INTRODUCTION

Tinnitus is defined as a sensation of sound perceived by an individual in the absence of an external sound source, and it affects approximately 15% of the population worldwide (1). Although less common, up to 20% of people with tinnitus do not report hearing impairment and have normal audiologic responses (2).

This symptom can affect the life of an individual and may interfere negatively in working capacity and quality of life. The pathophysiology of tinnitus is still not fully understood but it is known that it is an abnormal neural activity in the brain that causes subjective tinnitus (3).

This activity may originate in the ear but is more likely generated somewhere in the ascending auditory pathway. Acoustic components seem to overlap emotional and attention components, causing interplay between them. The unwanted sound is perceived and the attention given to adverse noise causes an emotional reaction to tinnitus, which is what usually determines the severity of the response (3,4).

So far, there are few hard data in the literature regarding how the discomfort of tinnitus affects patients with normal audiological thresholds. These patients constitute an important group because their perception are not affected by hearing loss.

Therefore, the purpose of this study is to assess the level of tinnitus annoyance in patients with normal hearing thresholds, using the Tinnitus Handicap Inventory (THI), and correlate the findings with the results of the Evoked Auditory Brainstem Response (ABR).

METHOD AND MATERIALS

This project was approved by the Ethics Committee in Research of the State Department of Health of the Government of the Federal District.

The groups were formed by a non-random sample of convenience type. The Study Group (SG) was composed by 84 individuals, 38 males and 46 females, aged 18 to 48 years with subjective tinnitus and normal audiometric thresholds (up to 25 dB HL) at frequencies of 250 Hz to 8000 Hz. The control group (CG) consisted of 47 subjects without tinnitus, 22 males and 25 females, paired by age and audiometric thresholds.

The discomfort of tinnitus was assessed using the THI, a questionnaire consisting of 25 questions that identifies the degree of impact that tinnitus has in life. The scores vary from 0 to 100. According to the THI score, patients were divided into four categories: No disability: 0-16; Mild disability: 18-36; Moderate disability: 38-56; Severe disability: 58-100 (5).

Subjects in SG and CG underwent ABR examination to evaluate inner ear and brainstem function using the BIOLOGIC NAVIGATOR PRO® and normative parameters (6).

For comparison and analysis of the latencies of waves I, III and V and interpeak I-III, III-V and IV were established two sets of ears: Ears Study Group (ESG), composed only by the ears with tinnitus in the SG and The Ear Control Group (ECG), formed by the ears of patients in the CG.

For comparison and analysis of interaural difference of wave V latency between the ears of 87 tinnitus patients in the SG, we divided this group in patients with unilateral tinnitus (UT) and patients with bilateral tinnitus (BT).

The Student t test was used to compare the age distribution among individuals of the SG and the CG.

The Chi-square test was used to compare the annoyance of tinnitus and the degree of discomfort between genders in patients with tinnitus.

We compared the absolute latencies of waves I, III and V, the interpeak I-III, III-V and IV and interaural difference of wave V latency, using the Student t test, in order to compare the two groups of ears (ESG and ECG). P value was considered relevant when < 0.05.

RESULTS

The SG consisted of 84 subjects, 38 (45.2%) males and 46 (54.8%) females. The control group consisted of 47 subjects, 22 (46.8%) males and 25 (53.2%) females. There was no statistically significant difference between the two groups according to age or gender.

The ESG was composed only by the ears with tinnitus among the 84 patients in the SG. The group resulted in 142 ears. The ECG consisted of 94 normal ears from the 47 patients of the CG.

For comparison and analysis of interaural difference of wave V latency between the ears of 84 tinnitus patients, we divided the SG (84) into two subgroups: UT (N=26) and BT (N=58).

All patients in the control group had completely normal results of ABR. Of the 84 patients in the study group, 35.7% (N = 30) had altered results in any of the seven parameters tested. However only the difference in the interaural wave V latency in patients with unilateral tinnitus was significantly different between the SG and the CG.

Table 1 presents the results of the level of discomfort in the Study Group, according to THI. It was found that 27.4% showed no disability, 35.7% mild disability, 21.4% moderate disability and 15.5%, severe disability. Notice that the annoyance tends to be higher in females.

In Table 2, the results are presented according to the categories of THI and normal and abnormal ABR results. No significant correlation was found between the normal and abnormal ABR results and the THI categories (p < 0.171).

DISCUSSION

In our study we noticed that in females the annoyance tends to be worse, which is consistent with the findings similar studies (7).

All comparison results were significant, in the present study we found altered ABR results in 35.7% of patients in the SG, which agrees with findings in researches with similar characteristics (8).

Despite the absence of statistically significant differences in six of the seven parameters evaluated in the present study ABR, 35.7 % of patients had some parameter changes, indicating that the tinnitus can, somehow, generate changes in the central auditory pathway of patients with normal hearing.

THI in the SG showed that most of the patients referred mild disability, similar to what showed Kehrle et al. in 2008 (9).

In our study group, the discomfort of tinnitus seems to have been perceived in a similar way to studies that include patients with tinnitus of different etiologies, including hearing loss, confirming the theory that the degree of discomfort probably do not depend on the etiology or the hearing threshold (10).

The discomfort of tinnitus showed no correlation with the normal and abnormal ABR, suggesting that the level of dysfunction in the brainstem is not related to the annoyance of tinnitus. (4,11)

CONCLUSIONS

The level of tinnitus annoyance in patients with normal hearing has no correlation to the results of Evoked Auditory Brainstem Response (ABR).

REFERENCES