



Vestibular Schwannoma in Sudden Sensorineural Hearing Loss Patients

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Introduction

Sudden sensorineural hearing loss, which is referred to as SSNHL, is a common otologic emergency, presenting mostly as an acute unilateral deafness, with an abrupt onset (generally within 3d), of more than 30 dB hearing loss at three consecutive frequencies. SSNHL can be caused by various etiologies, including infectious diseases, neurological disorders, ototoxic agents, immunologic causes, head injury, and neoplasms. Approximately 1% of cases of SSNHL are caused by retrocochlear lesions that may be related to neoplasms, demyelinating disease, or stroke.

We evaluate with the otologic examinations including audiometry, test for tinnitus and vertigo to diagnose SSNHL. Especially, because of high sensitivity and specificity, magnetic resonance imaging (MRI) of the brain is thought the gold standard for the diagnosis of retrocochlear pathologies. But MRI scans are expensive, they are not utilized to screen all patients. So we utilized audiometry as Auditory Brainstem Response (ABR). We determine abnormal sign as interaural latency for wave V is more than 0.2ms.

This study aimed to establish the incidence of CNS lesions in patients with SSNHL, check the validity of ABR comparing with Temporal bone MRI for diagnosing the vestibular schwannoma (acoustic schwannoma). We report several unusual cases among these patients.

Methods

We reviewed retrospectively the charts and MRI findings of all adult patients who presented with SSNHL and admitted to the Department of Otolaryngology-Head and Neck Surgery, Incheon St. Mary's Hospital between January 2012 and May 2015. We utilized gadolinium enhanced temporal bone MRI as a screening method in SSNHL patients. The study included 252 patients, 137 females and 115 males, with an average age of 51 years (range 8-82 years). We also evaluated the audiometry, especially ABR in all patients and compared the wave V latency of lesion side with normal side.

Table 1- Summary of MRI findings in 252 patients with SSNHL.

Abnormality	No.	Percentage
Acoustic schwannoma	18	7.1%
Large endolymphatic sac anomaly	1	0.4%
Arachnoid cyst	2	0.8%
Meningioma	1	0.4%
Pituitary adenoma	1	0.4%
Rathke cleft cyst	2	0.8%
Brain metastasis	1	0.4%
Total	26	10.3%

Abbreviations: SSNHL, sudden sensorineural hearing loss.

Table 3- Validity of ABR in 18 patients with acoustic schwannoma

Interaural latency for wave V	No.	Percentage	Average of Interaural latency(ms)
Greater than 0.2ms	13	72.2%	0.67
Less than 0.2ms	5	27.8%	0.11
Total	18		

Interaural latency for wave V greater than 0.2ms is considered abnormal.

Abbreviations: ABR, Auditory Brainstem Response.

Table 2- Summary of patients with acoustic schwannoma presenting with SSNHL

Case no.	Sex	Age	Site	Size(cm)	Interaural latency for wave V in ABR(ms)
1	M	48	R	1x0.5	0.54
2	F	39	L	1.4x1	0.63
3	F	39	L	1x0.4	0.75
4	F	56	L	0.5x0.8	0.41
5	M	49	R	2x1.3	1.42
6	F	56	L	1.5x1.5	0.29
7	F	65	L	1.1x0.4	No response (L)
8	F	50	R	1.5x0.7	No response (R)
9	M	50	R	0.7x0.7	No response (R)
10	F	73	R	1.4x0.7	No response (R)
11	F	54	L	1.3x0.5	No response (L)
12	F	70	R	0.6x1.4	No response (R)
13	F	60	L	1.8x2.4	No response (L)
14	F	50	R	0.7x0.4	0.08
15	M	50	R	0.9x0.6	0.16
16	F	58	L	0.4x0.4	0.16
17	F	52	L	2.1x2.0	0
18	M	53	R	1.2x1.2	0.16

Interaural latency for wave V greater than 0.2ms is considered abnormal.

Abbreviations: M, male; F, female; ABR, Auditory Brainstem Response

Results

Of the 252 patients with SSNHL, acoustic schwannoma was found in 18 (7.1%) cases. the patients had several other CNS diseases, as large endolymphatic sac anomaly, arachnoid cyst, meningioma, Rathke's cleft cyst, pituitary adenoma, Brain metastasis. [Table 1]

Especially, the patients who had acoustic schwannoma are 13 women and 5 men aged 39 to 73 years old. (mean, 54 years old). And they had variable sized IAC tumor (0.4 to 2.1cm). the patients profiles are summarized in Table 2.

We tested auditory brainstem response(ABR) to all SSNHL patients and checked the latency for wave V compared lesion side with normal side ear. The Interaural latency for wave V greater than 0.2ms was considered abnormal. 13 patients(72.2%) with acoustic schwannoma had the interaural latency of wave V greater than 0.2ms and their average was 0.67ms. 5 patients(27.8%) with acoustic schwannoma had the interaural latency of wave V less than 0.2ms and their average was 0.11ms. [Table 3]

Conclusion

Some acoustic schwannoma has SSNHL as initial symptoms and CNS lesions were sometimes found incidentally in SSNHL patients. Until recently, ABR testing was considered the most sensitive modality for the detection of even small tumors, with detection rates of 95% to 100%. However, actually, sensitivity of ABR (determined interaural latency of wave V) detecting schwannoma in SSNHL patients was just 72.2% in our study. So it is insufficient to depend on ABR entirely to find the cause of hearing loss.

Recently, as a result of the increasing widespread use of MRI, more patients with acoustic schwannoma than expected have been detected among those with SSNHL. Because gadolinium contrast MRI is sensitive and specific for detection of acoustic schwannoma or other CNS lesion.

Consequently, MRI would seem to be mandatory in all cases of SSNHL.