

Sudden Sensorineural Hearing Loss; Prognostic Factors

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Abstract

Introduction:

Sudden sensorineural hearing loss (SSNHL) is a frightening and frustrating symptom for the patient as well as the physician. Prognosis is affected by multiple factors including duration of hearing loss, presence of associated vertigo and tinnitus, and co-morbidities such as hypertension and diabetes.

Materials and Methods:

Forty subjects presenting to our department with features of sudden hearing loss were included in the study. Detailed otological history and examination, serial audiometric findings and course of disease were studied.

Results:

Subjects presenting late (in older age), having associated vertigo, hypertension and diabetes had a significantly lower rate of recovery.

Conclusion:

Only 60–65% of patients experiencing SSNHL recover within a period of 1 month; this rate is further affected by presence of multiple prognostic indicators.

Keywords:

Outcome, Prognostic factors, Sudden sensorineural hearing loss.

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Introduction

Sudden sensorineural hearing loss (SSNHL) is generally defined as a threshold reduction of ≥ 30 dB in at least three contiguous audiometric frequencies. All ages and both sexes are affected, with peak ages ranging between 30 and 60 years (1). Tinnitus is usually present in SSNHL (>90%) and vertigo is frequent either spontaneously or as isolated positional vertigo (2,3). A maximum of 32–65% of cases of SSNHL may recover spontaneously (4,5), although clinical experience indicates that even this recovery rate may be an overestimation. The prognosis for recovery is dependent on a number of factors, including patient age, presence of vertigo at onset, degree of hearing loss, audiometric configuration, and time between onset of hearing loss and treatment (6–8). Because the etiology of SSNHL is usually unknown, treatments have traditionally been empirical. The most commonly used treatment has been corticosteroids (systemic and/or intratympanic). A large array of other treatments such as antivirals, antibiotics, diuretics, vasodilators, osmotic agents, plasma expanders, anticoagulants, mineral supplements, and hyperbaric oxygen or carbon dioxide rich gases, among others, have been used (9).

Materials and Methods

A retrospective analysis of patient records from 2010 to 2013 was carried out.

Aims and objectives

The primary objective of the study was to evaluate the various prognostic factors associated with the outcome of SSNHL. The factors considered were age, sex, duration of hearing loss at presentation, associated tinnitus, vertigo, and presence of various comorbid factors such as diabetes and hypertension.

Patient selection

The present study was undertaken in the department of ear, nose and throat (ENT)

and head and neck surgery at our institute. Subjects included in the study were suffering from idiopathic sudden-onset unilateral or bilateral sensorineural hearing loss. Only one subject was less than 10 years of age (8 years). She was excluded from the study as she was not cooperative in the hearing assessment. Patients suffering from known causative factors such as trauma or ototoxicity were excluded from the study.

Patient assessment

Detailed otolaryngological history including hearing impairment, ear discharge, vertigo, tinnitus, aural fullness, and presence of upper respiratory infection was taken. Any history of trauma, straining, diving, flying, and intense noise exposure was noted. Past medical history of other diseases associated with sudden hearing loss was obtained, such as diabetes, autoimmune disorders, malignancies, neurologic conditions (multiple sclerosis), or hypercoagulable states. An ENT examination was performed in all subjects to examine the state of the tympanic membrane. Tuning fork tests were carried out in all cases at frequencies of 256 Hz, 512 Hz, and 1024 Hz. This was followed by pure tone audiometry assessment at the time of presentation and subsequently on Days 3, 7, 10 and after 1 month of treatment using a Madsen Orbiter 922 v2 audiometer in a sound-treated double-room set up.

Air conduction and bone conduction thresholds were tested and plotted by the same audiologist for a particular patient. Narrow band masking was used whenever required. Serial testing was conducted to note the progression or resolution of the hearing loss and response to treatment. The final outcome of disease was decided on the basis of the audiometric evaluation performed after 1 month. All findings were documented as per the study performance.

Patient intervention

Evaluation and management of sudden

hearing loss should be considered medically urgent, if not an emergency. In our study, after initial audiometry subjects were admitted to a ward. Routine hematological investigations (i.e., hemogram, serum urea, creatinine, blood sugar and electrocardiogram) were performed in all patients. The following treatment was initiated:

1. Intravenous steroids (dexamethasone) at a dosage of 8 mg thrice a day for 10 days followed by oral steroids (deflazacort) in tapering doses started at an ~1 mg/kg body weight and tapered at an interval of 3–5 days for another 21 days. The oral steroid was administered as a single dose after meals with a cover of oral antacid. (In the experience of the author, giving a prolonged dose of steroids helps in treating subclinical or persistent histopathological edema).
2. Oral diuretics in the form of acetazolamide (250 mg twice a day) for a total period of one month.
3. Vasodilators in the form of carbogen therapy, twice daily.
4. Nitroglycerine patches for 10 days under hospital supervision and blood pressure monitoring. The patch contained 10 mg nitroglycerine.
5. A broad spectrum antibiotic (usually co-amoxiclav, at a dose of 30–40 mg/kg in three divided doses) intravenously for seven days.
6. Appropriate treatment for co-morbid conditions was initiated or continued.
7. Supportive therapy in the form of multi-vitamins.

