

Sudden Sensorineural Hearing Loss: Clinical Profile and Hearing Outcomes Following an Office-Based Treatment Protocol – A Retrospective Study

P. Lakshmi, L. Meena*, Rashmi Ramashesh

ABSTRACT

Background: Sudden sensorineural hearing loss (SSNHL) is an otological emergency in which early recognition, audiological confirmation, and timely treatment are considered important for hearing recovery. Management in routine office-based practice may require a systematic approach incorporating early audiological assessment, identification of potentially contributory factors, and corticosteroid-based treatment. **Objective:** The aim of the study was to describe the clinical characteristics, evaluation, management, and short-term hearing outcomes of patients with SSNHL managed using a systematic office-based treatment protocol. **Methods:** This retrospective observational study included patients presenting with SSNHL to an office-based ENT practice between June 2019 and January 2023. Demographic characteristics, presenting symptoms, potential etiological or contributory factors, comorbidities, audiological findings, investigations, and treatment were reviewed. Pure-tone audiometry was performed before treatment and during follow-up. The primary outcome was change in pure-tone hearing threshold following treatment. **Results:** Thirty patients were included, comprising 18 males and 12 females. Tinnitus was present in 40% of patients and giddiness in 15%. The majority of cases were classified as idiopathic, with idiopathic SSNHL associated with comorbidities accounting for an additional proportion. Comorbid conditions included hypertension, Type 2 diabetes mellitus, dyslipidemia, thyroid disorders and cardiac disease. The mean pretreatment pure-tone hearing threshold was 60.50 ± 20.74 dB HL, which decreased to 21.67 ± 8.77 dB HL following treatment. The difference between pretreatment and post-treatment thresholds was statistically significant ($P < 0.001$). **Conclusion:** In this retrospective cohort from an office-based ENT practice, a systematic approach incorporating early audiological assessment and corticosteroid-based management was associated with significant short-term improvement in hearing thresholds. These findings support the importance of prompt evaluation and structured management of SSNHL. Larger prospective studies with standardized treatment protocols, longer follow-up, and appropriate comparator groups are required to determine the independent contribution of individual treatment components to hearing recovery.

Keywords: Sensorineural hearing loss, Corticosteroid, Pure tone audiometry

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INTRODUCTION

Sudden sensorineural hearing loss (SSNHL) is an otological emergency characterized by a rapid onset of sensorineural hearing impairment, traditionally defined as a loss of at least 30 dB across three contiguous frequencies occurring within 72 h. Although several etiological factors have been proposed, most cases remain idiopathic despite clinical evaluation. Tinnitus and vestibular symptoms may accompany SSNHL and have been investigated as potential prognostic factors.^[1,2]

Early audiological assessment and prompt treatment are important in the management of SSNHL. Corticosteroids, administered systemically and/or intratympanically, remain central to current treatment strategies, while intratympanic corticosteroids are also used as salvage therapy in patients with incomplete recovery. However, spontaneous hearing recovery is common, making assessment of treatment outcomes challenging, particularly in uncontrolled clinical studies.^[2-4]

The present study describes the clinical profile and short-term hearing outcomes of patients with SSNHL managed using a systematic office-based treatment protocol, with particular emphasis on changes in pure-tone hearing thresholds following treatment.

MATERIALS AND METHODS

This retrospective study was conducted in an office-based ENT practice over a period of 3.5 years, from June 2019 to January 2023.

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A total of 30 patients diagnosed with SSNHL were included in the study. The objective was to evaluate the clinical profile and hearing outcomes following an office-based treatment protocol.

Patient details were recorded in a structured case pro forma, which included demographic characteristics, presenting symptoms, possible contributing etiological factors, clinical examination findings, investigations, audiometric findings, and treatment administered. A detailed clinical assessment included general physical, otological, cardiovascular, and neurological examination. History regarding recent upper respiratory tract infection, acoustic or direct trauma, ototoxic drug exposure, systemic disorders, previous surgery, and similar complaints in the family was documented.

