EIFFICACY OF BETAHISTINE HYDROCHOLRIDE IN TINNITUS DUE TO NOISE-INDUCED HEARING LOSS

Shahzad Maqbool, Bashir Ahmed*, Tahir Manzoor*

75 Medical Bn Quetta, *CMH Rawalpindi

ABSTRACT

Objective: To determine efficacy of betahistine hydrochloride in treatment of tinnitus due to noise-induced hearing loss (NIHL) as compared to placebo.

Study Design: Randomized- controlled trail.

Place and Duration of Study: This study was carried out at ENT department, CMH Rawalpindi from July 2006 to December 2006.

Patients and Methods: *A* total of 70 patients of tinnitus due to NIHL, diagnosed on the basis of history, clinical examination and audiometric findings, were randomly divided into two groups of 35 each. Group I, was treated with betahistine hydrochloride 16 mg thrice a day for two months. Group II, the control or placebo group was prescribed a single tablet of Multivitamin thrice a day for the same duration; after taking informed consent. All the subjects were assessed using Visual Analogue Scale (VAS) scores thrice during the treatment i.e. on first visit, after one month (2nd visit) and then after two months (3rd visit).

Result: No statistically significant difference was noted in the loudness of tinnitus, between the two groups from the start of treatment till the complication of therapy.

Conclusion: It is concluded that Betahistine hydrochloride is 'not' better than a placebo in its efficacy for the treatment of tinnitus due to NIHL.

Keywords: Tinnitus, Noise-induced hearing loss, Betahistine.

INTRODUCTION

Tinnitus (pronounced as ti-NIGHT-us or TIN-i-tus) is the perception of sound in the ears or head where no external source is present. The word comes from Latin meaning "to tinkle or to ring like a bell"[1]. It is the commonest otological disorder referred to either the general practitioner or ENT surgeon [2].

Noise is a growing problem of today's world; one that has immediate and cumulative adverse effects on health. It is a common occupational hazard leading to one of the frequent complaints in the adult population seen by the otorhinolaryngologists. NIHL is a sensorineural hearing deficit which affects higher frequencies (3,000 to 6,000 Hz) to start with and gradually progresses as a result of chronic exposure to excessive sound levels. In a large proportion of patients with occupational NIHL, a significant aspect of the handicap concerns the concomitant tinnitus [3]. Especially among military veterans hearing loss, tinnitus and other auditory complaints are a common finding.

Whatever the cause of tinnitus, numerous therapeutic modalities have been tried, and still there is no consensus regarding the most effective therapeutic agent. Betahistine hydrochloride, structural and pharmacological analogue of histamine, has shown efficacy in treating tinnitus [4] and vertigo in some past studies. Nevertheless, these past studies might have been flawed and a recent review suggested that it is still unclear if betahistine has any true effect on tinitus or not [5]. The aim of this study was to determine the efficacy of betahistine hydrochloride in alleviating tinnitus associated with NIHL and if improvement was observed as compared to the placebo, recommendations can be made to rationalize the use of this safe, easily available and cost effective drug.

PATIENTS AND METHODS

Theses randomized control trail (RCT) were carried out at ENT dept of CMH Rawalpindi from July 2006 to December 2006. All the cases inducted in this study were above

Correspondence: Maj Shahzad Maqbool, ENT Specialist, 75 Medical Bn Quetta
Email: shahzadmaqbool73@gmail.com
Received: 24 Aug 2007; Accepted: 05 June 2009

18 years of age having tinnitus due to NIHL, with confirmed history of exposure to noise and Pure Tone Audiogram (PTA) having a definite dip at 3 or 4 kHz on Air Conduction (AC). Patients with tinnitus due to other causes or having diabetes, hypertension, peptic ulcer disease and alcoholics were excluded from the study

Patients were randomly divided in two groups. Group I, was treated with betahistine hydrochloride 16 mg thrice a day for two months. Group II, the control or placebo group was prescribed a single tablet of Multivitamin thrice a day for the same duration; after taking informed consent.

Loudness of tinnitus – the main out come measure of this study was assessed using VAS scores, as self-assessment of perceived loudness of tinnitus on each visit. The patients were asked to score the loudness of tinnitus between 0 (min) to 10 (max).

Descriptive statistics were used to describe the data. Data was analyzed using SPSS10. Independent Sample-T test was applied as a test of statistical significance to compare the means of loudness of tinnitus between the two groups on the first and third visits. P- Value of < 0.05 was to be taken as significant.

