

Intratympanic Steroid Injection for Idiopathic Sudden Sensorineural Hearing Loss (ISSHL)-An Emerging Therapy

Monoj Mukherjee, Siddhartha Das, Arpita Mohanti

¹Assistant Professor; Siddhartha Das (Corresponding Author) RMO

²PGT, Department of ENT, NRS Medical College, Kolkata, West Bengal, India

Abstract: Introduction: Idiopathic sudden sensorineural hearing loss is a very frightening condition as the patient suddenly realises hardness of hearing, most commonly after awakening in the morning, and incidence varies between five to ten per 100000 per year. Management of this disease is controversial. Most common mode of management is oral steroids for two to four weeks. Several drugs with different dose and duration has been tried with unsatisfactory results. So there is search for newer drugs/methods of management. Intratympanic dexamethasone injection is new in this field. Objectives: To find the effectiveness of intratympanic steroid injection (ITS) for hearing recovery and comparing the results with oral steroids therapy. Materials and Methods: This study was done in the department of ENT, NRS Medical College, Kolkata, over a period of two years from January 2017 to December 2018. Total 64 patients of ISSHL was selected for the study. Through examination, otoscopy and pure tone audiometry was done for all the cases before initiation of therapy. Thirty patients received and thirty four patients received oral prednisolone for a protocol based dose and duration. Pure tone audiometry was repeated every two weeks over duration of two months for documentation of improvement of hearing on pure tone four frequency average. Results: Chances of recovery was more with intratympanic injection (70%) in comparison to oral steroids (58.8%). The ITS group showed faster recovery also with lower side effects. Conclusion: Intratympanic dexamethasone injection is more effective in comparison to oral prednisolone for the management of ISSHL. It is technically demanding.

Keywords: idiopathic sudden sensorineural hearing loss, intratympanic steroid injection

1. Introduction

Idiopathic sudden sensorineural hearing loss (ISSHL) is a very frightening condition as the patient suddenly realises hardness of hearing, most commonly after awakening in the morning. The incidence varies between five to ten per 100000 per year [1]. Management of this disease is controversial. Spontaneous recovery is found in about fifty percent of cases. Most common mode of management is oral steroids for two to four weeks though the role of steroids in the management of this disease remains unclear [2]. Several drugs with different dose and duration has been tried with unsatisfactory results. None of these conventional management options have shown better result than placebo. So there is a search and need for newer methods. Intratympanic steroid injection is new in this field.

2. Objectives

The aims and objectives are-

- 1) To find the effectiveness of intratympanic dexamethasone injection (IDI) for recovery of hearing and associated symptoms
- 2) Time taken for recovery.
- 3) Morbidities associated with this modality
- 4) Comparing the results with the patients using oral steroids therapy.

3. Materials and Methods

This prospective study was done in the department of ENT, NRS medical college, Kolkata, over a period of two years from January 2017 to December 2018. The patients

presenting with chief complain of sudden hearing loss in our OPD was thoroughly examined to select the candidate for this study.

Inclusion criteria:

- 1) The patients presenting with 30 dB or more hearing loss on three or more contiguous frequency developed within 72 hours were included in this study [3].
- 2) The patients presenting within one month of initiation of symptoms were included.

Exclusion criteria

- 1) Infective changes in ear, any identifiable aetiology, medically unfit candidate.
- 2) Unwilling for injection in ear.
- 3) The cases with delayed presentation i.e. after one month of initiation of symptoms were not included

Total 71 patients of ISSHL was selected for the study. Only 33 patients have given written consent for injection in ear and followup. They are our target population for this study. Other 38 patients were shifted to oral steroid group. We have not prescribed antivirals to any patient.

Through examination, otoscopy and pure tone audiometry was done for all the cases before initiation of therapy. Four contiguous frequency average of hearing threshold was noted on 500Hz, 1000Hz, 2000Hz and 4000Hz. Any associated symptoms like tinnitus, dizziness and vertigo were noted also.

