

A Novel Treatment Method to Eliminate the Complaints of Tinnitus and Related Psychiatric Disorders

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Background: Tinnitus has been commonly seen worldwide and affects the psychological condition and quality life of people. In this study, we aimed to eliminate the complaints of tinnitus and related psychiatric disorders.

Materials and Methods: Thirty patients who were newly diagnosed with tinnitus were included in the study. We applied a new treatment solution to all patients for tinnitus. Before and after the treatment, the patients were asked to complete Tinnitus Handicap Inventory (THI) and Beck Depression Inventory (BDI). We compared pre- and post-treatment BDI scores and THI grades of the patients.

Results: Post-treatment BDI scores of the patients were significantly lower than pre-treatment ones ($p<0.05$). Post-treatment THI grades of the patients were meaningfully lower than pre-treatment ones. The results showed that the severity of tinnitus and depressive symptoms decreased statistically and clinically after our treatment ($p<0.05$).

Conclusion: This novel treatment method with a new solution can be used superior to other interventions for treating tinnitus and related psychological problems.

Keywords: Tinnitus, treatment, depression, psychological problems

Introduction

Tinnitus, without any sensory stimulus from outside, inside the ear or head is defined as buzzing, crowing, rustling, chirping, whistling, or ringing. This is an unusual situation, which affects people psychologically and socially. Today's physicians do not have enough knowledge about complex pathophysiological mechanism that is the cause of tinnitus. Therefore, the interventions for tinnitus cannot reach a positive outcome.

Tinnitus can occur single or double-sided. The vast majority of people with tinnitus try to live with it. The reason is the lack of an adequate and concrete solution to tinnitus. Thus, in people with tinnitus, psychological problems such as hopelessness, depression, and anxiety may commonly occur (1). On the other hand, severe costs are paid for the treatment of the disease. There are many reasons for the etiology of tinnitus. The most common causes are sensorineural hearing loss, sound exposure

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and mechanical trauma. Otolaryngology disease such as Meniere's disease, otosclerosis; drug side effects; different metabolic diseases like diabetes, vitamin deficiency, hypertension; and vascular diseases can also cause tinnitus (2). Tinnitus may be treated with the treatment of these underlying diseases.

Although some people have no additional diseases, and in physical practice, tympanum and hearing functions are entirely normal, they may complain of severe tinnitus. This situation is considered to be psychological by most physicians, and they recommend the patient to receive psychiatric treatments and supports. In this case, many tinnitus patients may have to use antidepressants.

This study aims to eliminate the complaints of tinnitus in patients with normal hearing functions and tympanic membrane. In this context, we aim to increase the quality of life of the patients and to reduce the psychological problems. We also wanted to reduce the treatment cost and duration of the disease. We prepared a solution for this purpose. The solution included three herbal oils (sesame oleum, amygdalarum oleum, and oleum olive), dexamethasone, coenzyme Q₁₀, vitamin E, and PRP (platelet rich plasma). These oils are used in the treatment of various diseases among the population, but not in the treatment of tinnitus.

Materials and Methods

The ethical approval was obtained from the ethics committee of Adana City Hospital in Adana in Turkey. The patent of our treatment has also been approved. The patent number is 2018/16475. This study was conducted as a prospective study. We included diagnosed 30 patients with tinnitus who did not have any other systemic and otolaryngology diseases.

The patients referred to our center with the first complaint of subjective tinnitus. All patients underwent ear-nose-throat examinations. The patients also underwent pure tone audiometry testing. We excluded all metabolic syndrome diseases such as hypertension, diabetes mellitus, and all otolaryngology diseases such as sensorineural hearing loss, chronic otitis, Meniere disease, otosclerosis, etc.

Direct measurement of the tinnitus severity is obtained via self-report questionnaires. For instance, the Tinnitus Severity Scale (3) and Tinnitus Handicap Inventory (THI) (4). In our study, before and after the treatment, the patients were asked to complete the THI. Based on the total THI score, the patients with tinnitus were classified into five categories: slight (0–16), mild (18–36), moderate (38–56), severe (58–76), and catastrophic (78–100). The patients were asked to complete the Beck Depression Inventory (BDI) for psychological problems. BDI is a self-report scale to evaluate the depression risk and severity of depressive symptoms. It can be used for both psychiatric patients and the general population. BDI includes 21 Likert-type items each scored between 0–3. The range of scores is from 0 to 63.14.

Preparing the solution

Three different herbal oils were used. These oils were sterile oils that are mined by the various distillation methods. Dexamethasone, coenzyme Q₁₀, vitamin E, and PRP were used additionally.

1. Sesame Oleum (0.1 cc)
2. Amygdalarum oleum (0.1 cc)
3. Oleum olive (0.1 cc)
4. Dexamethasone 8 mg (0.2 cc)
5. 1 mg coenzyme Q₁₀ and 5 mg vitamin E TPGS (D- α -Tocopherol polyethylene glycol 1000 succinate) solution (0.5 cc)
6. PRP (platelet rich plasma): PRP is obtained by centrifuging the blood from patients at 8000

rpm for 15 minutes (0.5 cc). Finally, A 1.5 cc mixture is obtained.