RESULTS

Seventy subjects were included in the study. We had 19 (27.15%) cases that were from artillery and mortar (heavy gun) platoons. And 17 (24.3%) were heavy engine (automobiles, air crafts etc.) mechanics and drivers. Similarly 15 (21.4%) cases were from signal corps dealing with noisy telecommunication equipments like, wireless operators, wiremen etc. The last category of trade (miscellaneous) was making 27.1% (n=19) of total. It included trades like welder, sapper (mine field sweeper) and small arm firer. Twenty eight (40%) cases had left sided tinnitus, 16 (22.9%) had right sided while 26 (37.2) cases had bilateral tinnitus. Patients were randomly divided into two groups of 35 each. All the cases in our study were military personnel and male. The mean age for the Drug group (Group I) was 47.83 ± 13.60 years and for the Placebo group (Group II) was 48.94 ± 11.96 years, (Figure).

In Group I, 13 (37.1%) cases were in their active service and 22 (62.9%) cases were pensioner. Similarly in Group II, 12 (34.3%) cases were serving and 23 (65.7%) cases were pensioner (P>0.05). The mean years of service during which patients were exposed to occupational noise was 20.51 ± 7.23 years for Group I and for Group II was 21.49 ± 3.79 years (P>0.05).

The mean of VAS score on the first visit of Group I was 5.80 ± 1.59 and for Group II was 6.11 ±.1.68. Similarly, after one month i.e. on the second visit it was still comparable i.e. 4.43 ± 1.91 for Group I and 4.77 ± 2.03 for Group II (P>0.44). After two months on the third (final) visit the mean of VAS scores of Group I was 4.073± 1.96 and that of Group II was 4.46 ± 2.23 (P>0.40).

The results indicate that there was statistically isignificant difference in loudness of tinnitus between the two groups from the start of treatment till the completion of therapy after two months.

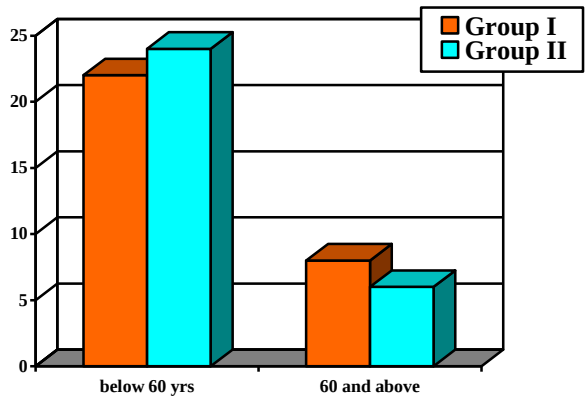

Figure: age distribution of the two groups

DISCUSSION

Tinnitus is a result of a complex psychosomatic process in which mental and social factors are considered to have a determining effect on all aspects of the patient's life [6]. Among the long list of its causes, certain modifiable risk factors are also incriminated. Exposure to loud noise is one of the common causes of NIHL and can lead to tinnitus [7, 8].

Many drugs of varied categories have been tried for alleviating tinnitus. Various studies are

available in the research literature that advocate efficacy of different drugs but none has been declared absolute so far.

A study very relevant to our subject was conducted by Shemesh et al in 1993. In this study all the cases recruited had tinnitus with NIHL. They found that deficiency of Vitamin B12 (Cyanocobalamine) may increase the risk of developing tinnitus and concluded that a therapeutic trail of Vitamin B12 may be warranted in all the patients with tinnitus associated with NIHL [9].

Betahistine hydrochloride has been used for vertigo [10-13] and tinnitus since it was marketed first in 1967. It causes vasodilatation in cochlea leading to hypothetical increase in perfusion of stria vascularis and reciprocal decrease in endolymphatic pressure.

A German scientist Jakobs in 1978, compared Betahistine, pentoxifyllin and xantinol-nicotinate in the treatment of tinnitus resulting from blast injury. Using 172 patients, the results showed that those receiving Betahistine produced significantly better therapeutic results in eliminating their tinnitus. But more recent researchers, like James and Burton, still doubt its efficacy and state that its role is still unclear [14].

Suga and Snow studied the effects of this drug in the cochlea and demonstrated that Betahistine caused marked and sustained improvement of cochlear microcirculation without affecting systemic blood pressure [15]. Rivera et al showed that Betahistine caused improvement of cerebral circulation in patients with vertebro-basilar insufficiency [16]. Dorina and his team of researchers have concluded that Betahistine is a very well tolerated drug, having no sedative effect and is suitable for long-term treatment [17].

The sources of noise are as varied as the activities carried out by the members of Army, Navy and Air force. We had 19 (27.15%) cases that were from artillery and mortar (heavy gun) platoons. And 17 (24.3%) were heavy engine (automobiles, air crafts etc.) mechanics and drivers. Similarly 15 (21.4%) cases were from signal corps dealing with noisy telecommunication equipments like, wireless operators, wiremen etc. The last category of trade (miscellaneous) was making 27.1% (n=19) of total. It included trades like welder, sapper (mine field sweeper) and small arm firer. All these are the sources of potentially damaging noise in military setting.

As there is predominance of left-sided tinnitus [18]; in our study, 28 (40%) cases had left-sided tinnitus and 16 had right-sided (22.9%); while bilateral tinnitus was seen in 26 (37.16%).

