

Vertigo as a Prognostic Sign in Sudden Sensorineural Hearing Loss

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Abstract: Several prognostic indicators of favorable outcome in idiopathic sudden sensorineural hearing loss (ISSHL) have been proposed: an initial profound hearing loss, a down-sloping audiometric curve, advanced age, and the presence of vertigo. The latter has been disputed in the literature. The present study addressed the correlation between vertigo and outcome of ISSHL. Sixty-seven patients with ISSHL, aged 52 years on average, were treated with tapered doses of oral prednisone and complete bed rest. Factors found to have a statistically significant prognostic value as indicators of outcome in ISSHL were tinnitus on admission (positive indicator, $p < .041$) and a descending type of audiometric curve (negative indicator, $p < .009$). The presence of vertigo was also found to be significantly correlated with the lack of improvement in hearing, but only at the 8-kHz frequency. Dizziness was reported by 27% of the patients. The correlation between the presence of vertigo and persistent high-frequency ISSHL may be explained by the anatomic contiguity of the basal turn of cochlea and the vestibule.

Key Words: descending audiometric curve; idiopathic sudden sensorineural hearing loss; tinnitus; vertigo

There is no agreement about the signs and symptoms that might predict a favorable prognosis in idiopathic sudden sensorineural hearing loss (ISSHL). It is believed that an initial profound hearing loss, a sloping hearing curve, vertigo accompanying the hearing loss, and advanced age predict an unfavorable prognosis [1]. Vertigo accompanies ISSHL in 30–40% of cases and is considered to be a poor prognostic sign [1,2]. In 1975, Siegel [3] was one of the few who did not consider vertigo to be an unfavorable prognostic sign. The purpose of our study was to investigate whether there is a correlation between vertigo and the outcome of ISSHL.

MATERIALS AND METHODS

Our study included 67 patients (37 male and 30 female) admitted to the department of otolaryngology of the Bnai-Zion Medical Center in Haifa between 1990 and

1997 owing to unilateral ISSHL. The mean age was 52 years (range, 38–66 years). All patients underwent a complete audiological investigation, auditory brainstem response tests, electronystagmography, computed tomography of the brain and internal acoustic canals, and magnetic resonance imaging of the brain. Imaging was part of the workup, with the purpose of excluding possible retrocochlear lesions, including demyelinating diseases. Oral prednisone, 80 mg/day for 5 days, tapered off by 20 mg every 5 days, was administered to all patients. The patients were discharged after 10 days of complete bed rest when the daily prednisone dose reached 40 mg. Clinical recovery was estimated by contrasting the audiometric results at admission and

Table 1. Audiological Results

Frequency	Hearing Threshold	
	Admission	Discharge
Speech-frequency pure-tone average	48.9 ± 24.0 dB	31.0 ± 23.4 dB
8 kHz	54.6 ± 27.0 dB	43.6 ± 28.0 dB

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Table 2. Improvement of Hearing at the 8-kHz Frequency as a Function of Vertigo

Vertigo	Improvement	No Improvement
Present	5 (30%)	12 (70%)
Absent	29 (58%)	21 (42%)

those at discharge 10 days later. The calculated parameters were the difference between the averages of speech frequencies (0.5, 1.0, and 2.0 kHz) and the difference between the high-frequency thresholds at 8 kHz. Values greater than or equal to the median of the group were considered significant with respect to improvement.

RESULTS

The audiological results on admission and discharge are presented in Table 1. The possible prognostic factors in ISSHL evaluated using multivariate analysis included age, gender, vertigo, electronystagmography results, time elapsed between onset of sudden deafness and beginning of treatment, mean speech frequency threshold on admission, and a word recognition test. Only two factors were found to be statistically significant with regard to hearing improvement in these patients: tinnitus on admission and the audiogram slope on admission ($p < .041$ and $p < .045$, respectively, by multivariate analysis). A statistically significant negative prognostic factor was found to be the descending type of audiometric threshold curve ($p < .009$).

Dizziness was noted in 17 patients (27%). No significant prognostic relationship was found with improvement of audiometric threshold over the speech frequencies. Lack of hearing improvement at 8 kHz was found to be significantly correlated with the presence of vertigo ($p < .04$ by univariate analysis; Table 2).

COMMENT

The correlation between high-tone ISSHL and poor prognosis was presented in a study by Linssen and Schultz-Coulon [4]. The correlation between vertigo and high-tone hearing loss is explained by the anatomical proximity of the basal coil of the cochlea and the vestibule. Cochlear lesions may cause vestibular damage by endolymphatic alterations via ductus reuniens. In 1993, Nakashima and Yanagita [5] studied 1,313 ISSHL patients and found that 30% had vertigo. In one-half, a descending audiogram slope was found. Mattox and Simmons [2] reported that a descending audiogram slope associated with vertigo was an unfavorable prognostic sign.

Dizziness may be an indicator of the extent and severity of the injury. In our study, vertigo was found in 17 patients (27%), and we did not find any correlation between the presence of vertigo and the improvement of hearing at the various speech frequencies. We did find a statistically significant correlation between vertigo and the lack of improved hearing at 8 kHz. On the basis of our results, we suggest that vertigo is not an adverse prognostic sign for the outcome of hearing, except in the case of high-frequency hearing loss.

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