(e) ISSN Online: 2321-9599

(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Sensorineural hearing loss in diabetic patients

[1]Jyoti Tugave, [2]Dhirendra Sinha

[1]Assistant Professor, Department of ENT, Narayan Medical College, Sasaram, Bihar, India;
[2]Assistant Professor, Department of General Medicine, Narayan Medical College, Sasaram, Bihar, India

ABSTRACT:
Background: The capacity to detect vibrations and variations in the pressure of the surrounding medium over time through an organ like the ear is called hearing, or auditory perception. The present study was conducted to assess sensorineural hearing loss in diabetic patients. **Materials & Methods:** 84 diabetics with sensorineural hearing loss of both genderswere put into group I. Group II had control subjects. To examine the ears in general, otoscopy was used. Pure Tone Audiometry was used in conjunction with a routine ear examination to assess the degree, type, and configuration of any hearing loss as well as the hearing function. **Results:** Group I had 22 males and 20 females, and group II had 18 males and 24 females. A normal hearing loss was seen in 28% in group I, and 92% in group II, mild hearing loss was seen in 60% in group I, and 8% in group II and moderate hearing loss was observed in 2% in group I. The difference was significant (P< 0.05). **Conclusion:** There was higher hearing loss in diabetics in comparison of healthy subjects.
Key words: diabetics, hearing loss, Pure tone audiometry

Corresponding author: Dhirendra Sinha, Assistant Professor, Department of General Medicine, Narayan Medical College, Sasaram, Bihar, India

This article may be cited as: Tugave J, Sinha D. Sensorineural hearing loss in diabetic patients. J Adv Med Dent Scie Res 2015;3(3):225-227.

INTRODUCTION

The capacity to detect vibrations and variations in the pressure of the surrounding medium over time through an organ like the ear is called hearing, or auditory perception. Our ability to hear is crucial for both social interaction and awareness of sounds in our immediate surroundings.[1] A partial or complete loss of hearing is referred to as hearing loss, hearing impairment, or both. Any level of impairment in the ability to understand sound is referred to as hearing loss. The term "acquired hearing loss" refers to the loss of hearing resulting from nongenetic factors, such as exposure to chemicals, medicines, or loud noises in the environment. Numerous factors can lead to damage to spiral ganglion cells, supporting cells, auditory hair cells, and other cell types.[2]

Hearing, or auditory perception, is the ability to recognize changes in the pressure of the surrounding medium over time through an organ such as the ear.[3] Social contact and being aware of sounds in our immediate environment depend on our ability to hear. Hearing loss, hearing impairment, or both can refer to a partial or whole loss of hearing. Hearing loss is the term used to describe any degree of impairment in one's capacity to perceive sound.[4] The phrase "acquired hearing loss" describes hearing loss brought on by nongenetic causes, such as exposure to noise-producing substances, medications, or toxins in the environment. Damage to auditory hair cells, supporting cells, spiral ganglion cells, and other cell types can result from a variety of reasons.5The present study was conducted to assess sensorineural hearing loss in diabetes patients.

MATERIALS & METHODS

The present study consisted of 84diabetics with sensorineural hearing loss of both genders. They gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. Patients were put into group I. Group II had control subjects. To examine the ears in general, otoscopy was used. Pure Tone Audiometry was used in conjunction with a routine ear examination to assess the degree, type, and configuration of any hearing loss as well as the hearing function. Next, the HbA1c values of each diabetes participant were computed. Five milliliters of blood were drawn in accordance with standard laboratory protocols in order to measure the serum HbA1c concentration.Results of the study was compiled and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

