural hearing loss, SNHL, diabetic patients, etc.

Introduction
A sensorineural hearing loss (SNHL) is defined as damage to the hair cells in the cochlea (this is the sensory hearing organ) or damage to the neural pathways of hearing (nerves). With this type of hearing loss it is not always possible to tell which part is damaged and is therefore often listed together as sensorineural hearing loss.

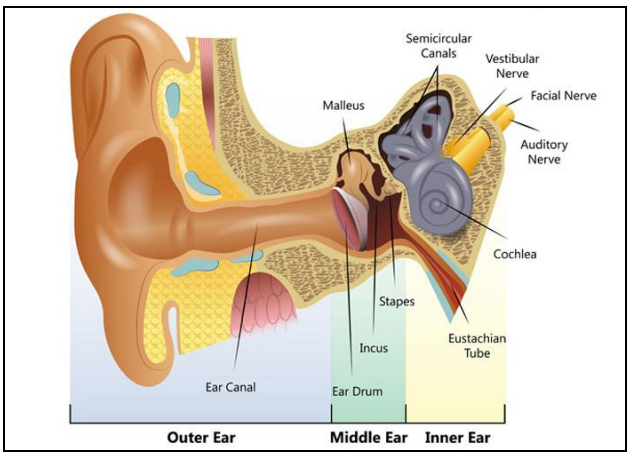

Fig 1

The causes of sensorineural hearing loss are varied but can be generally put into two categories: congenital and acquired.
Congenital hearing loss is present at birth and is the most common problem seen in new born babies. It can be either inherited or caused by abnormal development in the fetal stages of life. Before the development of a vaccine, maternal rubella or German measles was a common cause of congenital hearing loss.
Acquired hearing loss, which happens after birth, can be caused by a wide range of factors. These include trauma, presbycusis (age-related hearing loss), noise exposure from machinery or firearms, Meniere's disease and meningitis. Ototoxic drugs - which damage the ear but may be necessary to treat some life-threatening medical conditions – can also trigger hearing loss. A tumour on the hearing nerve can cause the rarer neural hearing loss.
Hearing is one of the most important among the five senses gifted to mankind. It plays an important role in the development of speech, communication and cognitive, emotional and social development of a human being. Being an hearing impaired puts a step backward in the overall development of the child. Thus it is very essential to identify this impairment in early stages and treat effectively. Diabetes mellitus is a multisystem disorder with abnormally high blood glucose level. It is a disease known since ages. It is said that 1 in 8 individuals is a diabetic. It affects almost all the systems in the body to its severity if left uncontrolled. Likewise, diabetes affects hearing by damaging the inner ear structures. The effect of diabetes mellitus on hearing is known since 1857, when Jordao first showed hearing loss in a patient with incipient diabetic coma. The typical hearing loss pattern in diabetics is progressive, bilateral sensorineural hearing loss affecting the higher frequencies. But rarely, there are incidences where sudden onset, sensorineural hearing loss affecting lower frequencies are also noted. The type of hearing impairment noted, is similar to that of presbyacusis, but those affected show a greater decrease in hearing than one would except at that age. Hence this case control study aims to find out whether diabetes mellitus causes hearing loss, and if so then its relation to age of patient, sex of patient, duration of diabetes, family history of diabetes, control of diabetes and type of medication taken.
The effect of diabetes mellitus on hearing is known since

1857, when Jordao [2] first showed hearing loss in a patient with incipient diabetic coma. The relationship between diabetes mellitus and hearing function has been studied for a long time, yet there is currently no adequate consensus on this topic. With 220 million diabetics worldwide, WHO [3] ring an alarm that, the prevalence rate would be 5.4% in 2025. In developing countries majority of diabetics, are in the productive period of their lives, which has a major implication in respect to health care needs. The goal of modern medicine is no longer treatment of diseases but also their prevention and control, thereby improving the quality of life of individuals and mankind as a whole.

Therefore there is a need for further studies not only to investigate hearing loss in diabetics but also to see the effect of progression of disease on severity of hearing loss. Hence this study was planned to assess the prevalence of sensorineural hearing loss in diabetes mellitus.

Methodology

This study was conducted in patients admitted in PMCH. Total 100 patients detected with diabetes were enrolled into the study. The approval of the institutional ethic committee had been taken before the study. All the patients were informed consent. The aim and the objective of the study are conveyed to all patients.

Following is the inclusion and exclusion criteria for the both study group.

