



ASSOCIATION OF HEARING IMPAIRMENT WITH TINNITUS AUREUM

Otorhinolaryngology

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ABSTRACT

Tinnitus is sound perceived by patients in their ears when no external source of the sound exists. Subjective tinnitus is generally linked with high frequency hearing loss, as a result of noise exposure or presbycusis. Aim of present study was to study association of degree and type of hearing loss with tinnitus. Total 100 patients with complain of tinnitus were included in the study. All patients were subjected to clinical and audiological tests including pure tone audiometry for hearing. Length of tinnitus was more than one year in 55% patients. Left ear tinnitus was more common than right ear or both ears tinnitus. Subjective hearing loss was present in 90% patients were on pure tone audiometry only 64% ears with tinnitus had mild to moderate hearing loss. Out of these 60% ears had sensorineural hearing loss. Present study concluded that there is definite association of tinnitus with hearing impairment, more so with sensorineural hearing loss than to conductive hearing loss.

KEYWORDS

Tinnitus, pure tone audiometry, sensorineural hearing loss, conductive hearing loss.

Introduction:

Pliny the Elder introduced term 'tinnitus' which is taken from the Latin tinnire meaning to ring [1]. This term embraces countless variety of auditory sensations, which are not due to external stimulation [2]. 'Dysacusis' is any deviation from normal auditory sense and contains variety of phenomenon and described as difficulty in hearing or 'odd' hearing [3]. Tinnitus often seen with hearing loss of cochlear origin due to increased neural plasticity, hyperactivity and hypersensitivity of auditory pathway [4]. Tinnitus is not a single well defined disease, but a symptom of much trivial to severe pathology of temporal region and beyond expanding from simple cerumen to brain tumors. The aim of present work is to study association of hearing loss and its types with tinnitus.

Material and methods:

The study was conducted in otorhinolaryngology department at tertiary teaching medical college center. Ethical approval for this prospective study was obtained from local ethical committee. Total 100 patients with complain of abnormal perception of sound were included in this study irrespective of age and gender. Each patient was then subjected to detailed history taking with systemic and local E.N.T examination. All patients hearing assessment was done for conversation speech and whisper voice. Tuning fork tests were done for clinical evaluation of hearing thresholds. Pure tone audiometry (PTA) was done in all patients using Interacoustic 40 audiometer. PTA was evaluated in term of laterality, severity and type of hearing loss and these interpretations were statistically analysed with tinnitus using SPSS version 19.

Results:

Total 100 patients, 58% male and 42% women, from 15 years to 75 years age, were included in present study. Out of these 53% belong to the age group of 15 years to 40 years, while 47% age group of 41 years to 75 years. Out of 100 patients 55% had tinnitus for one year, 26% had it for more than one year while 19% complain for less than one month. Left ear tinnitus was present in 42% cases, right ear tinnitus in 33% while 25% patient had tinnitus in both ears. Total 90% tinnitus patient complained of hearing loss, while 10% have no complained of hearing impairment. Out of these 41 complained for both ears, 25 left ear and 24 right ear hearing impairment. PTA interpretation of these patients showed that out of the total 125 ears having tinnitus 36% ears were having hearing within normal limits while 64% ears were having hearing loss. 40.8% ears suffering from hearing impairment although were not affected by tinnitus. In the total group out of 200 ears however, 65.5% ears were having impaired hearing and 34.5% ears were having hearing within normal limits [Table 1]. Further interpretation depicted that out of 80 tinnitus ears 48 (60%) ears are having sensorineural hearing loss (SNHL). This is followed by 17 (21%) ears with mixed hearing loss and 15 (18.75%) ears with conductive hearing loss (CHL). Out of the total group of 131 ears with hearing loss 80 (61%) ears were having sensorineural hearing loss,

followed by 32 (24.5%) ears with mixed hearing loss and conductive hearing loss was found in 19 (14.5%) ears [Table 2]. Further interpretations were drawn regarding association of tinnitus with severity of different types of hearing loss. Out of total 80 SNHL ears, 60 (75%) have mild hearing loss while out of 48 SNHL ears with tinnitus, 38 (79%) had mild hearing loss.

