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RESEARCH ARTICLE

THE EFFECTS OF DIGITAL HEARING AID WITH TINNITUS MASKER IN MANAGEMENT OF TINNITUS PATIENT IN COMPARED WITH OTHER METHODS OF MANAGEMENT IN IRAQ

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ABSTRACT

The aim of this study's to determine the role and effect of digital hearing aid with tinnitus masker in management of tinnitus patient in Iraq. It's a Prospective clinical case series study in Department of Surgery and Audiology, Al-Jamhori Teaching Hospital. From the period2013 January to April 2018 of 100 patients. **Inclusion Criteria:** Tinnitus associated with sensorineural hearing loss, mixed hearing loss, conductive type hearing loss(e.g. Otosclerosis), retro cochlear type hearing loss. **Exclusion Criteria:** pediatric tinnitus, those patients suffering from psychological upset (phantom tinnitus), tinnitus due to other causes which may needs surgical interventions likes chronic secretary otitis media, adhesive type otitis media, perforated ear drum, tumors. **Intervention:** History, E.N.T. examination (Otoscopy examination), Diagnostic pure tone Audiometry device (the important device used in our study), Diagnostic OAEs device, tympanomtry and reflexes device. Outcome Measures: The outcome measurements we depends on subjective feeling of improvement in Tinnitus. Statistical **Analysis:** done using Graphic Pad Chi-Sequer and P value calculated. **Results:** Significant decreases in the severity of tinnitus, Mini-Tinnitus is obtained by using digital hearing aid with tinnitus masker in group 1 gives better results than group 2. **Conclusion:** The findings obtained using either the combined devices Digital Hearing Aid with Tinnitus Masker or the medical treatments like betaserc tab. 16mg demonstrate that these devices are better in tinnitus treatment alternative.

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INTRODUCTION

Tinnitus refers to an auditory perception not produced by an external sound. It is commonly described as a "hissing, roaring, or ringing" and can range from high pitch to low pitch, consist of multiple tones, or sound like noise (having no tonal quality at all). It most often is constant, but can also be perceived as pulsed, or intermittent, and may begin suddenly, or may come on gradually. It can be sensed in one ear, both ears, or in the head (1). Tinnitus is involuntary sound perception originating in the head can be caused by: Hearing loss, Exposure to loud sounds, Extreme stress or trauma, Acoustic neuronal, Injury to ears, neck or head, Menière and heart disease, vascular anomalies (2) Hearing loss and tinnitus. Hearing loss is a common factor underlying tinnitus, although some people with normal hearing may also experience tinnitus. Loss of hearing is often an unnoticeable and gradual process and many people are surprised when they are told that they have a hearing loss.

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It is quite common for people to assume incorrectly that it is their tinnitus rather than their hearing loss that is causing hearing difficulties (3). Hearing aids and tinnitus: For many people, tinnitus may be related to sound deprivation, for example hearing loss. The aim of fitting hearing aids is to correct any such hearing loss with the possibility that this may help reduce the tinnitus. Hearing aids should be worn throughout your waking hours to gain maximum benefit (4).

Is there a positive effect on tinnitus by using hearing aids? Some studies have looked at the effect of hearing aids on every-day life for the tinnitus patient e.g. how a hearing aid may help reduce tinnitus and improve quality of life. Other studies have more strongly suggested that for a significant number of people, hearing aids do reduce the effect of tinnitus. Bilateral hearing aids (one on each ear) have been shown to be more beneficial than using only one aid. Since the introduction of digital hearing aids there can be more accurate tailoring of hearing aids to an individual and this has brought about an increase in the beneficial effect of hearing aids for tinnitus. (5).