Table 1

Inclusion criteria	Exclusion criteria
Type 2 diabetic patients on oral hypoglycemic agents	Patients with type 2 diabetes less than 20 years and more than 60 years of age
Patients of both gender in age group 20-60 years	Patients on insulin treatment
Without any other systemic illness (hypertension, coronary artery disease, thyroid disorders)	Patients on dialysis
	History of hearing loss prior to onset of diabetes
	History of ear discharge
	Patients with history of
Willing to undergo investigations	head trauma, radiotherapy, ototoxic drug intake, noise exposure

All the patients enrolled in the present study underwent anotoscopic examination, biochemical and routine urine investigations such as postprandial blood (PPBS), fasting blood sugar (FBS), serum urea and creatinine and urine for sugar, protein, ketones and micro albuminuria was obtained prior to the start of the study.

Pure tone audiometry was carried out in a sound treated room for the estimation of hearing threshold using a double channel GSI clinical audiometer. Pure tone thresholds were obtained at an octave between frequencies of 250 and 8000Hz for air conduction and 250 and 4000 Hz for bone conduction.

Results & Discussion

The data from the 100 diabetic patients were collected and presented as below.

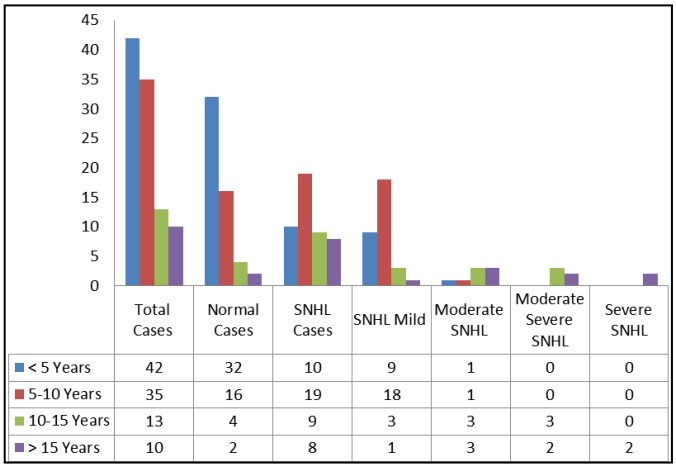

Fig 2: SNHL and Duration of Diabetes

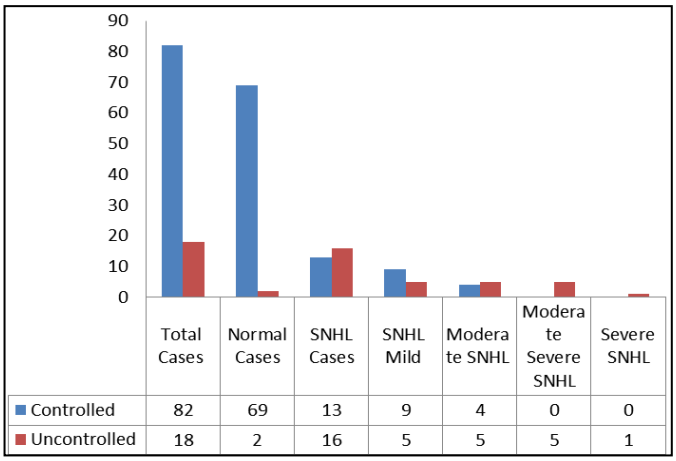

Fig 3: SNHL and Status of Diabetes

The relationship between diabetes mellitus and sensoryneural hearing loss is complex and under debate since many years supported by the bulk of conflicting literature. The crux about the effect of diabetes in SNHL lies centre don the cochlea and the neural pathways, which has been studied throughout the years in relation to duration of DM and glycaemic levels.

There is a strong correlation between the duration of diabetes and SNHL in our study. Those who are having more than 15 years of DM had a high prevalence of SNHL. In the group with duration of DM < 5 yrs., prevalence is only10 cases. The duration of DM is a significant factor responsible for SNHL in diabetics. In our study, it was found that the severity of hearing loss was proportional to the duration of DM.

According to Sheetal Krishnappa *et al.* [4], there was 63%incidence of hearing loss in < 10 years of duration of diabetes as compared to 85% in > 10 years of duration. Further, as duration progressed the severity of hearing loss also increased in most of the cases. Ashish C Agarwal *et al.* [5] noted that duration of DM did not have an effect on hearing status of diabetic patients. In our study, there is a high prevalence of SNHL among uncontrolled diabetics compared to controlled diabetics. The control status of DM is a significant factor responsible for SNHL in diabetics. The severity of SNHL was also high among uncontrolled DM group compared to controlled DM group. Ashish C Agarwal

et al. noted that median pure tone average (PTA) values were less in patients with good glycaemic status as compared to those with poor glycaemic status.

Conclusion

Present study is a hospital-based cross-sectional study conducted on 100 diabetic patients attending medicine OPD. These patients were recruited to ENT Department for clinical and audiological evaluation. The prevalence of SNHL was more in patients having uncontrolled diabetic status compared to patients having controlled diabetic status. Severity was also high among uncontrolled diabetic group.

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