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Comparison Of Handicap Inventory Tinnitus Scores Before and After Intra Tympanic Steroid Injection In Tinnitus Patients

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ABSTRACT

Introduction. Tinnitus is a symptom in the form of a conscious perception of sound that is not produced by a sound source outside the body. Patients with tinnitus often have complaints of quality of life, with some situations of extreme anxiety, depression, and life changes. The Tinnitus Handicap Inventory (THI) is a valid questionnaire to be associated with patients associated with tinnitus. The Tinnitus Research Initiative (TRI), an international academic organization founded in 2006, recommends the use of THI for the evaluation of tinnitus defects and therapeutic effects. Therefore, a THI assessment is needed at RSUP Dr. Mohammad Hoesin Palembang as a result of therapy. **Methods.** This research using a design that aims to determine the comparison of THI scores before and after intratympanic injection of corticosteroids in 18 samples at RSUP Dr. Mohammad Hoesin Palembang. **Results**. The average age of the sample was 57 (23-66) years and the number of men and women were the same, namely 9 (50%) samples. Most of the samples had problems in unilateral ears by 14 (77,8%) samples. The average THI before intratympanic steroid injection was 37 (12-72) and after injection was 20 (4-80). Wilcoxon test results showed significant changes between before and after intratympanic steroid injection. **Conclusion.** There was a significant improvement in THI scores after intratympanic steroid injection.

1. Introduction

The verb tinnitus comes from the Latin word tinnire which means ringing, and in common English usage it is defined as ringing in the ears according to the Oxford English Dictionary. Tinnitus is a symptom associated with many causes and triggers. In some cases, it can be a symptom of a serious disease such as a vascular tumor or vestibular schwannoma. Tinnitus often coexists with hearing loss, and damage to the outer, middle and inner ear can contribute to tinnitus. Intratympanic dexamethasone injection (ITDI) has been introduced as a treatment option for subjective tinnitus. Cause of tinnitus is a subjective symptom; a questionnaire is needed to assess and evaluate treatment in tinnitus patients. The Tinnitus Handicap Inventory (THI) is a valid questionnaire to be associated with patients associated with tinnitus recommended by (TRI) The Tinnitus Research Initiative since 2006.[1,2,3,4]

2. Methods

This study is an open label study using a design that aims to compare THI scores before and after intratympanic corticosteroid injections at RSUP Dr. Mohammad Hoesin Palembang. The study population was all subjective tinnitus patients at RSUP Dr. Mohammad Hoesin Palembang during the period July 2022 to September 2022. The inclusion criteria were as follows: (1) Patients understand Indonesian and can read questionnaires; (2) Subjective tinnitus patients with type A tympanometry; (3) Willing to participate in the study by signing an informed consent where the consent letter is signed by the research subject. Exclusion criteria were as follows: (1) Subjective tinnitus patients under 18 years of age; (2) Objective tinnitus patients. The minimum sample size was 18 samples.

Univariate analysis was used to analyze distribution patterns such as age, sex, affected ear, accompanying symptoms, onset, and THI value before injection, audiometric mean value before injection. THI values before and after injection were evaluated in bivariate analysis using the Wilcoxon test. The data obtained will be processed using SPSS software for Windows version 26.0.

3. Results

Univariate analysis in this study included demographic factors; age, gender, affected ear, vertigo, hypertension, diabetes mellitus, dyslipidemia, onset, and therapeutic outcome. This study found that out of 18 samples aged <60 years, more were found than samples ≥60 years, 13 (72.2%) samples with an average age of 57 years, the youngest age was 23 years and the oldest was 66 years old. The number of male and female samples were the same at 9 (50%) samples. Most of the samples had problems with unilateral ears of 14 (77.8%) samples.

There were 5 (27.8%) samples with vertigo, 4 (22.2%) samples with hypertension, 3 (16.7%) samples with DM and 6 (33.3%) samples diagnosed with dyslipidemia. Tinnitus onset has a mean of 14 days, the minimum onset is 5 days and the maximum is 183 days. Samples with onset of ≥2 weeks were found in 10 (55.6%) samples. The results of the therapy showed that most of the samples experienced an improvement of 13 (72.7%). The subject's characteristics and audiometry results are shown in tables 1 and 2.

