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Management of sudden sensorineural hearing loss: a prospective study of 30 patients

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ABSTRACT

Background: Sudden sensorineural hearing loss (SNHL) is sensorineural hearing loss of 30 dB or more over at least three contiguous audiometric frequencies that develop over a period of few hours to three days. The purpose of study is to make a protocol for treatment.
Methods: 30 cases of sudden SNHL who presented to OPD of Government Medical College, Miraj between December 2015 to April 2017 were included. Detailed history taking and ENT examination was done. All patients were admitted and started on intravenous methylprednisolone. If hearing improvement was not observed, intratympanic methylprednisolone (ITS) was administered.
Results: 50% patients had recovery with intravenous Methylprednisolone and 50% had no recovery. "No recovery" patients were subjected to ITS, of which 20% had complete, 30% partial and 50% no recovery. Among no recovery patients of ITS, 10% had hearing loss greater than 90 dB with improvement rate of 0%; 40% had hearing loss of 90 - 50 dB with improvement rate of 50%; 50% had hearing loss of 50-30 dB with improvement rate of 60%. Among 15 cases of ITS, mean number of days between onset of symptom and starting ITS was 13 days for complete recovery patients; 17.3 days for partial or slight recovery; 20.6 days for no recovery.
Conclusions: Hearing loss less than 90 dB and earlier ITS has positive influence on hearing recovery. Systemic steroids are currently the mainstay of initial treatment. ITS is an effective treatment modality for patients who fail to respond to systemic steroids.

Keywords: Sudden sensorineural hearing loss, Intratympanic steroid injection

INTRODUCTION

Sudden sensorineural hearing loss (SSNHL) is defined as sensorineural hearing loss of 30 dB or greater over at least three contiguous audiometric frequencies occurring over 72 hours.[1,2]

The incidence of SSNHL has been reported as approximately 5-20/100 per year. Studies have reported that the disease is least in people aged 20-30 years (4.7/100) and most in those aged 50-60 years (15.8/100).[1]

The SNHL is unilateral in more than 90% of the patients.[3] The most common suggested etiologies of SSNHL are perilymphatic fistulas, viral infections, vascular insufficiency, and autoimmune pathologies.[4]

Systemic steroids are the most widely accepted and effective drugs for treatment of the condition.[5] Steroids can be used orally, intravenously, or via the local intratympanic route, particularly in combination with other drugs. With steroid therapy, recovery rates increase from 32-65% to 49-89%.[6] Intratympanic administration

of steroids (ITS) achieves higher perilymphatic levels compared to the systemic route.[7] It also prevents systemic side effects, allows a higher concentration of steroids in the perilymph, and is particularly beneficial in patients who are contraindicated for systemic steroids. Therefore, it is becoming one of the most recommended treatment options for patients with SSNHL.[8] ITS can be used as a primary treatment, salvage treatment, or in combination with systemic steroids.[9]

Protocol of management of SSNHL is not clear even today. The purpose of our study is to make a protocol for management for the same.

METHODS

In this study 30 patients with SSNHL, who were treated during a period between December 2015 to April 2017 were enrolled. The patients presented to ENT OPD of Government Medical College, Miraj.

Patients with pure sensorineural hearing loss of at least 30 dB in at least 3 contiguous frequencies that occurred instantaneously or in a time interval not exceeding 3 days were included in the study. All patients were seen within 30 days of onset of hearing loss and none had received prior treatment.

Patients with mixed or conductive hearing loss hearing loss, pre-existing ear diseases, uncontrolled diabetes, benign and malignant tumours of the ear including acoustic neuroma, glomus juglare were excluded from the study.

Detailed history was taken in the selected patients including onset and progression of hearing loss, associated symptoms like tinnitus, vertigo, history pertaining to etiological factors like ingestion of ototoxic drug, exposure to loud sounds, fever or exanthemathous illness, trauma, URTI. A thorough neuro-otological examination was done in all the cases which included otoscopic, audiological and Neurological examination including cerebellar function tests. Following admission, an ECG and random BSL were done to assess the cardiac status of the patient and to rule out DM. MRI brain was done in all unilateral cases of sensorineural hearing loss to rule out acoustic neuroma.