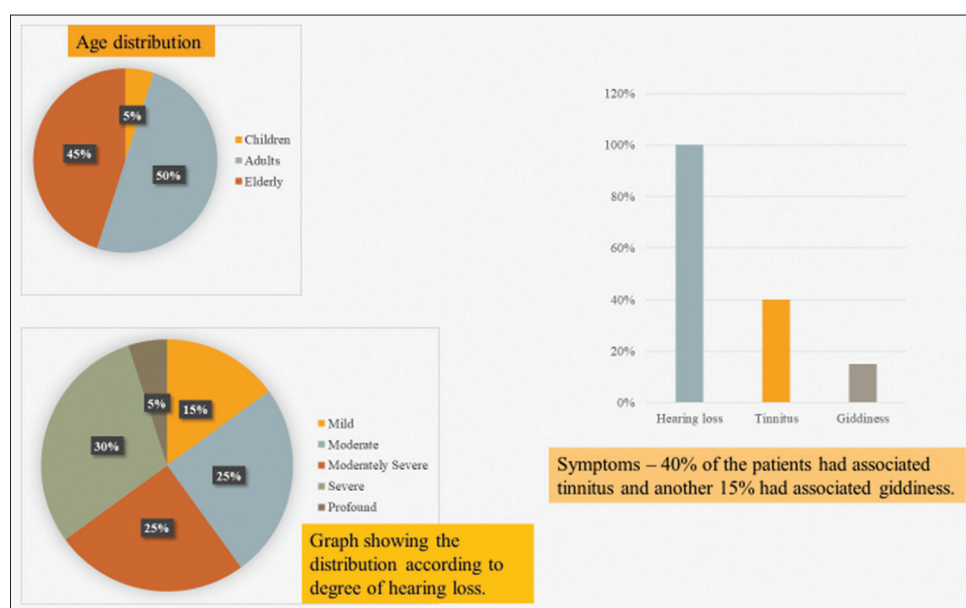


Figure 1: Age distribution, Associated Symptoms with hearing loss and distribution of degree of hearing loss

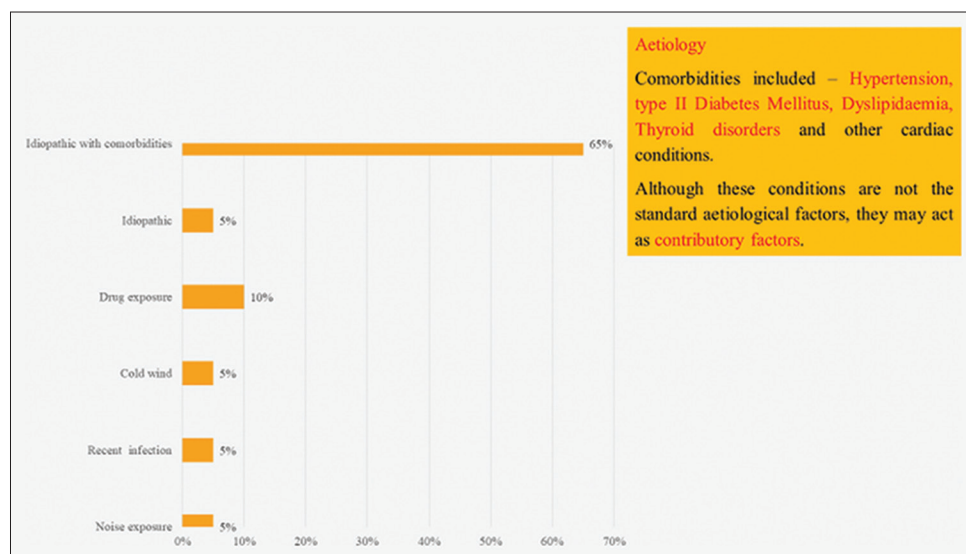


Figure 2: Aetiology of Sudden Sensorineural hearing loss

Audiological evaluation included pure tone audiometry (PTA) at the initial visit, followed by serial audiograms at 3, 5 and 7 days after initiation of treatment. Audiometric assessment before treatment and at 10 days after treatment was used for evaluation of hearing outcome.