Serial audiometry assessments were carried out. Subjects who did not recover hearing were followed-up for further investigations in the form of magnetic resonance imaging (MRI) brain scans and further investigations to rule out any associated lesion in the cerebellopontine angle area or otherwise.

Results

The study included 40 subjects, 24 of whom were male. The age of the subjects

ranged from 11–65 years. The average hearing loss of subjects at the time of presentation was 100 dB HL (air conduction), ranging from 78–110 dB HL. Out of the 40 subjects, 25 (62.5%) experienced recovery within a period of 1 month. The average audiometries of these subjects at the time of recovery was 38 dB HL (air conduction). Of these 25 subjects, only four recovered partially, having a persistent, moderate hearing loss of around 55–60 dB HL. The remainder of the 21 subjects recovered completely, reaching a hearing threshold comparable to normal person. Approximately 32.5% (13) of the subjects presented within 24 hours of onset of the hearing loss (Table. 1).

Table 1: Various prognostic factors affecting the outcome of patients presenting with sudden sensorineural hearing loss

	Total	Not recovered	Recovered
Subjects	38	15 (36%)	25 (64%)
Early presentation (24 hours)	13	3	10
Associated tinnitus	22	4	18
Associated vertigo	5	3	2
Associated URI	4	3	1
Diabetes	7	6	1
Hypertension	4	4	0

Of these, only three subjects did not recover. All three of these subjects had an associated history of co-morbid factors such as diabetes and hypertension. Fifty-five percent (22) of subjects had an associated history of tinnitus; while 12.5% (five) had vertigo and 10% (four) had an associated upper respiratory tract infection (Table. 1). Most of the subjects presenting with tinnitus recovered (81.8%). Approximately 17% (seven) subjects had associated diabetes. More than 85% (six out of seven) of diabetic subjects did not recover. Only four subjects had associated

hypertension. None of them recovered. Unexplained left side predominance was seen in our subjects (67.5% had left-sided hearing loss, 27.5% had right-sided, and 5% bilateral), like most previous studies (10). Most of the hearing loss in our study was profound.

Discussion

Hearing is one of our most important senses and its sudden loss can be frightening and frustrating for the subject as well as the physician. The outcome of SSNHL is related to multiple factors. The recovery rate in our study (62.5%) correlated well with the previous studies (32–65%) (4,5).

The aim of our study was to correlate the presence of these factors with the recovery and cure rates of SSNHL. Most subjects presenting within 24 hours of onset of hearing loss recovered. Many previous studies have found that the subjects seen earlier after onset of hearing loss show greater improvement, reflecting either the benefit of early treatment or the natural recovery rate (10). Fetterman et al. suggested that if therapy with one or more treatment types was started within 1 month of sudden hearing loss, there was a ~50% rate of improvement vs. ~25% if started later than 1 month. The amount of improvement seen on sequential audiograms may reflect the position of the subject on his/her own spontaneous improvement curve (7). The presence of vestibular symptoms has been considered as a poor prognostic indicator in earlier studies (11), but no such indication was obtained through our study, possibly because of the small sample size.

Viral infections, vascular compromise, autoimmune processes, and labyrinthine membrane ruptures have been proposed as possible etiologies of SSNHL (12). In our study, subjects presenting with diabetes had a significantly lower rate of recovery

(only 14.3% compared with an overall recovery rate of 62.5%). It has been postulated that diabetes is associated with microangiopathic injury, hence a vascular event and a possible etiological factor for SSNHL. Similarly, in our study it was seen that none of the subjects with an associated history of hypertension recovered. According to several reports, advanced age, hypertension, diabetes, and hyperlipidemia are poor prognostic factors, suggesting that microvascular dysfunction in the cochlea gives rise to poor outcomes (13).

Conclusion

We report a study of 40 subjects presenting to our department with SSNHL. We found the prognosis for SSNHL to be improved in subjects who presented early and with tinnitus. The outcome was poor in subjects presenting late, and having associated diabetes or hypertension. No relation with vertigo, however, was demonstrated in our study.

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