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Evaluation of Hearing Loss in Patients with Ankylosing Spondylitis

ORIGINAL INVESTIGATION

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ABSTRACT

Objective: The aim of this study was to evaluate the rate of hearing loss in patients with ankylosing spondylitis (AS) and to analyze whether the rates of hearing loss were different from the control group or not.

Materials and Methods: A total of 50 AS patients and 34 healthy controls were enrolled into the study. Physical examinations and disease activity score measurements were performed in patients with AS.

Results: The mean age was 32.20 years (18-55) in AS patients and 35.58 (20-50) in the control group. The mean disease duration was 5.27 years (0-22) in patients with AS. Hearing loss was detected in seven (14%) of the AS patients and three (8.8%) of the control patients. In terms of hearing loss, a statistically significant difference was not found between the two groups. Sensorineural hearing loss was the most commonly detected type of hearing loss in the two groups. Hearing loss was present in two (28.5%) of the seven AS patients in whom the duration of disease was more than 10 years. There was no statistically significant correlation between the duration of disease and hearing loss.

Conclusion: There was no significant difference between the AS and control groups with respect to hearing loss. The rate of hearing loss increased in line with the duration of disease.

Key words: Ankylosing spondylitis, disease duration, hearing loss

INTRODUCTION

Ankylosing spondylitis (AS) is a chronic inflammatory disease, the reason of which is not be known precisely, having axial skeleton involvement and that can hold peripheral joints and extra-articular structures (1, 2). Extraskeletal findings, such as acute anterior uveitis, aortic insufficiency, cardiac conduction disorders, upper lobe pulmonary fibrosis, neurologic involvement, or renal (secondary) amyloidosis, may accompany the disease (1).

In some studies, a relationship between AS and audiovestibular dysfunction is described (3-5). This relationship may be due to arthritis, neuropathy, an autoimmune mechanism, or a toxic effect of some medicaments used in its treatment. However, the type of hearing disorder that is specific to AS is controversial. Some authors suggested that middle ear involvement leads to the occurrence of conductive hearing loss (6), whereas some authors claim that inner ear involvement leads to the occurrence of sensorineural hearing loss (SNHL) (3-7). There are also studies in the literature indicating that there is no significant difference in hearing loss between patients with AS and normal people (3, 4).

In this study, we aimed to investigate the type of hearing loss in patients with AS and whether the degree of hearing loss is different in comparison to the control group.

MATERIALS and METHODS

The study included 50 patients with AS and a control group involving 34 healthy persons admitted to the rheumatology outpatient clinic. The forms including the onset of complaints, time of diagnosis of disease, pain, morning stiffness, chronic inflammatory low back pain history, peripheral joint involvement, global evaluation of the physician and patient VAS scores, BASDAI (8, 9), BASFI (10), BASMI (11) scores, Health Assessment Questionnaire- SpA (HAQ-S score), sedimentation, C-reactive protein (CRP), HLA-B27, and complete blood count values. Patients taking nonsteroidal anti-inflammatory drugs (NSAIDs) that had autotoxic effects were excluded from the study. Written informed consent forms of both groups were obtained. After both groups were examined completely in the otorhinolaryngology clinic, the patients who were appropriate in terms of otorhinolaryngology study criteria were investigated with regard to tinnitus. After right-left and bilateral separation of patients having complaints of tinnitus, the patients were scored in a range of 0-100 points according to the visual analog scale. Then,

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the patients involved in the study were tested by tympanometry (Interacoustic AZ-26 Denmark 2000), audiometry (Interacoustic AC – 33 Denmark 2000), and OAE (Interacoustic ILO 25 Denmark 2002) (12). Tympanometry is the graphical recording method of the elasticity and mobility of the external auditory canal and middle ear structures as a result of changing air pressure in the external auditory canal.

It is used to find out middle ear pathologies. In low-degree bilateral middle ear pathologies, ipsilateral and contralateral reflexes may be lost. Acoustic reflex test is used to investigate sensorineural hearing loss and its degree. The hearing test that determines the degree of hearing loss and type is called audiometry. OAE is the reply in the form of an echo emerging against a stimulus in the outer hair cells of the inner ear and can be measured through the external auditory canal. The existence of this reply in both ears indicates that the outer hair cells are normal and that there is less than 40 dB of hearing loss.

