Section: ENT

Original Research Article

COMPARATIVE STUDY TO DETERMINE ROLE OF ORAL, INTRATYMPANIC, COMBINED ORAL AND INTRATYMPANIC STEROID THERAPY IN IDIOPATHIC SUDDEN SENSORINEURAL HEARING LOSS

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Abstract

Background: The aim is to compare the role of oral, intratympanic and combined oral with steroid injection for treatment of idiopathic sudden sensorineural hearing loss. Setting is tertiary care center. Design is Prospective type of study. **Materials and Methods:** 39 patients were enrolled after a pure tone audiogram and history suggestive of sudden sensorineural hearing loss random allocation was done and subjects were split into 3 groups. group A received only intratympanic dexamethasone for 4 weeks, group B received both oral methylprednisolone and intratympanic dexamethasone and group C received only oral methylprednisolone. The results of which were assessed by pure tone audiogram conducted after the four-week treatment. Statistical analysis used chi square test **Result:** Out of 39 patients 13 received intratympanic with oral steroid treatment, this combination therapy showed most improvement (average dB improved-27.07Db) in post treatment pure tone audiogram as well as tinnitus ($p < 0.5$) followed by group A (23.33dB) (only intratympanic steroid) and least improvement (15.51 dB) in group C (oral steroid). **Conclusion:** We compared the efficacy of oral steroid therapy alone, intratympanic steroid injection alone and oral with intratympanic steroid injection combined for treatment of idiopathic sudden sensorineural hearing loss. We recommend that combination therapy can be considered as initial treatment especially for patients with sudden sensorineural hearing loss.

INTRODUCTION

Idiopathic abrupt sensorineural hearing loss signifies a hearing impairment resulting from a dysfunction in auditory system processing. Idiopathic abrupt sensorineural hearing loss is characterised by a 30 dB hearing reduction across three contiguous frequencies over a three-day period, as delineated by Wilson et al..[1]

A patient is classified as having idiopathic sudden sensorineural hearing loss only when no identifiable reason for the hearing loss can be established.

The predominant theories on the aetiology of sudden sensorineural hearing loss (SNHL) encompass insufficiency, and rupture of the intralabyrinthine membrane.[2]

Intratympanic administration is , a minimally invasive technique that depends on diffusion across middle ear barriers, chiefly the round window membrane and oval window, for medication delivery into the cochlea.[3]

This study aims to examine the effects of steroids as the primary treatment for idiopathic acute sensorineural hearing loss in both oral and intratympanic forms.

We examined the efficacy of oral steroid therapy alone, intratympanic steroid injection alone, and the combination for sensorineural hearing loss.

MATERIALS AND METHODS

Subjects- Prospective type of study was conducted in outpatient department. Patient diagnosed as case of idiopathic sudden sensorineural hearing loss irrespective of gender and age more than 18 yrs and less than 60 yrs. Patient prior to the procedure of intratympanic steroid injection. Care was taken not to get into any sort of conflict of interest in the community.

Inclusion criteria:

1. patient presenting with hearing loss unilateral or bilateral diagnosed as idiopathic sudden sensorineural hearing loss (onset within 72 hours,

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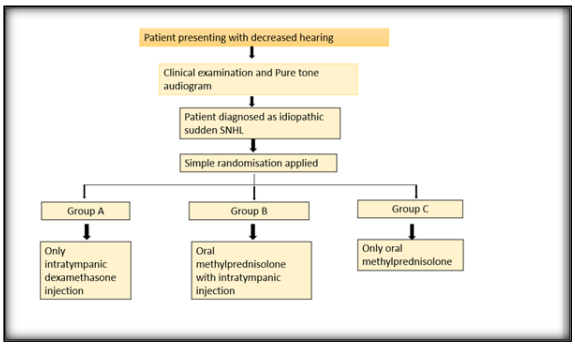
loss of 30dB or more on 3 consecutive frequency) on pure tone audiometry irrespective of gender and age more than 18 yrs less than 60 yrs .
2. patients willing to take part and give written informed consent after the details of the study were explained to them.
3. Patient willing to undergo intratympanic steroid injection as form of treatment

Exclusion criteria:

1. Previous history of ear trauma
2. Patient with active external or middle ear infections
3. Other types of sudden sensorineural hearing loss, or conductive forms or mixed type of hearing impairment
4. A history of fluctuating hearing loss.
5. Patient diagnosed with other known causes of sudden sensorineural hearing loss
6. Patient who are not suitable to receive oral steroid therapy due to comorbidities such as diabetes mellitus, hypertension, osteoporosis, immunosuppression, pregnant females (these comorbidities were ruled out by using standard blood investigations).