All the patients received injection Methylprednisolone 500 mg diluted in 100 cc of normal saline over a period of 30 min twice a day and continued in tapering doses for 10 days. Audiograms were done on 3rd day, 5th day and 10th day during hospitalisation to look for any improvement in hearing. Care was taken that the audiogram was done on the same machine to maintain the standardisation and to minimize any subjective error. No recovery patients according to Siegel's criteria were enrolled for intratympanic therapy.[10] These patients were given intratympanic Methylprednisolone once weekly for 6 weeks on an outpatient basis. Audiograms were done weekly to look for any improvement in hearing. The results were statistically analysed with Epi Info software.

RESULTS

In the present study out of 30 patients, 20 patients were males and 10 were females. Male to female ratio was 2:1.

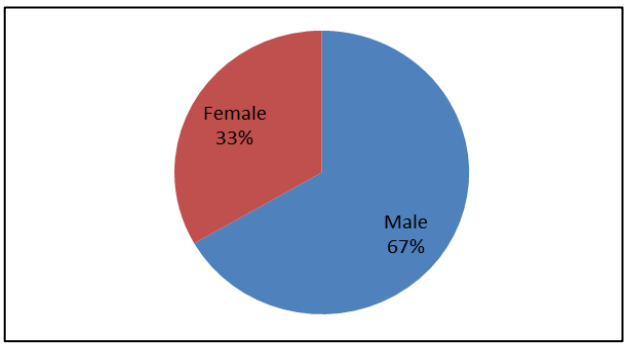

Figure 1: Gender distribution of sudden sensorineural hearing loss.

In our study, 30 patients of sudden hearing loss, all were given intravenous steroid injection, 15 cases (50% patients) showed recovery (complete and partial recovery) and no recovery was seen in 15 patients (50% of patients). Recovery was defined based on Siegel's criteria which is as follows.[10]

"Complete recovery" was defined as more than 30 dB hearing gain and as final hearing better than 25 dB, "partial recovery" as more than 15 dB hearing gain and as final hearing between 25 and 45 dB, "slight improvement" as more than 15 dB hearing gain but with a final hearing poorer than 45 dB, and "no improvement" as less than 15 dB hearing gain and final hearing poorer than 75 dB.

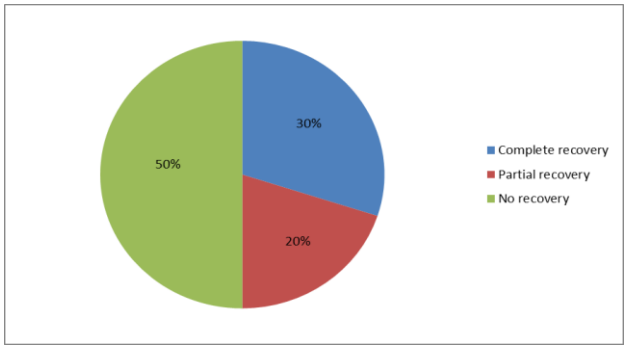

Figure 2: Response to intravenous methylprednisolone treatment.

"No recovery" patients from intravenous Methylprednisolone treatment were further selected for intratympanic injection of methylprednisolone, out of which 3 patients (20%) had complete recovery, 5 patients (30%) had partial recovery and 7 patients (50%) had no recovery.

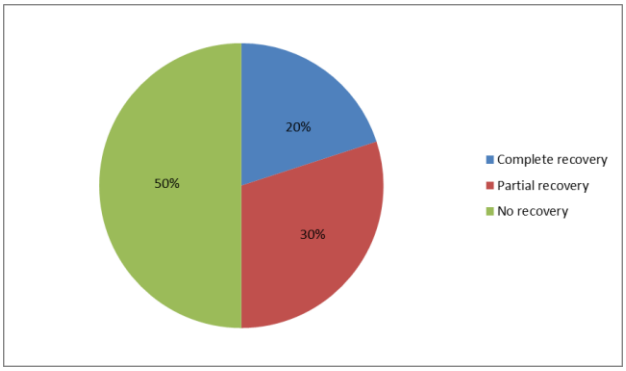

Figure 3: Response to intratympanic methylprednisolone treatment.

