

SUDDEN ONSET SENSORINEURAL HEARING LOSS: MANAGEMENT PROTOCOLAnil Kumar Dash¹, Kabi Kanta Samantray², Rudra Narayan Biswal³¹Assistant Professor, Department of ENT, Kalinga Institute of Medical Sciences, KIIT Campus, Patia, Bhubaneswar.²Associate Professor, Department of ENT, Kalinga Institute of Medical Sciences, KIIT Campus, Patia, Bhubaneswar.³Professor and HOD, Department of ENT, Kalinga Institute of Medical Sciences, KIIT Campus, Patia, Bhubaneswar.**ABSTRACT****AIMS**

To study the efficacy of transcutaneous nitroglycerin and pulse steroid injection in patients with sudden hearing loss.

MATERIAL AND METHOD

This was a prospective study conducted in the Department of ENT, KIMS, Bhubaneswar; 31 patients who fit to inclusion criteria included in this study.

RESULTS

Out of 31 patients of sudden onset sensorineural hearing loss, 18 (58.06%) patients had threshold closer to 30 dB.

KEYWORDS

Sudden Onset Sensorineural Hearing Loss, Transcutaneous Nitroglycerin Patch.

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INTRODUCTION

Definitions of sudden hearing loss have been based on severity, time course, audiometric criteria and frequency spectrum of the loss. Abrupt as well as rapidly progressive losses have been included under a single definition of sudden hearing loss. Awakening with a hearing loss, hearing loss noted over a few days, selective low-or high-frequency loss, and distortions in speech perception have all been classified as sudden hearing losses. A commonly used criterion to qualify for this diagnosis is a sensorineural hearing loss of greater than 30 dB over 3 contiguous pure-tone frequencies occurring within 3 days' period. Fortunately, the vast majority of cases of sudden hearing loss are unilateral and the prognosis for some recovery of hearing is good. Usually, it presents as unilateral loss of hearing; bilateral involvement is rare and simultaneous bilateral involvement is very rare.

The postulated pathophysiology for Idiopathic Sudden Sensory Hearing Loss (ISSHL) has 4 theoretical pathways as follows:

- Labyrinthine viral infection.
- Labyrinthine vascular compromise.
- Intracochlear membrane ruptures.
- Immune-mediated inner ear disease.

A disease process involving any of these theoretical possibilities could have sudden hearing loss as a symptom. Each theory may explain a fraction of the episodes of sudden sensory hearing loss, but none of the existing theories individually could account for all episodes.

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This is a medical emergency and various possible causal factors have been postulated. The optimal treatment modality is not known either, and this is reflected in the large number of publications suggesting the 'Best' treatment modality. Some cases will improve spontaneously. Transdermal nitroglycerin patch along with pulse steroid injections are the most recent form of treatment being studied and may provide hope for these patients, despite of the rarity and the unpredictable natural history of the disorder.

MATERIAL AND METHOD

This study was conducted in Department of Otolaryngology and HNS, KIMS, Bhubaneswar from 2012 June to June 2015; 31 patients of sudden onset hearing loss, who fit to inclusion criteria, were included in this study.

Inclusion Criteria

1. Hearing loss of greater than 30 dB over 3 contiguous pure-tone frequencies occurring within 3 days' period.
2. Normal tympanic membrane with type 'A' tympanometry.
3. No history of trauma to ear.

Exclusion Criteria

1. Type 'B' tympanogram.
2. Perforated tympanic membrane.
3. History of trauma to ear.
4. Cochlear otosclerosis.

After taking history and detailed otolaryngology examinations, these patients subjected to Pure Tone Audiometry and Impedence Audiometry. If the impedance is 'A' type and pure tone audiometry showing sensorineural hearing loss, then diagnosis is confirmed. All these patients were admitted to ENT ward and Intravenous Methylprednisolone 1 gm was given for 3 days followed by oral steroid. Transdermal nitroglycerin patch, applied over forearm, started with 2.5 mg after getting a normal ECG and cardiologist's opinion.

The maximum dose of nitroglycerin patch is 10 mg, which is gradually increased. The maximum duration of this patch application is 10 days.

RESULTS

There were 31 patients, out of which 18 were male and 13 females in the age range from 21 to 49 with mean age of 35.35 (Standard deviation ± 2.7). The impedance audiometry was performed in all 31 cases and Type 'A' type curve was seen in all these cases.

The Audiometry Report as give in Table-1

Patient Serial No.	Right Ear (dB)	Left Ear (dB)	Post Treatment Improvement (dB)
1	20	69	35
2	23	78	39
3	24	88	85
4	67	69	31
5	74	23	74
6	81	20	42
7	64	21	45
8	68	69	32.44 (Mean)
9	55	25	28
10	59	19	30
11	76	20	75
12	85	24	83
13	57	20	25
14	20	67	67
15	22	53	28
16	19	78	75
17	23	61	30
18	71	20	37
19	83	24	80
20	72	20	70
21	55	18	28
22	23	59	20
23	25	63	36
23	54	24	30
25	67	18	65
26	35	85	80
27	25	69	63
28	73	20	71
29	79	22	70
30	24	78	29
31	25	79	41

Only one patient was having bilateral sensorineural hearing loss. Of the rest 30 patients, 18 patients had right ear involvement and 13 had left side involvement (Table-1).

