Evaluation of Hearing and Balance Disorders in One Group of Geriatric Patients in Turkey

Türkiye’deki Bir Grup Geriatrik Hastada İşitme ve Denge Problemlerinin Değerlendirilmesi

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ABSTRACT

Introduction: In this study, we aimed to detect the prevalence of and treatment modalities for hearing and peripheral balance disorders in elders over 65 years of age in Turkey.

Materials and Methods: In this study, 63 patients with symptoms related with hearing and balance disorders, admitted to Ankara Numune Training and Research Hospital 3rd Otorhinolaringology Clinic, were chosen. All the symptoms and medical histories were recorded and all patients underwent otolaryngological and audiological examinations. Patients’ complaints about balance disorders and the level of hearing loss were examined together with their possible causes. The patients were queried about the presence of tinnitus and its relation with vertigo and hearing loss was also examined. The patients were also asked whether they received medical therapy for these complaints and their responses to these medications.

Results: Most of the patients over 65 years have peripheral vertigo symptoms (76.2%), sensorineural hearing loss (81.2%) and tinnitus (77.8%). A relation between hypertension and coronary artery disease with tinnitus and vertigo was also detected. Nearly half of the patients (58.7%) reported no relief from medical therapy.

Conclusion: The types of hearing loss and balance disorders in geriatric patients over 65 years were determined and the relation to systemic diseases was also emphasized.

Key Words: Hearing loss, geriatric, balance disorder, frequency, systemic disease.
INTRODUCTION

The increase in the life expectancy has resulted in an increase in the geriatric population. As a result, problems related with old age and their solutions have become vital. According to a study performed in the United States, the cause of death in geriatric patients is mostly due to accidents (1). Advanced age, hearing loss and balance disorders play a great role in these accidents.

Vertigo, tinnitus and hearing loss problems have a relationship with audiovestibular system diseases, but in geriatric patients, differential diagnosis of these diseases from systemic diseases should be made. The diagnosis and treatment methods are very complex.

The cause of hearing loss can be due to conductive hearing loss related with otitis and also because of presbyacusis (sensorineural hearing loss -SNHL- related with old age) in geriatric patients who have familial tendency.

Vertigo is defined as dizziness, like feeling fatigued, upset, or the sense of orientation loss or imbalance. It may also be defined as objective vertigo, feeling like you are spinning, or movement illusion, as in the spinning of surrounding objects (2). In clinical practice, audiovestibular system dysfunctions, with central etiology or peripheral etiology, can be observed. In addition, a systemic etiology and symptoms related with medications are also seen in elderly patients (3,4).

Tinnitus can be defined as hearing a sound away from an acoustic stimulus. This can be heard as the sounds of water, tingling or whizzing. In geriatric patients, these complaints are mostly accompanied by presbyacusis (2).

In this study, we aimed to detect the prevalence of and treatment modalities for the hearing and peripheric balance disorders in elders over 65 years of age in Turkey.

MATERIALS and METHODS

Sixty three patients over 65 years who were referred to Ankara Numune Training and Research Hospital with audiovestibular complaints were included in this study. All the patients were asked about their complaints and medical history, and underwent audiologic and vestibular examinations. Utilizing a questionnaire, systemic diseases like diabetes mellitus, coronary artery diseases, hypertension, family history and acoustic trauma history as an etiologic factor in tinnitus, and hearing loss were queried. The type and frequency of vertigo, nausea-vomiting and syncope were questioned, and according to the clinical findings, vertigo was classified as central, peripheral or atypical. The duration, type, side, and level of hearing loss and the appearance of the eardrum were recorded by audiological examination.
The patients were also asked whether they had received any medical therapy for these complaints and whether or not they benefited from the therapy.

**Statistical Analysis**

Statistical analysis was performed using the SPSS 15.0 program. Abnormality of the data was assessed using the Kolmogorov-Smirnov test. Parametric measurements were elaborated by using the intergroup independent sample t-test, and the non-parametric measurements were made using the Wilcoxon and the Mann-Whitney U tests. A value of p < 0.05 was considered statistically significant.

