The European Research Journal 2019;5(3):535-539 ORIGINAL ARTICLE

Evaluation of hearing results in Behçet's disease

Cem Bayraktar[1], Özlem Yağız Aghayarov[1], Sedat Doğan[1], Demet Işık Bayraktar[2], Ahmet Altuntaş[1]

[1]Department of Otolaryngology, Head and Neck Surgery, Adıyaman University Training and Research Hospital, Adıyaman, Turkey
[2]Department of Internal Medicine, Adıyaman University Training and Research Hospital, Adıyaman, Turkey

DOI: 10.18621/eurj.379685

ABSTRACT

Objectives: Behçet's disease is an inflammatory rheumatic disease with recurrent scarring in the oral and genital area, as well as skin, eye, joint, vein, and nerve involvement. The aim of the study was to investigate the level of hearing in Behçet's disease and whether there is a change in hearing levels as the level of the disease increases.

Methosd: In this study we examined 32 patients with Behçet's disease and 50 healthy volunteers. All patients were evaluated with audiometry, tympanometry and acoustic reflex tests, as well as detailed ear, nose, and throat examinations.

Results: Sensorineural hearing loss was observed in 9.3% of the patients with Behçet's disease, according to the audiological data, and all patients were bilateral. We also observed sensorineural hearing loss to be the fifth most common symptom in our study. Especially in high frequencies, there was positive correlation between hearing levels and disease exposure time ($p < 0.05$).

Conclusions: We think that the audiological examinations should be included in the routine check-ups of Behçet's patients. In addition, a follow-up assessment of the hearing level of these patients with high frequency audiometry may be more meaningful.

Keywords: Behçet's disease, hearing loss, audiometry

Received: January 16, 2018; Accepted: March 7, 2018; Published Online: June 3, 2018

Behçet's disease is a systemic and complex disease thought to be caused by autoimmune and autoinflammatory mechanisms. It was described as an oral aphthae, genital ulcer and recurrent uveitis triad by Turkish dermatologist Hulusi Behçet in 1937. Geographical differences are observed in the prevalence of Behçet's disease. It is estimated that there are about 2000 patients in the UK, while this ratio is much higher in Japan (10 in 100.000) and Turkey (8-38 in 100 000) [1-3].

Gastrointestinal, renal, pulmonary, cardiovascular, and musculoskeletal system involvement may be seen in addition to the triad described in patients with Behçet's disease [4]. In rare cases, vena cava superior syndrome [5], optic perineuritis [6], oculopalatal tremor [7], and audiovestibular symptoms have also been reported [8].

There are many studies in the literature about inner ear involvement. The incidence of hearing loss in these studies ranges from 12% to 80% [9-14].

Address for correspondence: *Cem Bayraktar, MD., Adıyaman University Training and Research Hospital, Department of Otolaryngology, Head and Neck Surgery, 02000 Adıyaman, Turkey*
E-mail: cem_dr23@hotmail.com, Fax: +90 416 2145599

e-ISSN: 2149-3189

Behçet's disease is a systemic vasculitis which may have cochlear involvement. The aim of this study was to investigate the relationship between Behçet's disease and hearing loss, determine the effect of disease duration on hearing loss; and emphasize the importance of hearing loss in these patients.

METHODS

This study was carried out with 32 patients (64 ears, 12 females and 20 males) who were diagnosed with Behçet's disease at the Department of Internal Medicine in the Adıyaman University Training and Research Hospital. This study was approved by the Ethics Committee of Adıyaman University, and informed patient consent was obtained. This study was carried out between April 2017 and December 2017. Demographic data, such as the age and sex of the patients, were recorded. Clinical findings that could be observed during the course of Behçet's disease were investigated, and accompanying symptoms were recorded. Exclusion criterias are : previous ear surgery, known hearing loss stories, head trauma, autotoxic drug use stories, under 18 years of age, other systemic diseases that could lead to hearing loss. Fifty (100 ears) voluntary patients (14 females, 36 males) who were referred to our out-patient clinic for non-ear reasons were included in the study as a control group with respect to gender and age. After the otological examination, chronic noise exposure and the use of ototoxic drugs were investigated as causes and excluded. Pure tone audiometry, tympanometry and acoustic reflex tests were performed. Patients who were not complaining of hearing loss, were acoustically reflex positive, and had type A curve in tympanometrywere included in the control group. Hearing thresholds at frequencies between 250-8000 Hz were analyzed between the patient group and the control group, comparing the right and left ears. Pure tone average value was calculated by adding the thresholds obtained at 500, 1000, 2000, and 4000 Hz frequencies and dividing the result by four.