In our study, efficacy of Betahistine was evaluated specifically in tinnitus due to NIHL. Essentially, the conclusion seems to be that there is no evidence of this drug being harmful, but also little evidence to support its therapeutic efficacy in tinnitus due to NIHL as compared to the placebo. So being an inert drug, its status can be equilibrated with placebo in the management of tinnitus, despite being a vasodilator.

Westerberg et al conducted a study to determine the effect of Baclofen on tinnitus. The results were that out of 31 subjects on baclofen, only 3 (9.7%) reported improvement and out of 32 patients in the placebo group, only 01 (3.4%) reported improvement, and no significance was found between the two groups. Baclofen is placed in the category of Placebo for tinnitus [19]. The results of our study are almost identical to this study. So Betahistine hydrochloride should also be classified as placebo in the management of tinnitus due to NIHL.

CONCLUSIONS

It is concluded that Betahistine hydrochloride is 'not' better than a placebo in its efficacy for the treatment of tinnitus due to NIHL. Betahistine hydrochloride use should not be hyped as a very effective drug to alleviate tinnitus due to NIHL. However, further large scale studies with more diverse population, including both gender may be helpful.

REFERENCES

1. Iorio L, Avagliano F. Galeno's "De Pulsis et urinis" from the Casinensis Codex 97. J Nephrol. 2004; 17: 319-23.

2. Roy D,Chopra R. Tinnitus: an update. J R Soc Health 2002; 122:21-3.
3. Razi MS, Jaffer S, Gendeh BS.Tinnitus in Malaysia. Pak J Otolaryngol 2004; 20:27-30
4. Laurikainen EA, Miller JM, QuirkWS, Kallinen J, Ren T, Nuttall AL, et al. Betahistine-induced vascular effects in the rat cochlea. Am J Otol. 1993; 14:24-30.
5. James AL, Burton MJ. Betahistine for Meniere's disease or syndrome. Cochrane Database Syst Rev 2001:CD001873.
6. Stobik C, Weber RK, Munte TF, Frommer J. Psychosomatic stress factors in compensated and decompensated tinnitus. Psychother Psychosom Med Psychol. 2003; 53: 344-52.
7. Sindhusake D, Mitchell P, Newall P, Golding M, Rochtchina E, Rubin G. Prevalence and characteristics of tinnitus in older adults: the Blue Mountains Hearing Study. Int J Audiol. 2003; 42: 289-94.
8. Dias A, Cordeiro R, Corrente JE, Goncalves CG. Association between noise-induced hearing loss and tinnitus. Cad Saude Publica. 2006; 22: 63-8.
9. Shemesh Z, Attias J, Ornan M, Shapira N, Shahar A. Vitamin B12 deficiency in patients with chronic-tinnitus and NIHL. Am J Otolaryngol. 1993; 14: 94-9.
10. Kaźmierczak H, Pawlak-Osińska K, Kaźmierczak.W. Betahistine in vertebrobasilar insufficiency. Int Tinnitus J. 2004; 10:191-3.
11. Prokopenko SV, Rudnev VA, Afanas'eva EV, Abramov VG. A use of betaserc in ataxic syndromes. Zh Nevrol Psikhiatr Im S S Korsakova. 2004; 104: 41-5.
12. Solov'eva AD, Kornilova LN, Akarachkova ES, Temnikova VV. Betaserc treatment of psychogenic vertigo. Zh Nevrol Psikhiatr Im S S Korsakova. 2004; 104:39-42.
13. Albera R, Ciuffolotti R, Cicco MD, Benedittis GD, Grazioli I, Melzi G, et al. Double-blind, randomized, multicenter study comparing the effect of betahistine and flunarizine on the dizziness handicap in patients with recurrent vestibular vertigo. Acta Otolaryngol. 2003; 123:588-93.
14. Jakobs P, Martin G.The therapy of tinnitus resulting from blast injury. HNO. 1978; 26:104-6.
15. Suga F, Snow JB. Cochlear blood flow in response to vasodilating drugs and some related agents. Laryngoscope. 1969; 79: 956-1979.
16. Rivera VM, Meyer JS, Baer PE, Faibish GM, Mathew NT, Hartmann A. Vertebrobasilar arterial insufficiency with dementia: controlled trials of treatment with betahistine hydrochloride. J Am Geriatr Soc.1974; 22: 397-406.
17. Petrova D, Sachansca T, Datcov E. Investigation of Betaserc in auditory and vestibular disturbances. Int Tinnitus J. 2004; 10: 177-82.
18. Lindberg P, Lyttkens L, Melin L, Scott B. Tinnitus- incidence and handicap. Scand Audiol. 1984: 13: 287-91.
19. Westerberg BD, Roberson JB Jr, Stach BA. A double-blind placebo-controlled trial of baclofen in the treatment of tinnitus. Am J Otol 1996; 17:896–903.

.....