Applying the solution

The solution is applied to the patient in the supine position under a bio microscope. The solution is applied to the upper posterior quadrant of the tympanic membrane with a dental injector. The patient is asked to wait for 15 minutes without swallowing and talking. These were applied to keep the solution in the middle ear and to be effective.

We applied the solution once a day for three consecutive days. Two weeks after the treatment, the patients were asked to complete THI and BDI again. We compared pre- and post-treatment BDI scores and THI grades of the patients. During and after the treatment, the patient did not complain of pain or any adverse reactions.

Statistical analysis

Standard deviation, mean, median, lowest, highest, frequency, and ratio values were utilized in the descriptive statistics of the data. The distribution of the variables was assessed with the Kolmogorov Smirnov Test. Paired Samples T-Test and Wilcoxon Signed Rank Test were used for the analysis. The analyzes of data are made use of SPSS v21 software.

Results

The demographic variables and comparison of pre- and post-treatment BDI scores and THI grades of the patients were shown in Table-1. The mean age of the patients was 37.43 ± 2.5 , and 56.7% (n: 17) of the patients were female. Pre- and post-treatment BDI scores and THI grades of the patients were significantly different. Post-treatment BDI scores and THI grades were significantly lower than pre-treatment ones ($p < 0.05$).

Table-1. Demographics, BDI Scores and THI Grades

Variables	Min-Max	Median	Mean $\pm$ SD/N%
Age	17 - 66	34.5	37.43 $\pm$ 2.5
Gender			17 56.7%
▪ Female			13 43.3%
▪ Male			
	Min-Max	Mean $\pm$ SD	P*
BT BDI Score	7 - 48	27.07 $\pm$ 11.3	0.008
AT BDI Score	1 - 33	14.93 $\pm$ 8.67	
	Min-Max	Percentiles (50 th)	P**
BT THI Grade	1 - 5	3	0.0001
AT THI Grade	0 - 3	1	

BT: Before treatment, AT: After treatment, BDI: Beck depression inventory, THI: Tinnitus handicap inventory. * Paired Sample T-Test was used. ** Wilcoxon Signed Rank Test was used.

Discussion

Although tinnitus is prevalent in population, it is a major clinical puzzle. When tinnitus is a symptom of a different disease, the treatment of the current disease can cure the complaint of tinnitus. However, if the cause cannot be known, it is difficult to find a cure. Below, some treatment experiences related to tinnitus will be discussed.

In the study of Jastreboff et al., by developing the retraining therapy method, they allowed the patients to in retraining lam the brain to familiarize with tinnitus signal, thus encouraging the patient to perceive the tinnitus as a neutral stimulus (5).

Cognitive behavioral therapy (CBT) aims to reduce unwanted emotional and behavioral responses to tinnitus by rearranging the patient's negative ideas and behaviors (6). In a meta-analysis study involving 468 patients, it was found that CBT decreased depression and life inquiries in eight studies, but six studies showed no effect on subjective tinnitus volume (7). Since patients with tinnitus usually have high-frequency hearing loss, hearing aids are also used in the treatment of tinnitus. Hearing

aids enable masking of tinnitus by amplifying environmental sound (8,9). In our clinical experience, the vast majority of our patients do not prefer hearing aids for tinnitus.

Many drugs have been used to treat tinnitus. However, there is no definitive medication for tinnitus treatment today. Antidepressants and anticonvulsant agents are used (10,11). However, almost all of the drugs given as treatments are ineffective, and most of them have undesirable side effects (2).

Transcranial magnetic stimulation is a method of treatment of short magnetic pulses, which is administered by a coil through a disease-free scalp to designated areas of the brain. Repetitive transcranial magnetic stimulation (rTMS) has been found to reduce neural activity indirectly stimulated regions of the brain and distant regions. The rTMS is applied, assuming that tinnitus complaint is related to abnormal activity in the central hearing system (12,13). Although all studies have shown improvements in the severity of tinnitus with rTMS, it is not widely used since it is a costly method (14).

All of these treatment modalities are aimed at to reduce the tinnitus awareness of the patient by not eliminating tinnitus disease. These problems lead us to search for a new method that can treat tinnitus in a short time with low cost. We want to increase the satisfaction and quality life of the patients, and reduce the psychological problems.

We developed a solution based on our clinical experience and etiology of otolaryngology diseases. Firstly, we applied the solution to the middle ear of rats with sensorineural hearing loss (SNHL) by intratympanic injection. We applied the solution to rats once a day for three days. Then, we found that the hearing degree

of rats improved after intratympanic injection. There were not seen any complications on rats. Therefore, we decided to use this mixed solution to voluntary patients with SNHL and tinnitus. We found that the degree of SNHL reduced after the treatment. Our study with patients with SNHL is under review elsewhere.

The study results show that we were successful in treating the complaint of tinnitus. The patients with tinnitus benefited from our treatment method. The depressive symptoms of the patients also improved without need for antidepressants. However, our findings should be supported by future studies.

Conflict of Interests

The authors declared no conflict of interest with the present article.

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