*Any Tinnitus treatment must be used in connection with counseling and possible other treatment.
*Tinnitus is a perception of involuntary sound. It must be audible to the person, it originates in the head (6). Produced centrally, with peripheral influences e.g. Cochlear damage.
*Noise type can vary from pure tones to crackling sounds.
*Tinnitus can be Ringing, Chirping, Clicking, Pulsating, Continuous. patients with different history of exposure to Acoustic Trauma, from Meany expulsions or those veterans returning from Meany wars happened, come home with hearing loss and tinnitus Or due to another causes like Age related hearing loss (after 55 years old) may accompanied with different disease likes for example, diabetic mellitus, hyperlipidemia and hypercholstrema , atherosclerotic disease. (For those who suffer from tinnitus, external and artificial sounds from a masker can be preferable to the constant ringing they experience. A tinnitus Masker is an electronic hearing aid device that generates and emits broad-band or narrow-band noise at low levels, designed to mask the presence of tinnitus. Such masking noise is also referred to as white noise. For an individual suffering from both hearing loss and tinnitus, the masker and the hearing aid can operate together as one instrument (7).

What causes Tinnitus (8)

It is thought that when the structure of the OHC collapses, it can no longer inhibit the neuronal activity of the IHCs. The damaged hair cells move randomly in a constant state of irritation. They are unable to hold their charge and leak random electrical impulses which travel to the auditory cortex where they are interpreted as noise. Not limited to OHC damage alone. IHC damage can also play a role in the generation of tinnitus. Suggests there are additional mechanisms that are also responsible in tinnitus generation beyond OHC damage 2 (9). Maskers & Home Masking Devices. Maskers are used to cover-up the tinnitus perception with a competitive signal that either partially or completely competes with or conceals the tinnitus. This can be achieved by a number of methods, ranging from environmental masking to ear-level worn sound generators. Also, there are commercially available recordings of a wide range of sounds that can provide complete or partial masking. In addition to their masking effect, these sounds may assist in relaxation.(10) PATIENTS AND METHODS:- A study was designed to determine the effect of digital hearing aids with tinnitus masker in management of tinnitus patient done in our privet clinic in Iraq , the study was carried out in Mosul and ERBIL in Iraq from the period of 2013 January to April 2018.

One hundred clients was visits our clinics in this period suffering from continues Tinnitus associated with hearing loss, especially sensorineural hearing loss type, day and night especially in the night, these patient are divided from 2 groups, group 1 patient suffering from tinnitus associated with sensorineural hearing loss due to age related hearing loss (presbycusis) or to those who exposure to loud sounds either due to Occupational hazards or due to exposure to Acoustic Trauma (n= 50 patients),we give him and advice theme for used digital hearing aids with tinnitus masker (Tinnitus breaker) from 3 to 6 months periods, and compared with the corresponding results of group 2 (n=50 patients), who received drugs therapy of tinnitus like Gingko balboa and betaserc (Betahistine dihydrochloride) only (without hearing aid and tinnitus masker) tabs 16 mg from 1 to3 months periods, The age is from 23 years old to 80 years old,the hearing aid with tinnitus masker group (group 1), 30 males and 20 females with a ratio about 1.5:1 , the second group (group 2), we found the response of group 1 is better than group 2 , it can be concluded that digital hearing aids with tinnitus masker has significant effect in decreasing the symptoms of tinnitus after 3 to 6 months periods. These patients were arbitrary divided into two groups: group 1 (n= 50 patients), were given hearing aid digital type with tinnitus masker programmed on laptop according to there PTA reports, And compared with the corresponding results of group 2 (n=50 patients) who received medical treatment likes Gingko balboa (extract or row material? 60mg daily) for at least 2 months with or without Betaserc tab 16mg 1 by 3 for 2to 3 months duration.,

Intervention
-History, and E.N.T. examination (Otoscopy examination)
-Diagnostic pure tone Audiometry performed for all patients to confirm the diagnosis of sensorineural deafness and other type of hearing loss.
-Diagnostic OAEs done for patients who suffering from senerinural hearing loss to excluded the causes of tinnitus due to cochlear or Retrocochlear hearing loss?.
-Tympanomtry and reflexes test to exclude other causes of tinnitus. 50 patients treated by hearing aid (we use resound type and Belton type hearing aid from G.N. company) (11) While 50 received medical treatment

Inclusion criteria: Pure sensorineural hearing loss, mixed hearing loss, conductive type hearing loss, retro cochlear type hearing loss.