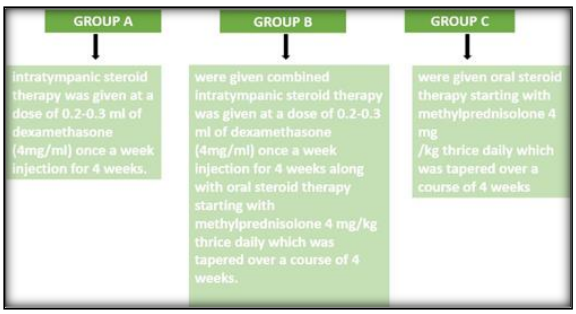


39 individuals after meeting the inclusion criteria were selected, three groups were made on a random basis irrespective of age and gender. Simple randomisation was done to allocate the patient to any group.

Group A – intratympanic steroid therapy.

Group B – combined

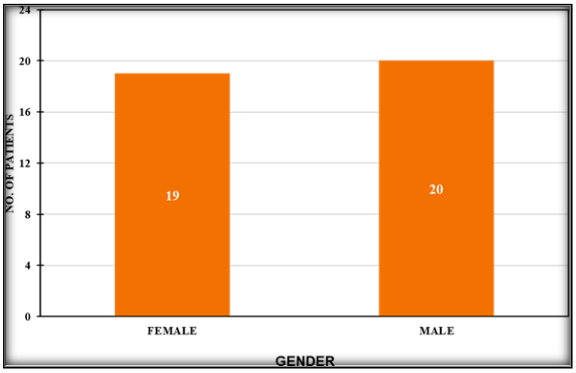
Group C – oral steroid therapy



Intratympanic Steroid Injection –

- The patient was positioned supine with head angled at a 45-degree angle towards the contralateral side.
- After verifying the integrity of the tympanic membrane while in the supine position, local anaesthesia using a cotton ball saturated with 10% lidocaine pump spray (Xylocaine, 10 mg/dose).
- A 26-gauge spinal needle was utilised to perform a single posteroinferior puncture for perfusion. A solution of dexamethasone (dexamethasone disodium phosphate, 4 mg/ml) was administered in a volume of 0.2-0.3 ml.[4]

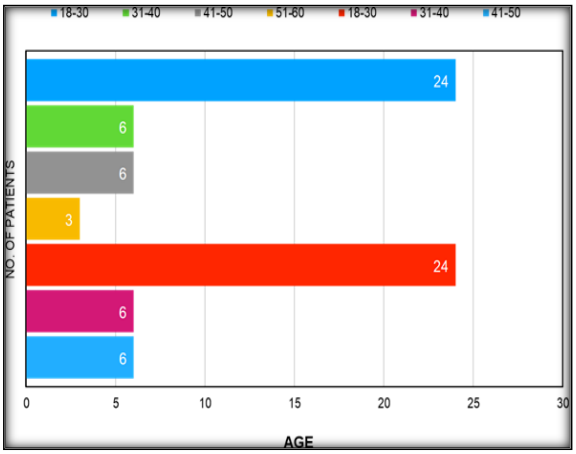
RESULTS



In our study, following table shows out of total 39 patients, 20 (51.2%) patients were male and 19 (48.8%) patients were female.

Following table shows the age wise distribution of the studied patients in three groups and it was observed that out of total 39 patients, majority 24 (61.5%) patients were from 18-30 age group, 6 (15.3%) patients belong to 31-40 years age range, 6 (15.3%) patients were from 41-50 years of age, 3 (7.9%) patients were from 51-60 years.50 years

Mean age was 37.69 years in group A, 29.77 years in group B and 26.62 years in group C. Comparison of age and groups were showed statistically non-significant results.



A total of 9 patients presented with associated complaint of tinnitus along with hearing loss out of those 4 belonged to group A and improvement in tinnitus was seen in 3 (75%) after a four-week period, 2 belonged to group B and improvement in tinnitus was seen in 2 (100%) after a four week period, 3

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belonged to group C and improvement in tinnitus was seen in 1 (33.3%) after a four week period.

The results signify that group B (combined oral with intratympanic steroids) group showed most improvement (27.07dB) followed by group A (23.33dB) (only intratympanic steroid) 1 and least improvement (15.51 dB) in group C (oral steroid).

Group B (24.98) has higher dB followed by group A (13.96) and group C (12.95). Comparison of dB and groups were showed statistically significant results.

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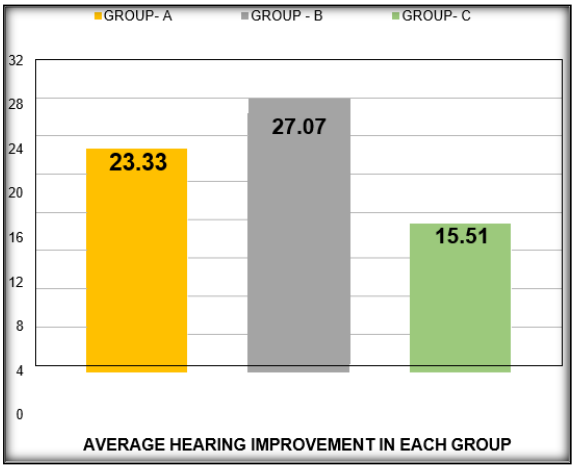

Table 1: Gender Wise Distribution.

