Original Research Article

Study of hearing loss in diabetes mellitus patients of Jharkhand population: A retrospective study

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Abstract

Background: Hearing loss is the one of the clinical symptom of D.M apart from old age hearing loss. Hence various grade of hearing loss in D.M patients were studied so that, early treatment can prevent severity or permanent hearing loss, **Method:** 53 patients aged between 30 to 50 years of DM patients having hearing loss were studied by pure tone audiometry by audiometry degree, type and configuration of hearing was assessed. General examination was done by Otoscopy followed by pure tone audiometry in which manual audiometry was used. **Results:** 26(49%) had moderate hearing loss, 19(35.8%) had moderate severe, 8 (15%) had severe hearing loss. The associated clinical manifestation were 17(32%) had parasthesia, 13(24.5%) skin diseases, 11(20.7%) had visual problems, 12(22.%) had lack of sleep. **Conclusion:** This empirical study will be helpful to ENT surgeon to treat efficiency and prevent the severity of hearing loss,

Key words: Otoscopy, Audiometry, Hyperglycemia, HbSA1C

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INTRODUCTION

As per WHO repot 5% of the world population (360 million) of diabetic mellitus (DM) are suffering with hearing loss. Furthermore WHO also suggests that half of all cases of hearing loss are preventable1. The association between DM and hearing loss was reported in 1857 by Jardo in patients of diabetic coma[2,3]. There are also many causes of hearing loss apart from DM. Hence hearing loss can be one of the clinical manifestations of DM due to hyperglycemia. D M has negative effect or hearing various from 13.1% to 60% globally.[4,5] Because pathogenesis of hearing loss. in DM is to mitochondrial DNA mutation, neuropathy and micro anginopathy6. Diabetic complications are associated with serum cholesterol, serum creatinine may leads to morbidity and mortality. Hence attempt was made to study degree of hearing loss in DM patients.

MATERIAL AND METHODS

53 patients aged between 30 to 50 years suffering with diabetic mellitus (DM) with hearing loss, regularly visiting Gandhi Nagar Hospital CCL, Ranchi-834008 (Jharkhand) were studied.

Inclusive criteria- The patients having hearing loss, having DM, diagnosed as per the national Diabetes data group and world health organism (WHO) issued the diagnostic criteria.

Random blood sugar concentration > 200gm/dl- Fasting plasma glucose > 126mg/dl. Two hour plasma glucose>200mg/dl. During glucose tolerance test HbSA1C to know the onset of DM. Age greater than 18 were included.

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Exclusion criteria – The patients having history of Noise damage, middle ear loss and history of cognitive function disability, menier's diseases or labyrinthinitis Immune-compromised patients were excluded from the study.

Method- Two methods were used for hearing assessment of ear examination (1) General ear examination (2) Pure tone audiometry. By audiometry degree, type and configuration of a hearing los otoscopy was used for general ear examination. This was followed by pure tone audiometry in which manual audiometry was used. The instrument was made to deliver the pure tone of different variable frequency and various intensity using ear phones. Assessment was done at 1000Hz, 2000Hz, 4000Hz, 8000Hz, 500Hz and 250Hz in the similar order. The intensity was varied for each of the frequency and the patients were instructed to signal when he/she hears any sound. The patients hearing threshold was taken as intensity at which patients hears any sounds, both air and bone conduction testing was done in every patients. The results were classified as mild (20 to 30 dB) moderate (31 to 6o dB) moderately severe (61 to 70 db) severe (71 to 90db) profound (> 91 db). Duration of study was March 2019 to August 2019

Statistical analysis- The grades of hearing loss and associated clinical manifestation were classified with percentage. The ratio of male and female was 2:1.

OBSERVATION AND RESULTS

Table-1 – Distribution of patients hearing loss, 26(49%) had moderate, 19(35.8%) had moderate severe, 8(15%) severe.

Table 1: Classification based on the hearing threshold(No of patients 53)

Sl. No	Decibels	Degree of hearing loss
1	20-30	Mild
2	31-60	Moderate
3	61-70	Moderately severe
4	71-90	Severe
5	>91	Profound
	No hearing	Total (complete) deafness

Table-2 – Associated clinical manifestation in hearing loss patients with DM 17 (32%) had parasthesia, 13(24.5%) Skin diseases, 11(20.7%) visual problems 12(22.6%) lack of sleep.

Table 2: Distribution of patients having hearing loss (No of patients 53)

Sl.No	Particular	No. of patients	Percentage
1	Moderate	26	49
2	Moderate severe	19	35.8
3	Severe	08	15

Table-3: The associated clinical manifestation in hearing loss Diabetes mellitus patients(No of patients 53)

Sl.No	Particular	No. of patients	Percentage
1	Parasthesia	17	32
2	Skin disease	13	24.5
3	Visual problems	11	20.7
4	Lack of sleep	12	22.6

DISCUSSION

In the present study, the hearing loss in DM patients of Jharkhand population. 26(49%) had moderate, 19(35.8%) had moderate severe 8(15%) had severe hearing loss(Table-2). The associated clinical manifestation in hearing loss in DM patients was 17(32%) had parasthesia, 13(24.5%) had skin diseases, 11(20.7%) had visual problems, 12(22.6%) had lack of sleep(Table-3). These findings were more or less in agreement with previous studies[7,8,9]. In the present study skin diseases involved purities, urticaria, angioderma etc, Parasthesia involved burning feet syndrome, visual problems included blurred vision, intra- ocular pressure, glaucoma etc. Sleep disorders included difficulty in falling sleep, early rise in the morning. Hearing loss in DM patients due to involvement of micro vascular insufficiency of the cochlea, like sclerosis of internal auditory artery, thickened vessel walls of stria vascular is and basilar membrane, damage to the outer sheath of the cochlear nerve and atrophy of spinal ganglion[10]. It was reported that, there is a significant correlation between in hearing loss and hyperglycemia. The hearing impairment is sensorineural type because there was hearing loss was found in both air and the bone conduction. Since sensorineaural hearing loss is a gradual progressive and threshold for hearing was greater higher frequency. Duration of DM also increases the sensorineural hearing loss. Moreover Age is also confounding factor but DM is alone responsible for loss of hearing in young and adult

patients. It was also reported that out of 45 patients10 patients had hearing loss problem (22.2%)[11]. In such patients renal and urinary tract infection complications were also observed [12]. In the DM patients, due to hyperglycemia, there will be more viscosity in the flow of blood which leads to ischemia, infarction to the respective organs hence hearing loss also one of the factor of ischemia/ infarction to cochlear apparatus, which has micro and macro vascular apparatus of blood supply

SUMMARY AND CONCLUSION

The present study of hearing loss in the DM patients of Jharkhand population. It is mandatory to every physician to explain the consequences and risk factors of DM. if any onset of hearing loss. Detailed history of cranial nervous system, ear examination has to be done, along with related blood examination in DM patients. This study demands further hormonal, genetic, patho-physiological, nutritional, immunological studies. As DM is a hormonal disease, quantum of release of hormone, duration of release is yet to be known. Hence pathogenesis of DM is still un-clear.

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