Exclusion criteria: Pediatric tinnitus, those patients suffering from psychological upset (phantom tinnitus)., tinnitus due to other causes likes chronic otitis media, perforated ear drum. Tinnitus due to other causes which may needs surgical interventions likes chronic secretary, adhesive type otitis media, perforated ear drum, tumors.

RESULTS

The mean age of patients of 2 (group 1 &2) groups range between 23 years and 80 years old who used hearing aid with tinnitus masker (group 1), the peak incidence was in the third decade how they are exposure to loud sounds or exposure to expulsions (Acoustic Trauma), and peak age was in the fifth decade of life who suffering from senerinural hearing loss due to Age related hearing loss. The group included male patients (30%), and females (20%) with ratio of 1.5 : 1 , in comparison, 55 years the patients in the second group (group 2), similarly, the peak age incidence was in the third decade, and peak age was in the fifth decade of life who suffering from senerinural hearing loss due to Age related hearing loss, so we find that there is a Significant decreases in the severity of tinnitus, Mini-Tinnitus is obtained by using digital hearing aid with tinnitus masker in group 1 gives better results than group 2 . the mean age of patients who used hearing aid with tinnitus masker (group 1)range between age 23years and 80 years , the peak incidence was in the third decade how they are exposure to loud sounds or exposure to expulsions (Acoustic Trauma) ,and peak age was in the fifth decade of life who suffering from senerinural hearing loss due to Age related hearing loss . The group included male patients (30%), and females (20%) with ratio of 1.5: 1, in comparison , 55 years the patients in the second group (group 2),with range 23-80 years, similarly, the

peak age incidence was in the third decade how they are exposure to loud sounds or exposure to expulsions (Acoustic Trauma) ,and peak age was in the fifth decade of life who suffering from senerinural hearing loss due to Age related hearing loss. Statistical methods Chi-Sequer was done and P-value which means statistically significant difference in favors of hearing aid .The results as fellow "The Chi-Square statistic is 25.2525, the P-value is .00001. This result is significant at P < .05. Statistical analysis done using Graphic Pad Chi-Sequer and P value calculated, Chi-Sequer was done and P-value which means statistically significant difference in favors of hearing aid .The results as fellow "The Chi-Square statistic is 25.2525, the P-value is .00001. This result is significant at P < .05. when we use hearing aid with tinnitus masker 40 patient out of 50 cured or improved while 15 patients out of 50 cured or improved by medical treatment.

DISCUSSION

We find that there is a Significant decreases in the severity of tinnitus, Mini-Tinnitus is obtained by using digital hearing aid with tinnitus masker in group 1 gives better results than group 2. our results show improvement of Tinnitus in the group no. 1, who use hearing aids with Tinnitus Masker with statically signals its differs in results as compared with medical treatments only and these results are the same to study by et.al. in reference point(12)(Hearing Aid or Tinnitus Masker which one is the best treatment for Blast-Induced Tinnitus), also the results are the same as in our study done by point (13) in References by OzI , and et.al. group.,also in point (14) Hearing aids and tinnitus therapy: a 25-year experience, M I Trotter etal (15)and I Donaldson etal,(16) they considered hearing aid and tinnitus masker is effective in management of tinnitus patient , the same as our opinion group. Some doctors considered drug therapy is enough for treatment of tinnitus patient likes in point (17), Salvi R, Lobarinas E, Sun W. Drugs Future. Also they considered the Effects of the potassium ion channel modulators BMS-204352 Maxi post its effective in treatment of tinnitus induced by Salicylate drug, (18).

Conclusion

We find that there is a Significant decreases in the severity of tinnitus, Mini-Tinnitus is obtained by using digital hearing aid with tinnitus masker in group 1 gives better results than group 2 .The findings obtained using either the combined devices Digital Hearing Aid with Tinnitus Masker or the medical treatments like betaserc tab. 16mg (Betahistine dihydrochloride) (2HCl) demonstrate that these devices better tinnitus treatment alternative.

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