Table 1. Study subject's characteristics

Variable	n (%)	Median (min-max)
Age		57 (23-66)
18-60 years	13(72,2)	
≥60 years	5 (27,8)	
Gender		
Male	9 (50)	
Female	9 (50)	
Effected ear		
Unilateral	14 (77,8)	
Bilateral	4 (22,2)	
Vertigo		
Yes	5 (27,8)	
No	13 (72,2)	
Hypertension		
Yes	4 (22,2)	
No	14 (77,8)	
Diabetes mellitus (DM)		
Yes	3 (16,7)	
No	15 (83,3)	
Dyslipidemia		
Yes	6 (33,3)	
No	12 (66,75)	
Onset		14 days
< 2 weeks	8 (44,4)	(5-183)
≥ 2 weeks	10 (55,6)	
Therapy result		
Improvement	13 (72,7)	
No improvement	5 (27,8)	

Table 2. Characteristics of patients' audiometry

	Audiometry before therapy (dB)				Audiometry after therapy (dB)			
Category	**Dextra**	**average**	**Sinistra**	**average**	**Dextra**	**average**	**Sinistra**	**average**
Normal (<25 dB)	9 (50%)	26,2 (15-90)	10 (55,6%)	23,75 (18,75-106,25)	10(55,6%)	25 (15-90)	9(50%)	29,2 (18,75-90)
Mild (26-40 dB)	4(22,2%)		1(5,6%)		4(22,2%)		1(5,6%)	
Moderate (41-55 dB)	2(11,1%)		3(16,7%)		1(5,6%)		4(22,2%)	
Moderate-severe (56-70 dB)	1(5,6%)		2(11,1%)		2(11,1%)		2(11,1%)	
Profound (71-90 dB)	2(11,1%)		1(5,6%)		1(5,6%)		2(11,1%)	
(>90dB)	0(0%)		1(5,6%)		0(0%)		0(0%)	

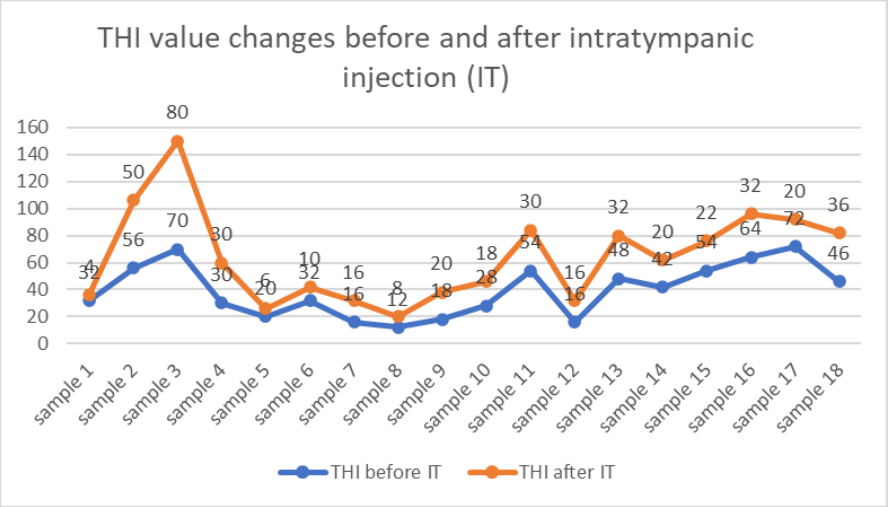

Figure 1. THI graphic before and after therapy

Table 3. Characteristic value of Tinnitus Handicap Inventory (THI) based on category

THI	Before	After	Change	*P*
THI value	37 (12-72)	20 (4-80)	-12 (-52-10)	0.002
Without handicap	3 (16.7%)	6 (33.3%)		
Mild	6 (33.3%)	10 (55.6%)		
Moderate	6 (33.3%)	1 (5.6%)		
Catastrophic	3 (16.7%)	1 (5.6%)		
Total	18 (100%)	18 (100%)		

Table 4. Tinnitus Handicap Inventory (THI) before and after therapy

	Before	After	Change	*P*
THI	37 (12-72)	20 (4-80)	-12 (-52-10)	0.002

From a total of 18 samples taken in this study, the characteristic value of the Tinnitus Handicap Inventory before injection obtained a mean value of 37 with an average value of 39.44 ± 19.46. Whereas for the characteristic value of the Tinnitus Handicap Inventory after injection, a median value of 20 was obtained with an average value of 25.0 ± 18.03. The characteristic results of the Tinnitus Handicap Inventory (THI) values can be seen in Table 3.

In this study, the mean THI before steroid injection therapy was median 37, the lowest score was 12 and the highest was 72. The mean THI after therapy was median 20, the lowest score was 4 and the highest score was 80. The mean change was median -12, the lowest change was -52 and the highest was 10. Analysis using the Wilcoxon test showed that there was a significant change (p=0.002) between THI before and after therapy. Judging from the category data, before being given the corticosteroid injection there were 3 (16.7%) samples without defects and the value increased to 6 (33.3%). 6 (33.3%) samples with mild THI increased to 10 (55.6%) samples, 6 (33.3%) samples with moderate THI reduced to 1 (5.6%) samples and 3 (16.7%) samples with catastrophic THI reduced to 1 (5.6%) samples. Changes in THI results can be seen in Tables 3 to 4 and Figure 1.