Statistical Analysis

The SPSS 15.0 (Chicago, USA) program was used for the analysis of the data. The Student's t-test and Fisher's exact test were used for the demographic characteristics of the groups. The two group averages were compared with the Mann-Whitney U test, as the data distribution of hearing results was not normal. The relationship between the duration of the disease and the average of frequencies was analyzed with a Pearson correlation test. A p value < 0.05 was considered statistically significant.

RESULTS

The ages of the patient group (12 males and 20 females, range 20 to 55) ranged from 20 to 55, with a mean of 39.56 ± 8.94. The ages of the control group (14 females and 36 males) ranged from 30 to 55, with a mean of 42.68 ± 8.04 (Table 1).

The most common symptom was oral aphthous ulcers (87%). Other symptoms were genital ulcers (68%), ocular findings (uveitis, 34%), neurological involvement (12%), and skin involvement and hearing loss (6%).

Over 25 dB very mild sensorineural hearing loss was detected in only 3 (9.3%) patients, according to pure tone averages at 500, 1000, 2000 and 4000 Hz. All of these patients had bilateral hearing loss. Disease duration wasbetween 2 and 30 years, with an average of 9.50 ± 7.75 years. Significant differences were observed between the control and the patient groups

Table 1. Demographic characteristics of the groups

	Control group (n = 50)	Patient group (n = 32)	*p* value
Age	42.68 ± 8.04	39.56 ± 8.94	0.105‡
Gender			
Female, n (%)	14 (28 %)	12 (37.5 %)	0.467¥

‡ Student t- test, ¥ Fisher's exact test

Table 2. The comparisons of average frequency values in the study and control groups

		Control group (n = 50)	Patient group (n = 32)	*p* value‡
Left ear	250 Hz	20.20 ± 5.88	21.25 ± 6.09	0.425
	500 Hz	17.40 ± 5.55	20.47 ± 4.28	**0.006**
	1000 Hz	15.80 ± 4.20	19.22 ± 5.55	**0.005**
	2000 Hz	16.50 ± 5.46	19.06 ± 5.45	**0.035**
	4000 Hz	22.60 ± 7.90	22.97 ± 11.69	0.340
	8000 Hz	23.40 ± 8.10	32.81 ± 18.48	**0.041**
Right ear	250 Hz	20.10 ± 5.66	21.09 ± 6.18	0.705
	500 Hz	17.70 ± 5.17	20.00 ± 4.21	**0.046**
	1000 Hz	16.30 ± 4.01	19.38 ± 5.35	**0.006**
	2000 Hz	17.30 ± 5.26	19.06 ± 5.88	0.119
	4000 Hz	22.00 ± 8.57	24.84 ± 11.32	0.346
	8000 Hz	26.00 ± 8.74	35.78 ± 15.66	**0.001**

‡ Mann Whitney U test

at frequencies of 500, 1000, 2000 and 8000 Hz in the left ear; and 500, 1000 and 8000 Hz in the right ear. There was no significant difference in the left ear at 4000 Hz, or in the right ear at 2000 and 4000 Hz (Table 2). In addition, we found a significant correlation between the duration of the illness and hearing loss in both ears at 4000 and 8000 Hz in our study. (left 4000 Hz: r = 0.575; $p = 0.001$, left 8000 Hz: r = 0.528; $p = 0.002$, right 4000 Hz: r = 0.582; $p < 0.001$, right 8000 Hz: r = 0.438; $p = 0.012$) (Table 3).

