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Is there any effect of anxiety and depression scores on the improvement of tinnitus after surgery in chronic otitis patients with tinnitus

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ABSTRACT

Background: Tinnitus is a common disease in public. It is not only associated with neuronal, muscular, vascular pathologies, but also with related psychological parameters. In this study, we aimed to investigate the relationship between tinnitus, anxiety and depression in patients undergoing tympanoplasty.

Methods: Patients with tinnitus and operated for chronic otitis media were included in our study. Before and after the operation, tinnitus handicap inventory, beck anxiety and depression scales were filled and pre- and postoperative values were compared. In addition, our patients were divided into two groups as tinnitus improve and did not improve and differences between them were investigated.

Results: 148 patients were included in our study. Of 148 patients, 60 were male and 88 were female. There was no significant difference between the patients with and without tinnitus when the dermografic features, hearing levels and physical examination findings were compared.

After the operation, the patients who did not improve tinnitus had higher levels of depression and depression than others (< 0.001).

Conclusion: As a result of our study, anxiety and depression scales of the patients whose tinnitus did not improve were found to be higher than the patients whose tinnitus improved.

1. Introduction

Tinnitus is defined as sound perception without any external stimuli. Patients can describe the tinnitus in one ear, in both ears and in the head. Tinnitus has two types, objective and subjective. If the doctor hears the voice heard by the physician or another person, it is called objective tinnitus. They are usually caused by vascular, neuromuscular, tracheal tube and temporomandibular joint dysfunction. Subjective tinnitus is felt without sound, and is felt only by the patient. Subjective tinnitus is much more common [1,2].

One of the complaints in patients with chronic otitis is tinnitus, the most common complaints of the patients are hearing loss and otorrhea. Hearing loss is known to be a strong correlation between tinnitus. However, in some patient groups, even if the hearing loss is recovered, the tinnitus may not improve [3,4].

Tinnitus affects patients psychologically and socially in many ways and disrupts their quality of life. Many studies have found that anxiety and depression scales are high in patients with tinnitus. Tinnitus itself can make symptoms of anxiety and depression in patients, while reducing treatment response in groups with high anxiety and depression scores [5,6].

When treating patients with chronic otitis media, the goal is to clear the pathology inside the middle ear and correct the hearing. Most of the time, the patients are asking the doctors if the tinnitus complaint will pass after the operation. There are studies in the literature showing that tinnitus may decrease after surgery, but it is not possible for surgeons to predict which patients will improve or decrease tinnitus [7,8].

In this study, the effect of tympanoplasty on tinnitus was evaluated in chronic otitis patients and it was investigated whether or not the parameters such as depression and anxiety scores had an effect on tinnitus after surgery.

2. Material and methods

This study included chronic otitis media patients who underwent tympanoplasty operation between December 2015 and December 2016. All surgical operations were performed by a single experienced surgeon. Ethical committee approval of our study was provided by the ethics committee of an education and research hospital.

The number of patients who underwent tympanoplasty surgery in our study was 152. Tinnitus was present in 84 (55.25%) patients. In all of our patients participating in the study, the tinnitus was on the

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operated ear side. Those who define tinnitus in both ears, or tinnitus as a sound from within the head, are excluded from the study. During the study, 4 patients were left with no follow-up. For this reason, our study was evaluated on 148 patients. Age, gender, subjective ear complaints, tympanic membrane perforation size and location were recorded. Before the operation, patients were filled in the tinnitus handicap inventory (THI) and tinnitus was detected in 84 patients. Patients completed a THI 6 months after the operation the severity of tinnitus in patients is determined by a number between 0 and 100 with the THI. The preop and postop 6th month Beck anxiety and Beck depression scores of our patients were filled and recorded with a one-to-one interview. The Beck Anxiety and Depression Scale consist of 21 questions. Each question is given from 0 to 3 points according to the patient's answers.

The potential changes of the patients after surgery were evaluated statistically. The effect of anxiety and depression on tinnitus presence and recurrence was investigated.