Groups	Group I	Group II
Status	Diabetics	Control
M:F	22:20	18:24

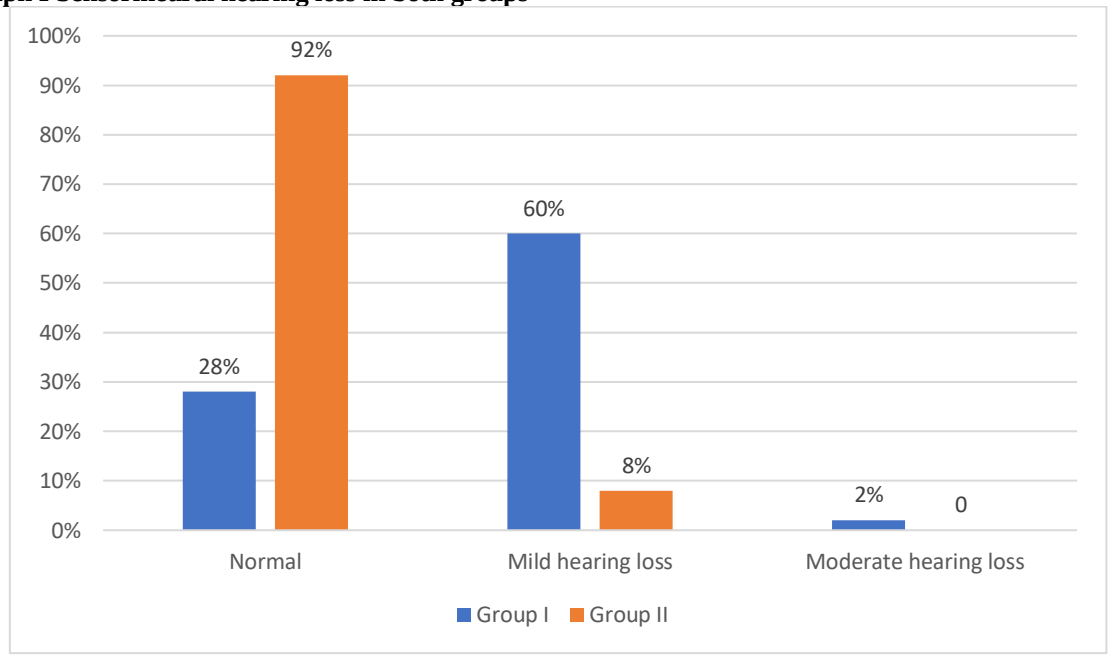
Table I shows that group I had 22 males and 20 females, and group II had 18 males and 24 females.

Table II Sensorineural hearing loss in both groups

Parameters	Group I	Group II	P value
Normal	28%	92%	0.02
Mild hearing loss	60%	8%	0.05
Moderate hearing loss	2%	0	0.01

Table II, graph I shows that normal hearing loss was seen in 28% in group I, and 92% in group II, mild hearing loss was seen in 60% in group I, and 8% in group II and moderate hearing loss was observed in 2% in group I. The difference was significant (P< 0.05).

Graph I Sensorineural hearing loss in both groups



DISCUSSION

Sensorineural hearing loss (SNHL) is a type of hearing loss that occurs when there is damage to the inner ear (cochlea) or the nerve pathways from the inner ear to the brain. It is one of the most common types of hearing loss and can range from mild to profound.[6]Presbycusis, or age-related hearing loss, is a common cause of sensorineural hearing loss. It typically occurs gradually over time and is often associated with changes in the inner ear structures and nerve pathways.Prolonged exposure to loud noises, such as loud music, machinery, or firearms, can damage the hair cells in the inner ear, leading to sensorineural hearing loss.Genetic factors can predispose individuals to sensorineural hearing loss.[7] Some genetic conditions, such as Usher syndrome or Waardenburg syndrome, can cause both hearing loss and vision problems.Certain illnesses or infections, such as meningitis, mumps, or measles, can damage the inner ear and lead to sensorineural hearing loss.[8]Certain medications, including some antibiotics, chemotherapy drugs, and high doses of aspirin, can damage the inner ear and cause hearing loss.Head trauma or injury to the ear can damage the inner ear structures and nerves, resulting in sensorineural hearing loss.[9,10]The present study was conducted to assess sensorineural hearing loss in diabetic patients.

We found that group I had 22 males and 20 females, and group II had 18 males and 24 females. Gates et al[11] in order to look into the potential link between presbycusis and cardiovascular disease (CVD), the 30-year prevalence of cardiovascular disease was compared with the hearing status of a cohort of 1662 elderly men and women. Odds ratios (ORs) and 95% confidence intervals (CIs) were computed using age-adjusted multivariate logistic regression to characterize the relationship between hearing and cardiovascular disease events, cardiovascular disease risk factors, and both events and risk factors independently for the 676 men and the 996 women. The combination of intermittent claudication, stroke, and coronary heart disease was known as cardiovascular disease events. Five categories of risk factors were examined: blood pressure and hypertension; diabetes, blood glucose level, and glucose intolerance; relative weight; smoking status and number of pack-years of cigarettes; and serum lipidsuch as lipoprotein fractions, triglycerides, and cholesterol. In both genders, but more so in the females, low-frequency hearing (low pure-tone average, 0.25 to 1.0 kHz) was linked to events related to cardiovascular disease. For women, the odds ratio (OR) for any cardiovascular disease event was 1.75 (95% CI, 1.28 to 2.40) for a high pure-tone average (average of 4 to 8 kHz) of 40 dB hearing level, and

3.06 for a low pure-tone average of 40 dB hearing level. The odds ratios for stroke and coronary heart disease, respectively, were 3.46 and 1.68, respectively, in men with a low pure tone average of 40 dB hearing level.