Laboratory investigations included complete blood count, thyroid profile, lipid profile, erythrocyte sedimentation rate, fasting blood sugar, postprandial blood sugar, and HbA1c. Magnetic resonance imaging of the temporal bone with contrast was performed when clinically indicated.

The treatment protocol consisted of tapering doses of oral corticosteroids, intratympanic steroid injections, correction of associated comorbidities, and other supportive medications.

The primary outcome assessed was the change in pure tone hearing threshold between the pretreatment and post-treatment audiograms.

RESULTS

A total of 30 patients with SSNHL were included in the study during the study period from June 2019 to January 2023. There were 18 males and 12 females [Figure 1].

Tinnitus was reported in 40% of patients, while 15% reported associated giddiness [Figure 1].

The distribution of hearing loss reported in the study was as follows: mild hearing loss in 3 patients, moderate hearing loss in 5, moderately severe hearing loss in 5, severe hearing loss in 6, and profound hearing loss in 1 patient [Figure 1].

The etiological distribution documented in the presentation included noise exposure (5%), recent infection (5%), exposure to cold wind (5%), drug exposure (10%), idiopathic cases (5%), and idiopathic SSNHL associated with comorbidities (65%) [Figure 2].

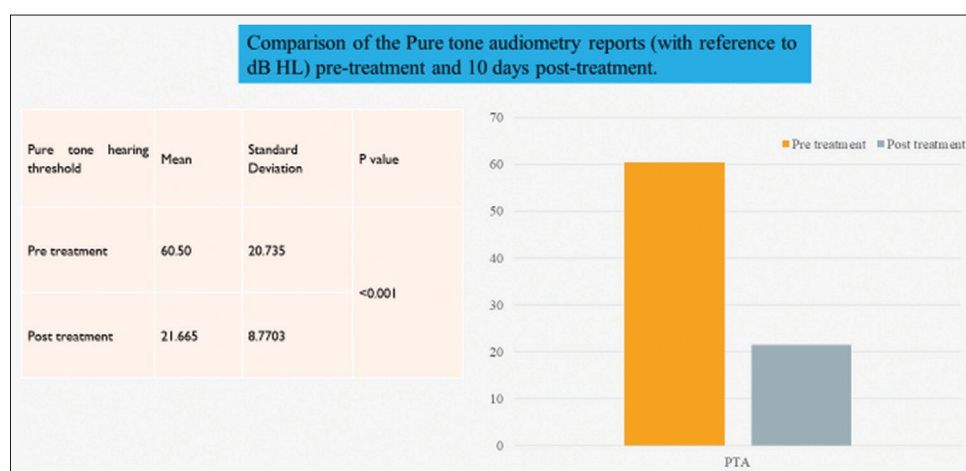


Figure 3: Comparison of pure tone audiometry pre and post treatment

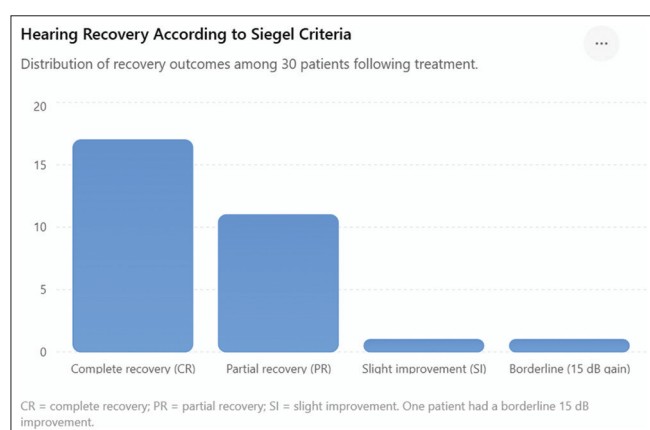


Figure 4: Outcomes of hearing recovery

The comorbidities documented included hypertension, Type II diabetes mellitus, dyslipidemia, thyroid disorders, and other cardiac conditions. These were considered possible contributory factors rather than standard etiological factors [Figure 2].