1. Pure tone audiometry of all participants of the study in the range of 250-8000 Hz was conducted.
2. The evaluation was scored "yes" or "none" by looking at the stapes reflexes of the patients.
3. Otoacoustic emission (OAE) test was performed for all patients. The evaluation was scored as "pass" for those from whom a reply was received and as "fail" for the others.

AS group: 50 patients between the ages of 20-50 who were diagnosed with AS according to Modified New York Criteria (1984) and accepted to participate to the study were involved. Those from both groups with another chronic disease before or during the study, having hearing loss associated with drug use, having abnormal tympanic membrane, and with recent ear operation were excluded from the study.

Statistical analysis

The statistical analysis of all data was carried out by using SPSS 15 software for Windows (Statistical Package for Social Sciences). Frequency values, rates, arithmetic means, and standard deviations of all data were calculated. Kolmogorov-Smirnov test was used to determine whether the data conformed to a normal distribution or not. Chi-square tests were used to determine the differences between the groups. A P value below 0.05 indicated that the difference between the data was significant.

Findings

A total of 84 persons, including 50 patients from the AS group and 34 persons from the control group, were taken into the study. The mean age was 32.20 (18-55) in AS patients and 35.58 (20-50) in the control group. The ratio of males to females was 4/1 in the AS group (40 males, 10 females) and 2/1 in the control group (22 males, 12 females). There was no significant difference between the control group and patients with AS in terms of age (p=0.069). The number of male patients in the AS group was higher than in the control group; however it was not significant statistically (p=0.095). The number of persons, age, and genders of the groups are summarized in Table 1.

The mean duration of disease in AS patients was 5.2 (0-22). The average VAS score of the patients was 51.3 (0-100). One patient with AS had a history of tuberculosis. Nine patients (18%) with AS had systemic diseases, such as hypertension and diabetes. The erythrocyte sedimentation rate (ESR) of patients with AS was 15 mm/sec. Whereas 6 of the patients in the AS group had anterior uveitis at the time of the study, 5 patients had anterior uveitis in the past, and 27 patients (54%) were HLA-B27-positive. The average disease activity scores of patients with AS having uveitis and HLA-B27 and their life qualities and radiological scores are indicated in Table 2.

Hearing loss was detected in 7 (14%) of the patients with AS and 3 (8.8%) of the control group. The types of hearing losses are shown in Table 3, and the most commonly detected type of hearing loss was SNHL. There was no statistically significant difference between the control group and the patients with AS in terms of hearing loss (p=0.36). Hearing loss was detected in 2 of 7 patients (28.5%) with AS having a disease duration of more than 10 years. The average time to diagnosis of patients with AS was 5.3±5.2 years and 9.8±7.7 years in patients having impaired audiometry. This difference was statistically significant (p<0.05). There was no statistically significant relationship between hearing loss and disease activity in the patients with AS. An acoustic reflex could not be elicited only from 6 of 14 patients (42.8%) with AS having a BASDAI score of more than 4. The distribution was 10% in patients with AS and

Table 1. Demographical features of the groups

	AS	Control	p
Number of cases (n)	50	34	
Age (year)	32.20±8.33	35.58±8.19	0.069
Gender			
Female/Male	10/40	12/22	0.095

AS: Ankylosing spondylitis

Table 2. Uveitis and HLA-B27 states of the patients with ankylosing spondylitis (AS), average disease activity scores, life quality scores, and AS metrology indices

Ankylosing Spondylitis	N (%) or mean±SD
Uveitis	
Still have	6 (12%)
Had in the past	5 (10%)
Never had	39 (78%)
HLA-B27 positive	27 (54%)
BASDAI	3.51±2.03
BASMI	2.62±1.99
BASFI	3.16±2.65
HAQS	0.77±0.56

BASDAI: AS disease activity index; BASMI: AS metrology index; BASFI: AS Functional index; HAQS: health assessment questionnaire; SD: standard deviation