Initially, intratympanic dexamethasone injection was started on thirty three ears. Dexamethasone injection preparation with 2mg/ml was taken. 0.5ml of this preparation was loaded in a 2.5ml injection syringe. 24G intravenous cannula

Volume 8 Issue 6, June 2019

www.ijsr.net

Licensed Under Creative Commons Attribution CC BY

needle was fitted with the syringe. Ear canal was thoroughly cleaned and 10% xylocaine sprayed on tympanic membrane for local anaesthesia. The tympanic membrane was visualised by zero degree 2.7 mm Hopkin's rod telescope and camera system. Under direct vision, the needle was inserted in middle ear through postero-inferior quadrant and dexamethasone injection given to fill the middle ear. Head was tilted to ipsilateral side immediately and the position was maintained for 15 minutes. Patient was asked not to swallow for that time. It helps for longer duration stay of injected steroids in the middle ear.

The intratympanic injection was repeated every 7th day and four injection given in this way. Repeat pure tone audiometry was done within seven days of 2nd and 4th or last injection. PTA was done every two weeks upto two months from the day of presentation. Four frequency hearing threshold average was noted for each patient again. Patient was thoroughly examined before each injection. Special query done regarding prognosis of associated symptoms i.e. tinnitus vertigo and dizziness. Exact date of subjective improvement of hearing loss and associated symptoms were noted.

Three patients were lost out of thirty three of intratympanic injection group. They were excluded from total study population. So thirty patient is counted in this study from this group of intratympanic dexamethasone injection.

Thirty eight patients received oral prednisolone for a protocol based dose and duration. Prednisolone tablet was given per oral 1mg/kg body weight for first seven days. It was reduced by half strength weekly and continued for four weeks. Pure tone audiometry done on third and fifth week for this group also. Four patients were lost in follow up from this group. They were excluded from the study. So thirty four patient were counted for study from this oral steroid group.

Pure tone audiometry was repeated every two weeks up to two months for documentation of hearing improvement on pure tone four frequency average.

4. Result Analysis

This study was conducted on sixty four cases of ISSHL though initially seventy one cases were selected. Total seven cases were lost in follow up. Out of these cases, 30 patients received intratympanic injection and 34 patient received oral steroids. Their age ranges from 25 to 54 years. There was no sex predilection as male to female ratio is one. The cases were divided in four groups according to the delay in presentation i.e. 1st week, 2nd week, 3rd week and 4th week groups

Table 1: No of cases as per delay in presentation

Groups	Delay in presentation	No of cases
1	0 to 7 days	18
2	8 to 14 days	24
3	15 to 21 days	12
4	22 to 30 days	10

Hearing loss was associated with other symptoms like dizziness, tinnitus and vertigo in descending order of incidence. Only 20 cases presented with pure hearing loss without any associated symptoms.

Table 2: Incidence of associated symptoms (n=44)

Sl. No	Associated symptoms	No of cases
1	Dizziness	10
2	Vertigo	6
3	Tinnitus	4
4	Combinations of above	24

Chances of recovery were more with middle ear injection group (60%) in comparison to oral steroids (50%). Here improvement is defined as 20 dB improvement in PTA or 20% improvement in SDS [5]. Complete recovery was found in six cases (20%) in injection group and five cases (14%) in oral steroid group. Complete recovery is defined as pure tone average of 25 dB or better

Table 3: Hearing outcome after treatment of ISSHL

Group	Total no of cases	Complete recovery	Partial recovery	No of cases no hearing improvement	Recovery of associated symptoms	Mean time for recovery
Middle ear injection	30	6	12	12	21 (70%)	21 days
Oral steroid	34	5	12	17	20 (58.8%)	45 days

Morbidities: Intratympanic injection group showed less incidence of side effects. No complications were found in follow up. Tympanic membrane was thoroughly examined before each injection under microscope. No perforation observed. Only few of the patients complaint of dizziness after injection that persisted for five to ten minutes and did not required any extra medications. No antibiotics or analgesic were required also. But the 30% patients of oral steroid group complaint side effects of steroid like dyspepsia, hot sensation and rise of blood pressure, palpitation.