Hearing recovery related to patient's age was analysed in our study. 12 out of 15 patients subjected to intra-tympanic methylprdnisolone injection were in age group between 40 to 55 years. Only 3 patients were in extreme age group, one of 18 years showing complete recovery and 2 of 75 years showing no recovery at all.

In our study of 15 patients of intratympanic injection of Methylprednisolone, for the group that responded to intratympanic injection of steroid with a "complete recovery" 3 patients, the mean no of days between onset of symptom and starting ITS was 13 days; for the group that responded to intratympanic injection of steroid with a "partial or slight recovery" 5 patients, it was 17.3 days; for the group that did not respond 7 patients, it was 20.6 days.

Table 1: Mean number of days between onset of symptom and starting intratympanic methypredinisolone.

Status of patient	Mean no. of days between onset of symptoms and starting ITS
Complete recovery	13
Partial recovery	17.3
Slight recovery	_
No recovery	20.6

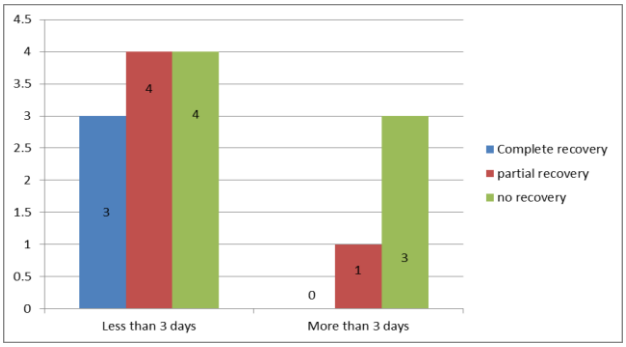

Figure 4: Number of days of stopping systemic steroid and starting ITS and its relationship with response to ITS.

In our study, out of 15 patients who received intra-tympanic methylprednisolone injection, 11 patients were started within 3 days of stopping systemic steroids, out of which 3 patients had complete recovery, 4 patients had partial recovery and 4 patients had no recovery.

In 4 patients ITS was started after 3 days, 1 patient had partial recovery and 3 patients had no recovery.

DISCUSSION

Out of 30 patients included in our study 20 (65%) were males and 10 (35%) were females. In comparison to our study, in the study conducted by Purushothaman et al 64% were males and 36% were females.[10]

In our study, all 30 patients of sudden sensorineural hearing loss, were given intravenous methylprednisolone, out of which 15 patients (50% patients) showed recovery (complete and partial recovery) and no recovery was noted in 15 patients (50% of patients).

Wilson et al, in their double-blind randomised study showed remission rate of 61% during therapy with glucocorticoids compared to placebo (32%) or null therapy (56%).[5]

Moskowitz et al, observed that 24 (89%) of 27 glucocorticoid treated patients "recovered at least 50% of their hearing," whereas 4 (44%) of 9 patients recovered their hearing without any treatment.[11] Veldmann et al found an effective response to glucocorticoid treatment in 6 (50%) of 12 patients, whereas only 6 (32%) of 19 non treated patients showed similar results.[12] Mattox and Simmons study showed 72% complete recovery in hearing with glucocorticoid treatment.[13]

Results of intratympanic injection of steroid

In our study, of these "no recovery patients"(15 patients) from intravenous steroid were further administered intratympanic injection of methylprednisolone, following results were observed, complete recovery (recovery of hearing to within 10dB of prehearing loss averaged pure tone score) were observed in 20% (3 patients), partial recovery (recovery of hearing to within 50% or more of the prehearing loss averaged pure tone score) were seen in 30% (5 patients), no recovery (less than 50% recovery of hearing) were recorded in 50% (7 patients).