Twenty three patients had clinical improvement of hearing; out of these 19 patients had documented hearing improvement in pure tone audiometry closer to 30 dB. The patient having bilateral hearing loss improved to 32 dB on both sides (Mean 32.44 dB).

DISCUSSION

Sudden onset of sensorineural hearing loss is a rare occurrence. The exact incidence of acute sensorineural hearing loss is not known, but is estimated to be between 5 and 20 per 100,000 persons/year and varies with age.¹ This condition may be extremely distressing for the patients affected, as it has a significant impact on their ability to interact socially and they may be concerned that there is some serious

underlying pathological condition. Various causes including viral,²⁻⁵ vascular,⁶ or autoimmune conditions,⁷ have been postulated. As yet, no single causal agent has been identified and the aetiology may be multifactorial.

Many different treatment regimens have been suggested. These included the use of steroids.⁸ (Which may be given intratympanically).^{9,10} low molecular weight dextran.¹¹ carbogen.¹² hyperbaric oxygen.¹³ LDL apheresis.¹⁴ acyclovir.¹⁵ and even stellate ganglion block.¹⁶ There is little convincing evidence that any one treatment produces any improvement in the audiometric results.¹⁷ It is, however quite difficult for various reasons to design and conduct a study on this condition in order to show a statistically and more importantly a clinically significant difference. There are many reasons for this. First of all, the condition is relatively uncommon and recruitment of an adequate number of patients to allow a double-blind clinical trial to be conducted would be difficult. The second problem is that the disorder is most likely not the result of a single disease process. A drug may help one of the causes, but not another, thus resulting in confusing outcomes. A third difficulty is that of spontaneous recovery of hearing. A spontaneous recovery rate of approximately 60% has been quoted.¹⁸ although the ranges in the literature vary considerably (32-89%).^{19,20}

The prognosis is not predictable. Variables which may worsen the prognosis include increasing age of the patient, number of days before presentation, a more severe initial mean hearing loss and the presence of vertigo.^{21,22} A better prognosis may be associated with early hearing improvement.²³ and prompt administration of corticosteroids.^{8,24} but this is controversial.²⁵ These factors may need to be taken into account when analysing results.

There is no general agreement regarding the definition of what constitutes acute, idiopathic sensorineural hearing loss. There is no consensus regarding the time period of evolution (In order to classify as acute) or which investigations need to be performed (In order to classify as idiopathic). One definition in the literature is "A loss of 30 dB at three contiguous frequencies within three days."⁸

Panda NK et al, conducted a study regarding the efficacy of transcutaneous application of nitroglycerin along with oral steroid. There was a clinically significant improvement in hearing in 36.2% of the patients. A significant association was seen between the duration of hearing loss before seeking treatment and the recovery. Younger patients showed better improvement. The severity of hearing loss at presentation had no influence on the recovery.²⁶ Our patients had similar rate of hearing improvement.

Dextran 40 is still available, but has recently not been prescribed due to concerns raised regarding its safety.²⁶ especially in elderly patients. Low molecular weight dextran increases plasma viscosity and should be used with caution in patients with heart disorders or renal impairment, since pulmonary,²⁷ or renal failure.²⁸ may result and deaths have been reported.²⁹ Whilst this infusion is being administered, the patient's urine and haematocrit should be closely monitored.

A Magnetic Resonance Imaging (MRI) scan of the internal auditory meatus should be performed in all cases.³⁰ even if their hearing loss improves.^{31,32} A study of 67 patients with acute sensorineural hearing loss by Nageris and Popovtzer found 24 patients had an acoustic neuroma; of these 4 (16.7%) recovered hearing after 1 month.³³ Rarely, a vestibular

schwannoma may present in this manner.³⁴⁻³⁷ Further investigations may help to identify factors, which contribute to the hearing loss.

The United States National Institute of Health is currently running a multi-centre randomised controlled trial.³⁸ to compare the efficacy of oral prednisolone and intratympanic methyl-prednisolone for the treatment of moderate-to-severe sensorineural hearing loss.

CONCLUSION

Sudden onset sensorineural hearing loss is an ENT emergency and patient need to be present early in order to get best result. Transdermal nitroglycerin patch is a supportive therapy along with intravenous pulse steroid. This regimen was found to be efficacious in the treatment of SSNHL. The single most important factor that influenced the recovery was the duration of hearing loss before seeking treatment. All patients should have an MRI scan, even if they have recovered from the hearing loss.

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