Table 3. The correlation between average frequencies and duration of disease

		r	*p value**
Left ear	250 Hz	-0.062	0.738
	500 Hz	-0.090	0.624
	1000 Hz	-0.242	0.182
	2000 Hz	-0.168	0.358
	4000 Hz	0.575*	**0.001**
	8000 Hz	0.528*	**0.002**
Right ear	250 Hz	-0.079	0.667
	500 Hz	0.089	0.628
	1000 Hz	-0.202	0.267
	2000 Hz	-0.046	0.803
	4000 Hz	0.582*	**< 0.001**
	8000 Hz	0.438*	**0.012**

*Pearson correlation coefficient. Statistically significance showed with bold characters

DISCUSSION

Although Behçet's disease has long been accepted as an oculo-oral-genital syndrome, it is now described as a vasculitis that can affect all systems. The presence of autoantibodies in the oral mucosa of approximately half of the patients suggests anautoimmune etiology [15].

In addition, infection and coagulation disorders can trigger T-cell proliferation and cytokine release, and cause neutrophil activation and endothelial damage in the vasculitis [16, 17].

Berrettini *et al*. [18] and Hagiwara *et al*. [19] reported sudden hearing loss cases that were completely remedied by steroid and immunosuppressive therapy. These findings support the theory of immunologic and vasculitic processes in the inner ear involvement of Behçet's patients [18, 19]. The cochlea feeds with a single terminal branchartery from the posterior cerebral circulation [20]. For this

reason, the most common cause of hearing loss in Behçet's disease may be vascular in nature.

Hearing loss was observed in 12% of cases by Belkahia *et al*. [21], 28% by Andreoli and Savastano [22], 55% by Gemigrani *et al*. [23], and 80% by Elidan *et al*. [10].

In our study, sensorineural hearing loss was observed in only three patients (9.3%). These cases were bilateral and very mild, and were compatible with the typical descending curve audiogram as noted in some studies in the literature [24, 25].

Soylu *et al*. [26] found significant differences in hearing thresholds at frequencies of 250, 500, 2000 and 4000 Hz in patients with Behçet's disease; Ak *et al*. [25] found a statistically significant difference at 250, 500, 4000, 6000 and 8000 Hz. Aslan *et al*. [27] stated that there was a significant difference between patient and control group at 250, 1000, 2000, 4000 and 8000 Hz. In our study, we observed statistically significant differences in frequencies of 500, 1000, 2000 and 8000 Hz in the left ear, and 500, 1000 and 8000 Hz in the right ($p < 0.05$).

A child with external ear canal necrosis, facial paralysis, Horner's syndrome and internal carotid artery rupture, in addition to inner ear involvement, has been reported by Miura *et al*. [28]. All of the patients in our study group underwent ear, nose, and throat examinations that proved normal.

This study did not use the SISI (short increment sensitivity index) and Metz recruitment tests to confirm the cochlear pathology as in Ak *et al*. [25], nor the TonDecay test to exclude retrocochlear pathology, nor the Auditory Brainstem Response (ABR) test as in Mahdi *et al*. [29] and Sonbay *et al*. [30]. Evereklioğlu *et al*. [31] reported that ABR, SISI, and ToneDecay tests produced no results when applied to Behçet's disease patients, so we did not add suchtime consuming and high cost tests to our study.

When we look at the relationship between the duration of the illness and hearing loss, Brama and Fainaru [32] found a relationship in the 1980 study, but no relationship was found in most studies in the following years [2, 10]. Ak *et al*. [25] found no relationship between hearing loss and duration of illness, but found that there was a relationship between the average age of the patients and hearing loss. In our study, we observed positive significant correlation between hearing loss and duration of illness in high frequencies.

Sonbay *et al*. [30] have shown that the age at the onset of the disease is higher in patients with hearing loss, and they have explained this with a more severe course in the early stages of the disease.

Hearing loss was the third or fourth most common clinical finding in the cases in some studies [3, 25, 33-35]. In our study, hearing loss emerged as the fifth most common along with other skin lesions, following oral and genital ulcers, ocular lesions, and neurological manifestations. Only two of the patients recognized and identified hearing loss, but the test results showed hearing loss in three (9.3%) patients. This suggests that these patients should be tested for hearing loss, whether or not they have a hearing complaint, and should be referred to the ENT physician if they are diagnosed.