4. Discussion

Intratympanic steroid injection (ITSI) is an effective treatment modality for various inner ear diseases such as sudden sensorineural hearing loss and Menière disease. Intratympanic dexamethasone injection (ITDI) has been introduced as a treatment option for subjective tinnitus. [2,5,6,7,8,9,10,11] This study found that out of 18 samples aged <60 years, more were found than samples ≥60 years, 13 (72.2%) samples with an average age of 57 years, the youngest age was 23 years and the oldest was 66 years old. The number of male and female samples is the same in 9(50%) samples. Most of the samples had problems with unilateral ears of 14 (77.8%) samples. There were 5 (27.8%) samples with vertigo, 4 (22.2%) samples with hypertension, 3 (16.7%) samples with DM and 6 (33.3%) samples diagnosed with dyslipidemia. Tinnitus onset has a mean of 14 days, the minimum onset is 5 days and the maximum is 183 days. Samples with onset of ≥2 weeks were found in 10 (55.6%) samples. The

results of the therapy showed that most of the samples experienced an improvement of 13 (72.7%).

A similar study conducted by Sayoo et al in 2019 found out of 40 samples, 26 (65%) of the samples were women and most of the samples were <60 years old with the youngest being 15 years old and the oldest being 65 years old. The sample is dominated by unilateral troubled ears. Consistent with Sayoo et al, research conducted by Yener et al in 2020 also found out of 107 samples, 61 of them were women with a mean age of 48.6 years, the youngest was 20 years old and the oldest was 77 years old and found that most of the samples were aged <6o years.[3,12]

Research conducted by Elzayat in 2021 also found that from 44 patients the proportion of the sample was 4:7 more women with an average age of 50 years with the youngest age being 30 years and the oldest being 65 years. Taha et al in 2019 found that out of 109 samples, the mean sample age was 55 years with the youngest being 20 years old and the oldest being 91 years old, the male sample was slightly larger than the female sample, namely 53 (51%) samples. All samples had unilateral ear impairment. There were 26(25%) samples had vertigo, 46(45%) samples had hypertension, 18(17%) samples had DM, 5(5%) samples had ischemic heart diseases and 10(10%) samples had dyslipidemia.[13,14]

In this study the average THI score before steroid injection therapy was with a median value of 37, the lowest score was 12 and the highest was 72. The mean THI score after therapy was with a median value of 20, the lowest score was 4 and the highest score was 80. The mean value of change was the median was -12, the lowest change was -52 and the highest was 10. Analysis using the Wilcoxon test showed that there was a significant change (p=0.002) between THI before and after therapy. Research conducted by Sayoo et al in 2019, found out of 40 samples, 24 (60%) samples reported complete improvement, 10 (25%) still experienced tinnitus, but experienced slight improvement and 6 (15%) samples did not improve after therapy corticosteroid injection into the tympanic membrane. Research conducted by Yener et al in 2020, the study was conducted for 6 months with monitoring every two weeks using Dexamethasone intratympanic injection therapy and found statistically significant changes and improvements.[3,12]

Similar to the findings of this study, research conducted by Ayub et al in 2022 using 1.5 ml of Dexamethasone ± 0.5 ml of 1% Lidocaine also found that there was a significant change in the THI score from an average of 29.6 ± 5.68 before exposure to 17.1 ± 7.45, the results of the T Test analysis showed that there were significant changes before and after corticosteroid injection therapy. Research conducted by Amin et al in 2021 also used Dexamethasone and lidocainde in treating tinnitus and concluded, samples with moderate-severe to severe degrees of hearing were more likely to experience improvement from this therapy for 6 months.[13,15]

5. Conclusion

Of the 18 samples of patients with tinnitus at RSUP Dr. Mohammad Hoesin Palembang from July 2022 to September 2022, 13 (72.2%) of the samples were <60 years old, the proportion of male and female samples was 1:1, most of the ears the problem is the unilateral portion of 14 (77.8%) samples. There were 5 (27.8%) samples with vertigo, 4 (22.2%) samples with hypertension, 3 (16.7%) samples with DM and 6 (33.3%) samples diagnosed with dyslipidemia.

Tinnitus onset has a mean of 14 days, the minimum onset is 5 days and the maximum is 183 days. The mean THI score before steroid injection therapy was 37(12-72) and the mean THI score after steroid injection therapy was 20(4-180). The median value of change was -12, the lowest value of change was -52 and the highest was 10. Analysis using the Wilcoxon test showed that there was a significant change (p=0.002) between THI before and after therapy.

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