Gender	Number	Percentage (%)
Male	20	(51.2%)
Female	19	(48.8%)

Table 2: Age Wise Distribution

	Number	Percentage
18-30	24	(61.5%)
31-40	6	(15.3%)
41-50	6	(15.3%)
51-60	3	(7.9%)

Table 3: improvement in Tinnitus

Tinnitus Improved	Number of Patients	Patients Improved	Percentage %
Group A	4	3	(75%)
Group B	2	2	(100%)
Group C	3	1	(33.3%)

Table 4: average decibel hearing improvement in each group post treatment

Group A (Intratympanic Inj Only)	Group B (Oral Steroid with Intratympanic Inj)	Group C (Oral Steroid Only)
23.33db	27.07db	15.51db

	Mean	Std. Deviation	P value
Group A	13.96	12.57	0.01 (S)
Group B	24.98	10.76	
Group C	12.95	7.45	
Chi square applied p value = 0.01 (significant)			

DISCUSSION

Systemic steroids constitute the primary therapeutic approach for the management of idiopathic. acute sensorineural hearing loss globally. In 1980, Wilson et al. conducted a double-blind trial in which patients received either systemic steroids or a placebo. The results indicated a statistically significant recovery rate of hearing, with 61% of steroid-treated patients recovering compared to 32% of those receiving the placebo.[5]

The overall mean age in our study was 31.35 years. Males constituted 51.3%, while females comprised 48.7%.

In our study, bilateral sensorineural hearing loss (SNHL) was observed in 20.5% of cases, while unilateral SNHL was observed in 79.5% of cases. Ravikeerthi G and Vibha B discovered that ISSNHL was more prevalent in females (65.71%) compared to males (34.28%).[6] ISSNHL occurred more frequently in the left ear (48.57%) compared to the right ear (34.28%).

The enhancement in our study was 52.1% for patients administered intratympanic steroid therapy, while 37.1% of patients exhibited improvement with intratympanic steroid therapy combined with oral steroids, and 18.1% improved solely with oral steroids, indicating statistically significant results in the study.

The non-inferiority randomised controlled trial conducted by Rauch and colleagues, which compared oral steroids and intratympanic steroids for patients presenting within two weeks of the beginning of idiopathic abrupt sensorineural hearing loss, showed that the intratympanic route was not inferior to the oral route of drug administration.[7]

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Metrics between IT steroid therapy alone and oral/systemic therapy alone. Data is current as of October 2023. Comparable findings have been seen by other researchers contrasting intratympanic dexamethasone with oral steroids as the principal treatment for sudden sensorineural hearing loss (SSNHL). Kosyakov et al. evaluated the effects of prolonged intratympanic steroid delivery (exceeding six months with grommet use) and concluded that long-term intratympanic steroid therapy resulted in a statistically significant recovery compared to conventional short-term intravenous steroid treatment.[8-11]

The systematic studies conducted by Vlastarakos et al,[12] and Spear and Schwartz,[13] determined that ITS therapy demonstrates equivalent efficacy contexts. When administered as the primary treatment, IT therapy demonstrated efficacy comparable to oral medication, with potential additional benefits in the salvage context augmenting those of the primary oral treatment. Nevertheless, no definitive agreement was reached concerning combination oral and intratympanic therapy. The research conducted by Battaglia et al,[14] demonstrated that the combination of intratympanic steroid (ITS) and oral steroid therapy outperformed oral therapy alone regarding word recognition scores. However, there were no statistically significant differences therapy alone and ITS alone groups, and the study was prematurely terminated due to inadequate patient recruitment. Ahn et al,[15] observed that the use of ITS dexamethasone with oral corticosteroids does not yield an improved outcome compared to oral treatment alone.

CONCLUSION

A total of 39 patients presenting as patient were taken in account for the study.

The results drawn from the study were as followed –

- The age range was 18-65 yrs. for this study, maximum patients belonged to age group 18-30yrs i.e. 24 (61.5%) and minimum patients belonged to age group 51-69 yrs i.e. 3 (7.9%).
- Tinnitus was found in 4 pts (23.1%) in group A, 2pts (15.4%) in group B and 3 pts (38.5%) in group C.
- improvement in tinnitus was seen in 3 out of 4 (75%) in group A(only intratympanic), in 2 out of 2 (100%) in group B (combined) and 1 out of 3 (33.3%) in group C (oral steroids) after a four-week treatment.
- Group B (combined) (29.05dB) has higher dB improvement followed by group A(intratympanic) (18.75dB) and group C (oral steroid) (14.15dB).
- The improvement in our study was 52.1% among patients treated with intratympanic steroid therapy with oral steroids, whereas 37.1% of the patients improved on receiving intratympanic steroid therapy and 18.1% of the patients improved on receiving only with oral steroids.

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