Limitations

There are some limitations in this study. First of all, the number of the study group is small. Secondly, assessments were performed according to audiometry results and objective hearing tests were not used in comparisons. And finally, adding high frequency audiometry to the test battery may be more meaningful in these patients.

CONCLUSION

In Behçet's disease, hearing levels are significantly worse at high frequencies (4000 Hz and 8000 Hz), and this correlateswith disease duration. Significant hearing loss was observed in different frequencies in both ears in the control and study groups. It should be kept in mind that the loss of hearing in these patients may develop over thetime. It may also be beneficial to include hearing tests in routine follow-up charts.

As it is possible to detect early hearing loss at very high frequencies due to small vessel involvement, a comparison of high frequency audiometry with the control group may be proposed as a new study topic in the future.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

Financing

The authors disclosed that they did not receive any grant during conduction or writing of this study.

REFERENCES

[1] Marshall SE. Behçet's disease. Best Pract Res Clin Rheumatol 2004;18:291-311.
[2] Soylu M, Ersoz TR, Erken E. The association between HLA B5 and ocular involvement in Behçet's disease in southern Turkey. Acta Ophthalmol (Copenh) 1992;70:786-9.
[3] Dagli M, Eryilmaz A, Tanrikulu S, Aydın A, Gonul M, Gul U, et al. Evaluation of cochlear involvement by distortion product otoacoustic emission in Behçet's disease. Auris Nasus Larynx 2008;35:333-7.
[4] Zeidan MJ, Saadoun D, Garrido M, Klatzmann D, Six A, Cacoub P. Behçet's disease physiopathology: a contemporary review. Auto Immun Highlights 2016;7:4.
[5] Sarr SA, Fall PD, Mboup MC, Dia K, Bodian M, Jobe M. Superior vena cava syndrome revealing a Behçet's disease. Thromb J 2015;13:7.
[6] Lai C, Sun Y, Wang J, Purvin VA, He Y, Yang Q, et al. Optic perineuritis in Behçet disease. J Neuroophthalmol 2015;35:342-7.
[7] Morgan ML, EspinoBarros Palau A, Lee AG, Foroozan R. Neuro-Behçet disease presenting with oculopalatal tremor. J Neuroophthalmol 2015;35:51-3.
[8] White AS, Taylor RL, McNeill C, Garsia R, Welgampola MS. Behçet's disease presenting as a peripheralvestibulopathy. J ClinNeurosci 2014;21:1060-3.
[9] Alajouanine T, Castaigne V, Lhermitte F, Gambier J, Gautier JC. La meningo-encephalite de la maladie de Behçet. Presse Med 1961;69:2579-82.
[10] Elidan J, Levi H, Cohen E, BenEzra D. Effect of cyclosporine A on the hearing loss in Behçet's disease. Ann Otol Rhinol Laryngol 1991;100:464-8.
[11] International Study Group for Behçet's Disease. Evaluation of diagnostic (classification) criteria in Behçet's disease-to wards internationally agreed criteria. Br J Rheumatol 1992;31:299-308.
[12] Yazici H, Yurdakul S, Hamuryudan V. Behçet'ssyndrome. In: Maddison PJ, Isenberg DA, Woo P, Glass DN, editors. Oxford textbook of rheumatology. 2nd ed. Oxford: Oxford Medical Publications; 1998:pp.1394-403.
[13] Chajek T, Fainaru M. Behçet'sdisease. Report of 41 cases and review of the literature. Medicine 1975;54:179-95.
[14] Nadeau SE, Watson RT. Neurologic manifestations of vasculitis and collagen vascular syndromes. In: Joynt RJ, editor. Clinical neurology. Philadelphia: JB Lippincott. 1992:pp.1-166.