In comparison to the present study, in the study performed by Ferri et al, 29 patients (52.7%) showed improvement in PTA, 24 (43.8%) had no change in hearing, and 2 (3.5%) worsened.[14]

On the contrary, in the study performed by Ahn et al, overall rate of hearing improvement was 73.3% (44/60 patients) in the intratympanic injection of steroids group, which was not significantly higher than the 70.0% rate (42/60 patients) in the control group.[15] In addition, there

were no significant differences among intratympanic injection of steroids group and control groups in each category of Siegel"s criteria of hearing improvement.

Recovery related to severity of hearing loss

Of total 15 patients subjected to ITS, 2 patients (10%) had hearing loss greater than 90 dB with an improvement rate of 0%; 6 patients (40%) had hearing loss of 90 dB or less and greater than to 50 dB with improvement rate of 50%; a total of 7 patients (50%) had hearing loss less than 50 dB and greater than 30 dB with an improvement rate of 60%.

In comparison to the present study,in the study performed by Ferri et al, 16 patients (29.1%) had hearing loss greater than 90 dB with an improvement rate of 7.2%; a total of 29 patients (52.7%) had hearing loss of 90 dB or less and greater than to 50 dB with improvement rate of 21.2%; a total of 10 patients (18.2%) had hearing loss less than 50 dB and greater than 30 dB with an improvement rate of 47.6% (Figure 3).[14] Patients with severe losses greater than 90 dB had a poorer recovery (7.2%) compared with losses less than 90 dB (35.6%)

A positive influence was noted on recovery relating to the severity of hearing loss. It is probably due to the small patient population, multicentric trials are needed for further confirmation.

Recovery related to time of onset of symptoms

In our study of 15 patients of intratympanic injection of methylprednisolone, for the group that responded to intratympanic injection of steroid with a "complete recovery" 3 patients, the median was 13 days; for the group that responded to intratympanic injection of steroid with a "partial or slight recovery" 5 patients, the median was 17.3 days; for the group that did not respond 7 patients, the mean was 20.6 days.

In the study performed by Ferri et al, the average number of days from onset of symptoms to intratympanic injection of steroid was 33 days with a range of 5 days to 96 days.[14] For the group that responded to intratympanic injection of steroid with a "complete recovery", the median was 12 days; for the group that responded to intratympanic injection of steroid with a "partial or slight recovery", the median was 23 days; for the group that did not respond, the mean was 34 days.

Recovery related to time of onset of symptoms and starting ITS therapy seems to influence positively the hearing recovery. It is probably due to the small patient population, multicentric trials are needed for confirmation.

Also in our study, out of 15 patients, 11 patients were started on ITS after stopping systemic steroids within 3 days and 4 patients after 3 days. Out of 11 patients 3 were showing complete recovery, 4 were showing partial recovery and 4 with no recovery, among the 4 patients who were started on ITS after stopping systemic steroids after a duration of more than 3 days 3 patients showed no recovery and 1 patient showed partial recovery.

Recovery related to age of the patient

12 out of 15 patients subjected to Intratympanic Methylprednisolone injection were in age group between 40 to 55 years. Only 3 patients were in extreme age group, one of 18 years showing complete recovery and 2 of 75 years showing no recovery at all.

In contrast to our study, in the study performed by Ferri et al, Hearing recovery related to patient's age was studied.[14] Fifty-seven percent of patients were under 60 years of age and had an overall recovery rate of 26%. Forty-three percent of patients were 60 years of age or older and had an overall recovery of 32%.

CONCLUSION

Sudden SNHL is an otologic emergency. It is the responsibility of otolaryngologist to raise awareness of sudden SNHL in the medical community and the public to promote earlier diagnosis and prompt treatment. This will undoubtedly lead to higher rates of treatment success.