Table 3. Audiological evaluation findings of the groups

Ankylosing Spondylitis	N (%) or mean±SD		
OAE			
Passed	46 (92)	32 (94.1)	
Failed	4 (8)	2 (5.9)	NS
Audiometry			
Normal	43 (86)	31 (91.2)	
Total Hearing Loss	7 (14)	3 (8.8)	
Neurosensorial	5 (10)	3 (8.8)	NS
Conductive type	2 (4)	0 (0)	
Mixed type	0 (0)	0 (0)	
Acoustic Reflex			
Yes	43 (86)	32 (94.1)	
None	7 (14)	2 (5.9)	NS

NS: Not significant; OAE: otoacoustic Emission; AS: ankylosing spondylitis

8.8% in the control group. The number of patients from whom an acoustic reflex could not be elicited was 7 (14%) in the AS group and 2 (5.9%) in the control group. In the OAE test, 4 patients (8%) in the AS group and 2 persons (5.9%) in the control group failed. When OAE and stapes reflexes were compared, there was no statistically significant difference between the two groups.

DISCUSSION

In addition to studies indicating that hearing loss is more commonly seen in patients with AS than normal persons, there are also studies suggesting that there is no significant difference (3, 4, 12-14). Eryılmaz et al. (14) found SNHL in 35.5% of patients in the pure tone audiometry measurement in the range of 250-6000 Hz for patients with AS. They found, especially in high frequencies, that the hearing loss in every frequency was significantly more than in the control group. In another study, SNHL was detected in 28.6% of patients with AS and 4.35% of the control group, and it was reported that the difference was significant (3). Dağlı et al. (12) detected SNHL in 35% of patients with AS and found that hearing loss was significantly greater than in the control group. They suggested that the outer hair cells at the base and middle part of the cochlea were damaged.

In a study conducted by Amor-Dorado et al., it was reported that there was SNHL in 29 (58%) of 50 patients with AS. There was no significant relationship among their clinical features, inflammation, audiometric findings, and laboratory markers (15). Similarly, in the studies of Kahveci et al. (16), there was no significant relationship between clinical and laboratory parameters and hearing thresholds. There was a correlation between patient age and the degree of hearing loss. AS patients having hearing loss are also supported by recent studies; however, the definite reasons of SNHL and the underlying pathology are still not known (4, 5, 15-17). Öztürk et al. (18) divided patients in terms of duration of disease and reported that hearing thresholds in the groups having a disease duration of more than 10 years increased significantly compared to the control group and the groups having a disease duration of below 10 years. Although the number of patients having hearing loss was low in this study, it was also found that hearing loss increased significantly in patients having a duration of disease above 10 years.

Adam et al. (13) could not find a significant difference in terms of hearing loss between patients with AS and the control group on the basis of audiometry results in the range of 250-8000 Hz. In this study, there was no significant hearing loss in these frequencies between patients with AS and the control group. Adam et al. (13) found that hearing loss at high frequencies (14,000-16,000 Hz) was significantly higher in patients with AS than the control group (71.1% in AS and 40% in the control group). No test was performed in this study at high frequencies. Casellini et al. (4), in their study involving 22 patients with AS, 19 patients with RA, and 31 healthy persons, detected hearing loss in 68.2% of patients with AS, 68.4% of the patients with RA, and 51.6% of the control group; however, they could not find a significant difference among the groups. In a study conducted by Bozkurt et al. (19), there was no significant difference in terms of hearing loss between rheumatoid arthritis and the control group.

When compared with the study of Casellini et al. (4), hearing loss rates in this study were lower in both groups, as well. The difference between hearing loss rates may arise from the mean ages of the patients. While the mean ages in the study of Casellini et al. (4) were 45.5 years in AS and 53 years in the control group, in this study, they were 32.2 years in AS and 35.6 years in the control group. Similar to the study of Casellini et al. (4), in our study, there was no significant difference between the control group and patients with AS in terms of hearing loss.

Consequently, there was no significant difference between the pure tone audiometry results (between 250-8000 Hz) of patients with AS and the pure tone audiometry results of the control group. There was no significant difference between the acoustic reflexes of patients with AS and the acoustic reflexes of the control group. It was found that although the number of patients having hearing loss was low, with the extension of duration of disease, the rate of hearing loss occurrence increased significantly. There was no significant relationship between hearing loss of AS patients and disease activity scores. New studies involving groups with more patients will help clarify the subject.

Informed Consent: Written informed consent was obtained from patients who participated in this study.

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