2.1. Statistical methods

SPSS 15.0 for Windows program was used for statistical analysis. Descriptive statistics; number and percentage for categorical variables, and mean, standard deviation for numerical variables. Mann Whitney *U* test was used for the comparison of numerical variables in two independent groups, since no normal distribution condition was provided. Numerical variables in dependent groups were analyzed by Willconson's test because the differences did not satisfy the normal distribution condition. Statistical significance level of alpha was accepted as $p < 0,05$.

3. Results

Of the 148 patients included in the study, 60 were male and 88 were female and the mean age was 28.4 ± 11.7. Compared with patients with and without preop tinnitus, there was no significant difference in the mean age, sex ratios, subjective complaints, discharge rates of the patients (Table 1).

The tympanic membrane perforation size and localizations of 148 patients are shown in Table 2.

Before surgery, THI, Beck anxiety and depression scales were significantly higher in patients with tinnitus compared to patients with and without tinnitus. (< 0.001, 0.026, < 0.001). In patients with preop tinnitus, there was a significant decrease in THI after surgery, but no significant difference was found in Beck depression and anxiety scales (< 0.001, 1000, 0.317).

After surgery, THI was found to be significantly lower in patients with and without tinnitus improvement, and beck anxiety and depression scales were significantly higher in the group without tinnitus improvement (< 0.001).

There was no significant difference between the groups with and without tinnitus between 500, 1000, 2000, 4000 Hz bone and air hearing levels (Table 3).

Table 2
Perforation type and location of patients.

Size	Locations	Patients	Total
Small	Anterosuperior	4	52
	Anteroinferior	10	
	Posterosuperior	12	
	Posteroinferior	26	
Moderate	Anterior	8	62
	Posterior	16	
	İnferior	38	
Large	Central	10	10
Near total	Central	24	24

Table 3
Hearing levels and tinnitus.

		Tinnitus				
		(+)		(−)		
		n	%	n	%	p
Bone 500 Hz	Preop	19.4 ± 12.4	17.5	21.9 ± 13.0	20	0.346
	Postop	18.8 ± 12.4	15	21.0 ± 13.4	20	0.423
Bone 1000 Hz	Preop	18.4 ± 128	15	19.1 ± 10.4	20	0.459
	Postop	18.2 ± 12.7	15	18.4 ± 10.4	17.5	0.524
Bone 2000 Hz	Preop	17.9 ± 15.7	15	18.3 ± 12.0	15	0.529
	Postop	18.0 ± 15.7	15	18.3 ± 11.9	15	0.537
Bone 4000 Hz	Preop	17.0 ± 14.3	12.5	21.3 ± 15.6	15	0.112
	Postop	16.8 ± 14.4	10	20.4 ± 15.7	15	0.163
Air 500 Hz	Preop	46.1 ± 14.7	42.5	47.8 ± 22.8	45	0.934
	Postop	34.9 ± 16.8	30	37.7 ± 22.9	30	0.978
Air 1000 Hz	Preop	39.2 ± 18.2	35	41.1 ± 18.3	45	0.602
	Postop	33.0 ± 18.7	30	33.4 ± 17.8	30	0.767
Air 2000 Hz	Preop	36.5 ± 17.7	35	35.5 ± 16.5	35	0.904
	Postop	31.5 ± 19.0	27.5	32.3 ± 17.2	32.5	0.645
Air 4000 Hz	Preop	42.3 ± 20.8	40	41.9 ± 17.8	40	0.982
	Postop	35.0 ± 20.0	30	37.3 ± 19.4	35	0.495
Air-bone gap 500 Hz	Preop	26.7 ± 12.4	25	25.6 ± 13.3	25	0.571
	Postop	16.0 ± 9.9	15	16.3 ± 11.1	12.5	0.925
Air bone gap 1000 Hz	Preop	21.3 ± 12.4	17.5	22.3 ± 13.0	20	0.696
	Postop	14.8 ± 12.0	10	15.1 ± 12.6	10	0.996
Air-bone gap 2000 Hz	Preop	18.9 ± 10.7	20	17.2 ± 10.0	15	0.400
	Postop	13.9 ± 10.4	10	14.0 ± 10.5	10	0.903
Air-bone gap 4000 Hz	Preop	25.0 ± 12.5	25	20.6 ± 10.5	20	0.120
	Postop	18.1 ± 11.7	15	17.0 ± 12.1	15	0.597

Table 1
Physical examination and tinnitus.