Out of total 19 CHL ears, 47% have mild hearing loss and 46% have moderate CHL. Out of 15 CHL ears with tinnitus, 40% have mild hearing loss and 53% have moderate CHL. Out of the ears with tinnitus having mixed hearing loss, sensorineural hearing loss up to 40 dB was found in 10 (59%) ears and 41-55 dB was found in 6 (35%) ears. Out of the ears with tinnitus having mixed hearing loss, conductive hearing loss between 31-45 dB was observed in 14 (82%) ears.

Discussion:

Tinnitus is probably a phenomenon as old as mankind. It may be defined as auditory perception due to an aberrant spontaneous activity, arising due to altered state of excitation or inhibition within the auditory system. Prevalence of tinnitus may be 100% if all forms of tinnitus are taken into consideration [5]. In our study tinnitus prevalence showed no ageing pattern as different age group were equally affected. In our study we had greater number of males (58%) than females (42%) in ratio of 1.4: 1. But on applying chi square test $p > 0.05$, there is no significance of disease being prominent in either group. In present study maximum patient had complain of tinnitus for more than 12 months. This may be due to the fact that many patients have their tinnitus started at a mild level which gradually became louder over a period of year. These patients seek medical advice only when tinnitus reached a level loud enough to be distressing. Hawthorne et al observed length of tinnitus in their study of 120 patients. They found duration of tinnitus <1yr in 33% patients, <2yrs in 47.5% patients and 5yrs and more in 27% of patients [6]. In the present study we noticed greater prevalence of tinnitus on the left side in females as compared to males. P-value was calculated for site of tinnitus which came .854775 and found to be non-significant. Hazel observed tinnitus affects the left ear rather more commonly than the right ear [7]. In this study nine out of ten complained of hearing impairment along with tinnitus, which suggests that these two symptoms are closely associated with each other as much patient concerns. Reed showed that 95.5% patients with tinnitus having hearing loss and out of them 83.5% had perceptive deafness [8]. In this study 60% of ears with tinnitus had SNHL. Coles mentioned that majority of the cases of tinnitus arises from disorders within cochlea or other parts of sensorineural pathway [9]. Ochi et al, in their study in cases of acute and chronic tinnitus patients reported that majority of patients of acute tinnitus had sudden sensorineural hearing loss with lesion mainly located at the level of cochlea [10]. In present study 40% ears with tinnitus had pure CHL or mixed hearing loss. Coles also reported that tinnitus sounds may result from movements within external or middle ear in patients of conductive deafness [9]. In present

study SNHL was noticed in 61% ears, CHL in 14.5% ears and mixed hearing loss in 24.5% ears. Tinnitus ears had 60 % SNHL, 19% CHL and 21% mixed hearing loss. On statistical analysis there was no statistically significant difference observed between ears with tinnitus and all hearing impaired ears regarding type of hearing loss. In this study it was observed that tinnitus ears have mild SNHL and moderate CHL in maximum number. These interpretations suggest that mild SNHL can cause tinnitus perception, while for similar perception moderate CHL is required.

Conclusion:

Although tinnitus is relatively common perceptive experience, the majority of people do not complain about it as tinnitus is not the primary symptom. Tinnitus can be present in any age group of either gender. Tinnitus is closely associated with hearing impairment as we observed 90 % of patient with tinnitus also complained of hearing loss. Sensorineural hearing loss seems to be more associated with tinnitus as compared to conductive hearing loss.

Table 1: Association of tinnitus with objective hearing loss as observed on PTA

Ears with or without tinnitus	No. of Ears (n=200)
Ears having tinnitus (t)	125 (62.5%)
Ears having tinnitus without hearing loss (t-d)	45 (36%)
Ears having tinnitus with hearing loss (t+d)	80 (64%)
Ears having hearing loss without tinnitus (d-t)	51 (40.8%)
Total ears having hearing loss (d)	131 (65.5%)
Total ears having normal hearing	69 (34.5%)

Table 2: Association of tinnitus with type of hearing loss as observed on PTA

No. of ear	Sensorineural hearing loss	Conductive hearing loss	Mixed hearing loss
No. of ears with Tinnitus + hearing loss (n=80)	48 (60%)	15 (18.75%)	17 (21.25%)
Total no. of ear having hearing loss (n=131)	80 (61%)	19 (14.5%)	32 (24.5%)
Chi square: 0.78	DF:2	p- value: 0.676705	

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