All the patients with sudden sensorineural hearing impairment should have a through neuro-otologic evaluation to rule out acoustic tumour. The occurrence of SNHL across all age groups is probably an indication of the multifactorial nature of this clinical problem. The male preponderance could be a reflection of social factors, wherein women do not have an easy access to medical care. Variables like age and sex of the patient did not affect the final outcome in our study. Moreover, the hearing losses less than 90 dB, and the earlier Intratympanic therapy seem to influence positively the hearing recovery. It is probably due to the small study population. High dosage systemic steroids are currently the mainstay of initial treatment, although their specific action remains unknown. Intratympanic injection of steroid appears to be a safe, cheap, easy to perform and an effective treatment modality for patients who fail to respond to systemic steroid therapy. Intratympanic injection of steroid has to be started as soon as the treatment with Intravenous Steroid fails. Earlier initiation of Intratympanic injection of steroid improves the outcome of treatment.

Evidence-based medicine is rapidly becoming the standard across all specifies. There have been thousands of publications on sudden SNHL, but very few randomized controlled trials. Randomized, controlled trials on a large patient population and required to generate data upon which sound medical decision-making can be based.

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Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Byl FM Jr. Sudden hearing loss: eight years' experience and suggested prognostic table. Laryngoscope. 1984;94:647-61.
2. Zadeh MH, Storper IS, Spitzer JB. Diagnosis and treatment of sudden-onset sensorineural hearing loss: a study of 51 patients. Otolaryngol Head Neck Surg. 2003;128(1):92-8.
3. Psifidis AD, Psillas GK, Daniilidis JC. Sudden sensorineural hearing loss: long-term follow-up results. Otolaryngol Head Neck Surg. 2006;134(5):809-15.
4. Levie P, Desgain O, de Burbure C, Germonpré P, Monnoye J, Thill M, et al. Sudden hearing loss. B ENT. 2007;3:33.
5. Wilson WR, Byl FM, Laird N. The efficacy of steroids in the treatment of idiopathic sudden hearing loss: a double-blind clinical study. Arch Otolaryngol. 1980;106(12):772-6.
6. Moskowitz D, Lee KJ, Smith HW. Steroid use in idiopathic sudden sensorineural hearing loss. Laryngoscope. 1984;94(5):664-6.
7. Chandrasekhar SS. Intratympanic dexamethasone for sudden sensorineural hearing loss: clinical and laboratory evaluation. Otol Neurotol. 2001;22(1):18-23.
8. Ho GM, Lin HC, Shu MT, Yang CC, Tsai HT. Effectiveness of intratympanic dexamethasone injection in sudden-deafnesspatients as salvage treatment. Laryngoscope. 2004;114:1184-9.
9. Erdur O, Kayhan FT, Cirik AA. Effectiveness of intratympanic dexamethasone for refractory sudden sensorineural hearing loss. European Arch Oto-Rhino-Laryngol. 2014;271(6):1431-6.
10. Purushothaman G, Purushothaman P K, Simham S. A retrospective study of the clinical characteristics and post-treatment hearing outcome in idiopathic sudden sensorineural hearing loss. Audiol Res. 2017;7(1):168.
11. Moskowitz D, Lee KJ, Smith HW. Steroid use in idiopathic sudden sensorineural hearing loss. Laryngoscope. 1984;94:664-6.
12. Veldmann JE, Hanada T, Meeuwsen F. Diagnostic and therapeutic dilemmas in rapidly progressive sensorineural hearing loss and sudden deafness. Acta Oto- laryngol (Stockh). 1993;113:303-6.
13. Mattox DE, Simmons FB. Natural history of sudden sensorineural hearing loss. Ann Otol. 1977;86:463-80.
14. Ferri E, Frisina A, Fasson AC, Armato E, Spinato G, Amadori M. Intratympanic Steroid Treatment for Idiopathic Sudden Sensorineural Hearing Loss after Failure of Intravenous Therapy. ISRN Otolaryngol. 2012;647271:6.
15. Ahn JH, Yoo MH, Yoon TH, Chung JW. Can Intratympanic Dexamethasone Added to Systemic Steroids Improve Hearing Outcome in Patients With Sudden Deafness. Laryngoscope. 2008;118:279–82.

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