		Preop tinnitus				
		(+)		(−)		
		Ort. ± SD	Median	Ort. ± SD	Median	p
Age		30,7 ± 13,7	30,5	28,8 ± 12,8	24,5	0,635
		n	%	n	%	p
Gender	Male	38	45,2	22	34,4	0,346
	Female	46	54,8	42	65,6	
Subjective suffering of patients	Hearin loss	76	90,5	58	90,6	1000
	Otorrhea	62	73,8	50	78,1	0,668
	Aural fullness	42	50,0	32	50,0	1000
	Otalgia	44	52,4	36	56,3	0,741
	Dizness	32	38,1	26	40,6	0,825
	Ear itching	2	2,4	0	0,0	1000
Operated ear side	Left	38	45,2	34	53,1	0,501
	Right	46	54,8	30	46,9	

4. Discussion

Tinnitus is a common disease in the community and we cannot always receive satisfactory results in its treatment. Understanding the comorbid diseases of tinnitus will allow us to better treat our patients.

There are many studies showing that tinnitus and stress disorders are frequent. Gomaa et al. found that the duration of tinnitus correlated with anxiety and depression [9]. In addition, Falkenberg et al. were found to have higher levels of anxiety and depression in patients with high tinnitus severity. Although the relationship between anxiety and depression with tinnitus is known, it is not possible to say that tinnitus is a predisposing factor for depression. However, early psychological interventions in patients with tinnitus may prevent the patient from being disturbed by tinnitus and may reduce the psychological problems that may occur [10].

One of the complaints of patients with chronic otitis is tinnitus. When we offer surgery for chronic otitis, it is not possible to predict whether the complaint of tinnitus completely improves. In a study by Guo et al., Tinnitus improved in most patients after tympanoplasty. In this study, it shows that tinnitus in the lower frequency is improved more precisely. There are many studies showing that the incidence of tinnitus is high in patients with hearing loss. [11].

Even if hearing is corrected in some patients, there is no improvement in tinnitus. It is not possible to say clearly that tinnitus will improve in tympanoplasty operations or otosclerosis surgeries. In a study conducted on otosclerosis patients in 2015, the improvement in tinnitus in young patients after stpedotomy was better than in elderly patients [12].

When the relationship between hearing frequencies and tinnitus was evaluated, there was no significant difference between the frequencies of hearing loss and tinnitus in our study. In a study by Vielsmeier et al., He states that hearing loss at high frequencies may be considered as the potential causes of tinnitus etiology. In many studies, the frequency of tinnitus tinnitus is measured and masking treatment is applied in the foreground. One of the possible causes of the possible consequences of our study is that the number of patients subdivided into a subset of patients may be insufficient. [13,14].

In our study, the tinnitus of the majority of patients improved after tympanoplasty surgery. When the postoperative tinnitus improved and the patients who did not improve were compared, it was seen that Beck anxiety and depression levels were higher in the patients whose tinnitus did not improve. In addition, there was no significant difference in Beck anxiety and depression levels before and after surgery. High anxiety and depression scales can affect tinnitus improving. Malakouti et al. reported a decrease in tinnitus complaints when medical treatment was given to patients who had comorbid stress disorder in 2012. It is suggested that the tinnitus complaint is related to decreasing tinnitus intensity rather than the direct effect of psychotropic drug. In order to predict the improvement of tinnitus in patients with chronic otitis patients, the fact that there is a very large patient group which is a parameter of one effect is difficult to predict. The high scores of beck anxiety depression in the patient group whose tinnitus did not improve may indicate that these patients can benefit from the treatment of stress disorders [15]. One of the reasons why post-operative tinnitus is not improved in patients with chronic otitis may be increased tinnitus intensities of people with high levels of anxiety and depression. In this case, tympanoplasty operation is less effective on tinnitus in patients with high anxiety and depression scales.

Tympanoplasty surgery with hearing restoration provided with many comorbid diseases with tinnitus. While giving information about tinnitus to our patients, we need to review comorbid diseases.

5. Conclusion

In our study, we observed that anxiety, anxiety and depression scores were higher in patients who did not improve tinnitus postoperatively.

Disclosure statement

The authors confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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