[15] Ehrlich GE. Vasculitis in Behçet's disease. Int Rev Immunol 1997;14:81-8.
[16] Hirohata S, Kikuchi H. Behçet's disease. Arthritis Res Ther 2003;5:139-46.
[17] Onder M, Gürer MA. The multiple faces of Behçet's disease and its aetiological factors. J Eur Acad Dermatol Venereol 2001;15:126-36.
[18] Berrettini S, Bruschini P, Sellari Franceschini S, Mita L, Olivieri I, Gemignani G. [Sudden deafness and Behçet's disease]. Acta Otorhinolaryngol Belg 1989;43:221-9. [Article in French].
[19] Hagiwara N, Harashima S, Tukamoto H, Horiuchi T. [A case of Behçet's disease with chronic and repeated sudden hearing loss: successful treatment with intravenous cyclophosphamide pulse therapy]. Ryumachi 2001;41:858-63. [Article in Japanese]
[20] Arts HA. Sensorineural hearing loss: evaluation and management in adults. In: Cummings CW, Flint PW, Harker LA, Haughey BH, Richardson MA, Robbins KT, et al., eds. Cummings Otolaryngology-Head and NeckSurgery, 4th ed. Philadelphia: Mosby. 2005:pp.3535-61.
[21] Belkahia A, Ben Ayed H, Ben H'Mida M, Hamza M. [Auditory and vestibular lesions in Behcet's disease]. Ann Otolaryngol Chir Cervicofac 1982;99:469-76. [Article in French]
[22] Andreoli C, Savastano M. Audiologicpathology in Behçet's syndrome. Ann J Otol 1989;10:466-67.
[23] Gemignani G, Berrettini S, Bruschini P, Sellari-Franceschini S, Fusari P, Piragine F, et al. Hearing and vestibular disturbances in Behçet's syndrome. Ann Otol Rhinol Laryngol 1991;100:459-63.
[24] Bayazit YA, Yilmaz M, Gunduz B, Altinyay S, Kemaloglu YK, Onder M, et al. Distortion product otoacoustice mission findings in Behcet's disease and rheumatoid arthritis. ORL J Otorhinolaryngol Relat Spec 2007;69:233-8.
[25] Ak E, Harputluoglu U, Oghan F, Baykal B. Behcet's disease and hearing loss. Auris Nasus Larynx 2004;31:29-33.
[26] Soylu L, Aydogan B, Soylu M, Ozsahinoglu C. Hearing loss in Behçet'sdisease. Ann Otol Rhinol Laryngol 1995;104:864-7.
[27] Aslan S, Serarslan G, Savas N, Teksoz E, Dagli S. Hearing loss in patients with Behçet's disease: an audiological and transient evoked otoacoustice mission study. J Laryngol Otol 2010;124:10-5.
[28] Miura MS, LubiancaNeto JF, Krumenauer RC, Prates K, de Castro R, Saffer M. Behçet's disease: external ear involvement. Int J Pediatr Otorhinolaryngol 2004;68: 817-21.
[29] Bakhshaee M, Ghasemi MM, Hatef MR, Talebmehr M, Shakeri MT. Hearing loss in Behçet syndrome. Otolaryngol Head Neck Surg 2007;137:439-42.
[30] Sonbay ND, Saka C, Tatlican S, Vuralkan E, Aygener N, Eren C, et al. Audiological evaluation in patients with Behçet's disease. J Laryngol Otol 2014;128:694-7.
[31] Evereklioglu C, Cokkeser Y, Doganay S, Er H, Kizilay A. Audio-vestibular evaluation in patients with Behçet's syndrome. J Laryngol Otol 2001;115:704-8.
[32] Brama I, Fainaru M. Inner ear involvement in Behçet's disease. Arch Otolaryngol 1980;106:215-7.
[33] Sota J, Vitale A, Orlando I, Lopalco G, Franceschini R, Fabiani C, et al. Auditory involvement in Behcet's disease: relationship with demographic, clinical, and therapeutic characteristics. Clin Rheumatol 2017;36:445-9.
[34] Kulahli I, Balci K, Koseoglu E, Yuce I, Cagli S, Senturk M. Audio-vestibular disturbances in Behcet's patients: report of 62 cases. Hear Res 2005;203:28-31.
[35] Erbek S, Erbek SS, Yilmaz S, Yucel E, Ozluoglu LN. Vestibular evoked myogenic potentials in Behcet's disease. Eur Arch Otorhinolaryngol 2008;265:1315-20.