5. Discussion

Different authors have defined ISSHL differently. The definition given by Wilson et al is most widely accepted and we also followed it in our study [3]. Kronenberg et al defined ISSHL as ≥ 20 dB sensorineural hearing impairment occurring abruptly or within seven days [4].

This is a very frightening disease as the patient suddenly feels handicapped and often associated with dizziness, tinnitus and vertigo. At present no monotherapy or combination therapy has shown proven cent percent recovery. So many drugs and treatment modalities are tried

for this disease. Unfortunately no one proved a better result than placebo [1] which showed 50% spontaneous recovery rate. Agents used for the management of ISSHL includes steroids, vasoactive agents, vitamins and anti oxidants, drugs to improve inner ear blood circulation, anti viral drugs and others.

Dose frequency of ITS varies with different authors. Sugihara EM et al found no difference in outcome of hearing with dose frequency [6]. They have tried dose frequency every 1-4 days, 5-10 days and 11-30 days in different groups. We have used frequency of every 7 days.

The use of intratympanic steroids (ITS) by the otolaryngologist varies in different region. The current frequency of use is not clear. In a survey in Europe Sutton L et al showed that it is being used by 49.1% otolaryngologist for the management of ISSHL [7]. 20.6% use ITS along with oral steroids. We have used it as the monotherapy.

Evidence based medicine shown 50 % recovery by the oral steroids and placebo [1]. In our study, we have found 50% recovery with oral steroids. But the ITS group showed 60 % recovery in our study. The ITS group showed a better control of associated symptoms like dizziness, tinnitus and vertigo are controlled better with ITS (70%) than oral steroid group (58.8%). Mean time taken for recovery of hearing is 21 days 45 days with ITS and oral steroid group respectively.

But ITS is technically demanding as only an otolaryngologist can give ITS injection. Whereas any physician can prescribe oral steroids. There is a fear among the patients regarding injection within ear.

6. Conclusion

Intratympanic dexamethasone injection is more effective in comparison to oral prednisolone for the management of ISSHL. In our initial study we have found a better result in respect of recovery rate, control of associated symptoms, side effects and mean time duration for recovery. It is an emerging therapy for the management of ISSHL. But it is technically demanding.

References

- [1] Martin J Barton and Richard J Harvey. Idiopathic sudden sensorineural hearing loss in: Michel Gleeson, editors. Scott- Brown's otolaryngology, Head and Neck Surgery 7th edition. Hodder-Arnold, 2008;3577-3590.
- [2] Cinnamon U et al. Steroids, Carbogen or placebo for sudden sensorineural hearing loss: A prospective double blind study. European Arch of otorhionolaryngology.2001;258:477-80.
- [3] Wilson WR et al. The efficacy of steroids in the treatment of idiopathic sudden hearing loss. A double blinded-blinded clinical study. Archives of Otolaryngology. 1980;106: 772-6.
- [4] Kronenberg et al. Vasoactive therapy versus placebo in the treatment of sudden hearing loss: a double blinded clinical study. Laryngoscope. 1992;102:65-8
- [5] Haynes DS, et al. Intratympanic dexamethasone for sudden sensorineural hearing loss after failure of systemic therapy. Laryngoscope. 2007 Jan;117 (1):3-15
- [6] Sugihara EM et al. the effect of intratympanic steroid injection frequency in idiopathic sudden sensorineural hearing loss. Am J Otolryngol. 2018 Nov-Dec;39 (6):688-692
- [7] Sutton Let al. Intratympanic steroid use for idiopathic sudden sensorineural hearing loss:current otolaryngology practice in Germany and Austria. Eur Arch otorhinolaryngol.2018 May; 275 (5):1103-1110