The mean pretreatment pure tone hearing threshold was 60.50 dB HL (SD 20.735), which decreased to 21.665 dB HL (SD 8.7703) following treatment. The difference between pretreatment and post-treatment hearing thresholds was statistically significant ($P < 0.001$) [Figure 3].

Thus, the study demonstrated a significant improvement in pure tone hearing thresholds following the office-based treatment protocol. The presentation reported a mean improvement of 61.2% [Figure 3].

Regarding possible contributing factors, drug exposure accounted for 10%, while noise exposure, recent infection, and cold-wind exposure each accounted for 5%. Idiopathic SSNHL with associated comorbidities accounted for 65%, with 5% classified as idiopathic.

Patients were managed with oral corticosteroids, intratympanic dexamethasone, correction of associated comorbidities, and supportive treatment. Audiometric assessment showed significant improvement, with mean PTA improving from 60.50 ± 20.74 dB HL before treatment to 21.67 ± 8.77 dB HL after treatment ($P < 0.001$) [Figure 3].

Based on the individual values provided, 17 patients (56.7%) achieved complete recovery, 11 (36.7%) partial recovery, and 1 (3.3%) slight improvement according to Siegel criteria. One patient demonstrated exactly 15 dB improvement and was considered borderline [Figure 4].

DISCUSSION

Sudden sensorineural hearing loss (SSNHL) is an otological emergency in which early recognition, audiological confirmation, and timely initiation of treatment are considered important for optimizing hearing recovery. In the present retrospective study, patients managed through a structured office-based treatment protocol demonstrated a significant improvement in hearing thresholds, with mean pure-tone average (PTA) improving from 60.50 ± 20.74 dB HL before treatment to 21.67 ± 8.77 dB HL following treatment ($P < 0.001$). This represents a substantial improvement in hearing thresholds and suggests that a systematic office-based approach may be associated with favorable short-term hearing outcomes.

In our cohort, 18 patients were male and 12 were female. Tinnitus was present in 40% of patients, whereas giddiness was reported in 15%. Vestibular symptoms have previously been associated with poorer hearing outcomes in SSNHL. A systematic review and meta-analysis by Yu *et al.* reported that patients with vertigo had poorer hearing recovery than those without vertigo.^[1] The relatively low proportion of patients with giddiness in our study may partly explain the favorable recovery observed; however, the small sample size does not allow a meaningful assessment of the prognostic significance of giddiness within our cohort.

The majority of patients in the present study were classified as having idiopathic SSNHL associated with comorbidities. Hypertension, type 2 diabetes mellitus, dyslipidemia, thyroid disorders, and cardiac conditions were documented as associated medical conditions. These conditions were considered potential contributing factors rather than definitive etiological causes. The high proportion of patients with associated comorbidities emphasizes the importance of a comprehensive medical assessment in patients presenting with SSNHL. However, because of the retrospective design and absence of a control group, the present study cannot establish a causal relationship between these comorbidities and hearing loss.

The severity of hearing loss at presentation is an important consideration when interpreting treatment outcomes. Previous studies have demonstrated that patients with severe or profound hearing loss generally have poorer recovery than those with less severe initial hearing impairment. Cheng *et al.*, using modified Siegel criteria, reported that pretreatment hearing severity and early treatment were important factors influencing recovery.[3] Similarly, a study involving 205 patients found poorer complete recovery among older patients and those with profound hearing loss. In our study, the baseline mean PTA was 60.50 dB HL, indicating a substantial degree of hearing impairment at presentation. Despite this, a considerable proportion of patients achieved complete or partial recovery.

Using the Siegel recovery criteria, 17 patients (56.7%) achieved complete recovery and 11 patients (36.7%) achieved partial recovery. Thus, 28 of 30 patients (93.3%) achieved either complete or partial recovery, while one patient demonstrated slight improvement. These findings appear favorable when compared with some previously published series. However, direct comparison between studies should be interpreted cautiously because differences in patient selection, baseline hearing severity, treatment timing, steroid regimens, definitions of recovery, and duration of follow-up can substantially influence reported recovery rates.