We found that a normal hearing loss was seen in 28% in group I, and 92% in group II, mild hearing loss was seen in 60% in group I, and 8% in group II and moderate hearing loss was observed in 2% in group I.In order to determine whether hearing loss in a population of elderly patients with diabetes mellitus and/or systemic arterial hypertension is more accelerated in these groups than in controls without these clinical conditions, Rolim et al[12] compared the initial audiometry (A1) with a subsequent audiometry (A2) performed after a 3 to 4-year interval. One hundred senior citizens took part in this investigation. A previous complete audiological test (A1) and a subsequent audiological evaluation (A2) conducted three to four years following the first one were used for the auditory threshold assessment. The subjects were split up into four groups: twenty people with diabetes mellitus, twenty people with systemic arterial hypertension, twenty people with diabetes mellitus plus systemic arterial hypertension, and forty people with matching controls.The mean auditory thresholds at the first A1 assessment and the second A2 assessment between the groups were compared, taking into account the mean increase in auditory thresholds per year. It can be observed that, for the DM group, there was no statistically significant difference at any frequency compared to its control group (Fig. 2); for the AH group, there were significant differences at 4 kHz ($p = 0.016$), 6 kHz ($p = 0.013$), and 8 kHz ($p = 0.037$) compared to its CG, as well as a non-significant difference at 3 kHz ($p = 0.060$) (Fig. 3); the DMHA group, on the other hand, significant differences were observed at the frequencies of 500 Hz ($p = 0.017$), 2 kHz ($p = 0.021$), and 3 kHz ($p < 0.001$) between the study group and its control

CONCLUSION

Authors found that there was higher hearing loss in diabetics in comparison of healthy subjects.

REFERENCES

1. Agarwal S, Mishra A, Jagade M: Effects of hypertension on hearing Indian J Otolaryngol. 2013; 65 (3): 614- 618.
2. Carrasco VN, Prazma J, Faber JE: Cochlear microcirculation effect of adrenergic agonists on arteriole diameter. Arch Otolaryngol Head Neck Surg. 1990;116:411–417.
3. Friedman SA, Schulman RH, Weiss S: Hearing and diabetic neuropathy. Arch Intern Med. 1975;135(4):573-6.
4. Kakarlapudi V, Sawyer R, Staecker H: The effect of diabetes on sensor neural hearing loss. Otol Neurotol. 2003;24(3):382-6.
5. Weng SF, Chen YS, Hsu CJ, Tseng FY: Clinical features of sudden sensorineural hearing loss in diabetic patients. Laryngoscope.2005;115(9):1676-80.
6. Dubno JR, Lee FS, Matthews LJ, Mills JH: Age-related and gender-related changes in monaural speech recognition. J Speech Lang Hear Res. 1997;40(2):444–452.
7. Pearson JD, Morrell CH, Gordon-Salant S, Brant LJ, Metter EJ, Klein LL et al: Gender differences in a longitudinal study of ageassociated hearing loss. J Acoust Soc Am:1995, 97(2):1196– 1205.
8. de Mores Marchiori LL, de Almeida Rego Filho E, Matsuo T: Hypertension as a factor associated with hearing loss. Braz Otorhinolaryngol 72(4): 533-40.
9. Makashima K, Tanaka K: Pathological changes of the inner ear and central auditory pathways in diabetics. Ann OtolRhinol Laryngol.1971;80:218-288.
10. Engdahl B, Aarhus L, Lie A, Tambs K. Cardiovascular risk factors and hearing loss: The HUNT study. International Journal of Audiology. 2015 Dec 2;54(12):958-66.
11. Gates GA, Cobb JL, D'Agostinho RB, Wolf PA: The relation of hearing in the elderly to the presence of cardiovascular disease and cardiovascular risk factors: Arch Otolaryngol Head Neck Surg. 1993;119:156–161.
12. Rolim LP, Samelli AG, Moreira RR, Matas CG, Santos ID, Bensenor IM, Lotufo PA. Effects of diabetes mellitus and systemic arterial hypertension on elderly patients' hearing. Brazilian journal of otorhinolaryngology. 2018;84:754-63.