**RESULTS**

In this study, 31 females and 32 males were included, the mean age was 73.6 (+ 4.8 years), and 15 (23.8%) patients were detected as having an acoustic trauma history. Twenty-one (33%) patients had familial hearing loss associated with old age. DM was detected in 17 (27%) patients, hypertension in 38 (60%) patients and coronary artery disease in 24 (38%) patients. Forty-nine (77.8%) patients complained of tinnitus and 36 (57%) patients complained of vertigo. Seventy-six percent of those patients had peripheral vertigo accompanied by nausea and vomiting, 6.3% had central vertigo and 24.8% had atypical vertigo accompanied by systemic diseases and syncope.

Hearing loss was detected in 56 (89%) patients (36.5% mild, 33.5% moderate and 19% severe decrease in hearing loss). The duration of hearing loss was less than 1 year in 22% of those patients, 1-5 years in 36.5% and >5 years in 41%.

Sensorineural hearing loss (SNHL) was seen in 81% of the patients and mixed type hearing loss in 14% of the patients; in 95% of cases, the hearing loss was bilateral. Ninety-two percent of the patients had intact eardrum and 8% had perforated eardrum.

In a statistical analysis, male patients had greater exposure to acoustic trauma (p < 0.05). There was a significant relation between coronary artery disease and tinnitus (p < 0.05) (Table 1). Although there was no significant relation between complaints of vertigo and the medical history, there was remarkable relation between syncope and coronary artery disease and male gender (p < 0.05). Most of the older diabetic patients had mild or moderate hearing loss, although the relation was not significant statistically (Table 2). Most of the patients with coronary artery disease had mild or moderate hearing loss, although the relation was also not significant statistically (Table 3). There was no significant correlation between hearing loss, vertigo and tinnitus. While 58.7% of the patients reported no benefit from the medical therapy, 41.3% of the patients did benefit from medical therapy (p < 0.05).

**Table 1.** The relationship between coronary artery disease and tinnitus (p < 0.05)

<table>
<thead>
<tr>
<th>Coronary artery disease</th>
<th>Tinnitus</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Negative</td>
<td>25</td>
<td>39</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>63</td>
</tr>
</tbody>
</table>

**Table 2.** The relationship between diabetes mellitus and degree of hearing loss (p ≥ 0.05)

<table>
<thead>
<tr>
<th>Degree of hearing loss</th>
<th>Diabetes mellitus</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative</td>
</tr>
<tr>
<td>None</td>
<td>5</td>
</tr>
<tr>
<td>Mild</td>
<td>23</td>
</tr>
<tr>
<td>Moderate</td>
<td>12</td>
</tr>
<tr>
<td>Severe</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
</tr>
</tbody>
</table>

**Table 3.** The relationship between coronary artery disease and degree of hearing loss (p ≥ 0.05)

<table>
<thead>
<tr>
<th>Degree of hearing loss</th>
<th>Coronary artery disease</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>None</td>
<td>-</td>
</tr>
<tr>
<td>Mild</td>
<td>13</td>
</tr>
<tr>
<td>Moderate</td>
<td>9</td>
</tr>
<tr>
<td>Severe</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
</tr>
</tbody>
</table>
DISCUSSION

Vertigo can manifest with different symptoms in elderly patients. Vertigo, SNHL and tinnitus are common symptoms of Ménière’s disease. The cause is believed to be the endolymphatic hydrops in the inner ear. Endolymphatic hydrops can be proved based on pathologic findings, so the disease can be diagnosed with similar clinical findings (5,6). Ménière’s disease is seen in the middle-aged population, but there are a limited number of studies about the incidence in the elderly population (5). In one study, 432 patients above 65 years were examined, and it was seen that only 25% of these patients applied to the hospital with drop attack and that 41% of these underwent surgery (7).

In elderly patients, benign paroxysmal positional vertigo (BPPV) can be mentioned as the cause of peripheral vertigo. Its cause is said to be the motion arrest of the otoliths in the inner ear (2). In our study, vertigo was detected in 36 (57%) patients. Seventy-six percent of these cases were peripheral, 6.3% were central and 24.8% were accompanied by syncope, which was thought to be related with a metabolic etiology.