An important consideration in interpreting the present findings is the possibility of spontaneous recovery. SSNHL has a variable natural history, and spontaneous recovery has been reported in a substantial proportion of patients. A systematic review and meta-analysis by Chaushu *et al.* reported a pooled spontaneous recovery rate of approximately 60% in idiopathic SSNHL.[5] Furthermore, Hultcrantz and Nosrati-Zarenou reported that systemic prednisolone at customary doses did not demonstrate a significant benefit compared with placebo or no treatment in idiopathic SSNHL, raising the possibility that part of the observed improvement in uncontrolled treatment studies may reflect the natural course of the disease.[6,7] Therefore, although the improvement observed in our cohort was statistically significant, it cannot be attributed exclusively to corticosteroid therapy on the basis of the present study design.

The role of corticosteroid therapy in SSNHL remains clinically important, with systemic and intratympanic corticosteroids commonly incorporated into treatment strategies. In our study, patients were managed using oral corticosteroids, intratympanic dexamethasone, correction of associated comorbidities, and supportive treatment. Because several treatment components were used together, the individual contribution of oral corticosteroids, intratympanic steroids, management of comorbidities, and other supportive measures cannot be determined from our data. This is particularly relevant because intratympanic corticosteroids are also commonly used as salvage therapy in patients with incomplete recovery.

Previous randomized evidence has also demonstrated the potential role of intratympanic corticosteroids as salvage therapy. Wu *et al.* reported a mean hearing improvement of approximately 9.8 ± 8.5 dB with intratympanic steroid treatment, with a significantly greater improvement compared with saline control.[8] The greater improvement observed in our study should therefore not be interpreted as evidence of superiority of the combined office-based protocol, as our study did not include a comparator group and differed in treatment design and patient characteristics.

The convenience of office-based treatment is an important practical consideration. A structured protocol that incorporates

prompt audiological assessment, appropriate investigation, corticosteroid treatment, and follow-up audiometry may facilitate early management of SSNHL without requiring hospitalization in appropriately selected patients. This may be particularly relevant in outpatient ENT practice, where rapid assessment and initiation of treatment can be achieved. Nevertheless, treatment decisions should remain individualized according to the patient's clinical status, comorbidities, contraindications to corticosteroids, severity of hearing loss, and response to initial therapy.

The present study has several important limitations. First, the sample size was small, with only 30 patients, which limits the statistical power and generalizability of the findings. Second, the retrospective observational design introduces the possibility of selection and information bias. Third, there was no untreated or placebo-controlled comparison group; therefore, the observed hearing improvement cannot be separated from spontaneous recovery. Fourth, the follow-up period used for the primary hearing assessment was short, limiting conclusions regarding long-term hearing stability.

Despite these limitations, the present study provides real-world observational data from an office-based ENT setting and demonstrates substantial short-term improvement in hearing thresholds following a structured management approach. The findings support the importance of early audiological evaluation, systematic clinical assessment, and timely initiation of treatment in patients presenting with SSNHL. Future prospective studies with larger sample sizes, standardized treatment regimens, predefined treatment intervals, longer follow-up, and appropriate comparator groups are required to determine the independent contribution of individual treatment components and to identify clinical factors associated with hearing recovery.

Overall, our findings suggest that a structured office-based approach to SSNHL management can be associated with significant improvement in hearing thresholds. However, given the potential contribution of spontaneous recovery and the absence of a control group, the results should be interpreted as an association rather than evidence of treatment efficacy.

CONCLUSION

- SSNHL is an otologic emergency requiring early recognition, thorough evaluation, and prompt treatment.
- The majority of cases are idiopathic.
- Intratympanic dexamethasone (2 mg) can be conveniently administered in an office-based setting.
- A combination of intratympanic and oral steroids was associated with significant hearing improvement in our study.
- Office-based management is convenient, potentially cost-effective, and may avoid hospitalization in appropriately selected patients.

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