Cervical discopathy may also cause vertigo in elderly patients. Decher reported that degeneration of vertebrae at the C4-7 level may cause symptoms similar to Ménière’s disease, so many patients may apply to the hospital with similar clinical findings (8). It is now believed that cervical pathologies may contribute to the cause of vertigo and hearing loss (9).

In one study, five patients who presented to the hospital with Ménière symptoms were diagnosed as stroke and cerebral ischemia. Thus, all patients who present to the hospital with vertigo symptoms should undergo careful neurologic examination and scanning with magnetic resonance imaging (MRI) (10). Syncope is occasionally related with a cardiovascular etiology (11).

In our patients, we did not find any meaningful relation between vertigo and systemic diseases, family history, hearing loss, tinnitus, or drug usage. We found a relation between syncope history, heart diseases and male gender (p < 0.05).

Dizziness can also be seen in elderly patients, which may also be confused with vertigo. Dizziness, apart from being a symptom, is accepted as a multifocal geriatric syndrome in elderly patients (12). Dizziness can be classified into 4 groups by classical means: presyncopal dizziness, disequilibrium, vertigo, and others (13). Its differential diagnosis is also important. In addition, other chronic systemic diseases were also seen in elderly patients (14). Tinetti et al. detected in a study that 10% of the elderly patients had chronic dizziness and in 68%, the cited reasons were depression, anxiety disorder, postural hypotension, and taking chronic medical therapy (antihypertensive, antidepressants, benzodiazepines) (13). Thus, chronic dizziness is a vestibular disorder, and vestibular rehabilitation is used in its therapy (15).

Psychosomatic disorders may also be confused with vestibular disorders in elderly patients. Generally speaking, anxiety disorders are usually seen in the elderly population and cause imbalance (16). Although hearing loss is frequently seen in patients over 65 years (25-60%), younger patients can be diagnosed (17,18). The most frequent type is presbyacusia, a kind of idiopathic SNHL, which can manifest as bilateral, progressive or loss in high frequency on the audiogram. The patients with hearing loss tend to withdraw and limit their outdoor activities (19). As a result, psychological problems like depression, confusion, attention deficit, anxiety, and negativism may occur (18,20). Furthermore, hearing loss may associate with Alzheimer-like dementia (19).

In one study, hearing loss was detected in 60% of patients, and 83% of these were moderate-severe (17). In our study, the hearing loss ratio was 95%. Fifty percent of these were mild, 11% were severe and 81% were sensorineural type.

Fish classified the differences occurring in presbyacusia in the cochlea into 4 groups (21). Loss of sensory neurons secondary to acoustic trauma features decreases in high frequency in an audiogram.

1. The most frequent type is neuron loss in the cochlea. Speech discrimination is also defective in this group.

2. Damage in stria vascularis: a flat type graphic is seen in the audiogram.

Tinnitus incidence was found to be 30% in a study of 2015 patients over 55 years of age (22). In some studies, tinnitus was mostly seen in patients with SNHL.
with a decrease in high frequency on an audiogram. Acoustic trauma, old age and family history are other reasons (22). It also has a relation with ototoxicity, hypertension, high blood lipid levels, liver diseases, cervical arthritis, and low socioeconomic status. Medical history is also very important in patients with tinnitus, because head and neck trauma risk rise from 21% to 96%. In the same study, every 10 dB increase in hearing loss increased the risk of tinnitus by 10%. In 1990, Colles detected that tinnitus risk increases 1.6 times with an increase in age (22).

In our study, tinnitus was detected in 49 (77.8%) patients among 63 patients over 65 years; 23.6% (15 patients) of the patients had an acoustic trauma history. Twenty-one (33.3%) patients had a familial history of presbyacusis. A statistically significant relation was determined only between tinnitus and coronary artery disease (p < 0.05).

In conclusion, in an elderly patient population, diagnosis of hearing and vestibular system disorders is very difficult, but their detection is important because of their negative effects on patients both physically and psychologically. In our study, only 41.3% of these patients benefited from medical therapies.

REFERENCES