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Original Research

A comparative study to assess the efficacy of oral vsintratympanic corticosteroid therapy for idiopathic sudden sensorineural hearing loss

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ABSTRACT:
Introduction: Oral corticosteroids have been used for over 30 years to treat idiopathic acute sensorineural hearing loss. Intratympanic steroid medication has recently been used to manage the symptoms of many patients. There is no reliable comparative effectiveness research to back up this approach. **Objective:** The goal of this study was to assess the efficacy of an oral steroid vs an intratympanic steroid in the treatment of acute sensorineural hearing loss.**Patients, Design, and Setting:** 250 individuals with unilateral sensorineural hearing loss who presented within 14 days of start of 50 dB or above pure tone average (PTA) hearing threshold were enrolled in a prospective, randomised, noninferiority experiment. The study took place at ENT OPD of Hitech Medical College and Hospital, Bhubaneswar from October 2019 to September 2021. Participants were tracked for six months after they completed the study. **Intervention:** One hundred and twenty-one patients were given either 60 mg/d of oral prednisone for 14 days with a 5-day taper or four doses of 40 mg/ml methylprednisolone injected into the middle ear over 14 days. **Measures of the main outcomes:** The primary outcome was a change in hearing after two months of treatment. Noninferiority was defined as a difference in hearing result of less than 10 decibels between treatments.**Results:** The oral prednisone group had the best results. The intratympanic therapy group improved by 28.7 dB while PTA improved by 30.7 dB. At two months, the oral steroid treatment group's mean pure tone averaged 50.6 dB, while the intratympanic therapy group's averaged 57.6 dB. The recovery of hearing on oral treatment was 2.0 dB greater than intratympanic treatment after 2 months, according to an intention-to-treat analysis (95.21 percent upper confidence interval, 6.6 dB). The intention-to-treat finding was validated by per-protocol analysis. As a result, the idea that intratympanic methylprednisolone is inferior to oral prednisone for the primary treatment of abrupt sensorineural hearing loss has been disproved. **Conclusion:** Hearing levels two months after treatment demonstrated that intratympanic treatment was not inferior to oral prednisone treatment in patients with idiopathic acute sensorineural hearing loss.
Keywords: Corticosteroid, Sensorineural Hearing Loss, Methylprednisolone, Prednisolone, Bhubaneswar

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INTRODUCTION

Idiopathic sensorineural hearing loss, defined as an unexplained unilateral sensorineural hearing loss that develops in less than 72 hours, is predicted to affect 5 to 20 people per 100,000 per year.[1] Because many people who recover rapidly do not seek medical help, this figure is likely to be underestimated. [2] Hearing loss, which is most commonly seen in adults, occurs between the ages of 43 and 53 years, with equal sex distribution and transient vestibular symptoms present in 28 percent to 57 percent of patients, according to several large case series involving a total of approximately 7500 cases in the United States, Europe, and Japan. [1,3-11]

A tapering course of oral corticosteroids is currently the usual treatment for idiopathic hearing loss (Prednisone or Methylprednisolone). This approach is based on a randomised, placebo-controlled trial of oral steroid medication in 67 individuals, which found that the steroid-treated group had considerably greater

rates of improvement. [12] Hearing recovery was observed in 32 percent (11 of 34) of placebo group participants and 61 percent (20 of 33) of treatment group participants in this study. The effect size (0.59) observed with this treatment led to its rapid and widespread acceptance. A big retrospective analysis of 266 patients who were additionally treated with oral corticosteroids followed. [13] Improvement was seen in 46 percent of the study population (122 of 266) and in 55 percent (76 of 139) of patients with a hearing threshold of 60dB or lower. A large effect size was identified for this subset of people with moderate to severe hearing loss (0.64).The 22 untreated individuals presenting with comparable hearing levels had a mean improvement of 12.9 dB, while the steroid-treated group had a mean improvement of 28.0 dB.

Intratympanic corticosteroid treatment by direct injection into the middle ear has grown in popularity during the last 15 years. Intratympanic therapy has the potential to boost medication concentration at the target organ. In guinea pig experiments, intratympanically delivered corticosteroids had significantly higher drug concentrations than systemically administered corticosteroids. [14,15] However, no sufficiently powered prospective randomised controlled trial comparing oral and intratympanic steroid treatments has been conducted to show that greater local drug concentration leads to improved hearing outcomes. Intratympanic success rates have been reported in uncontrolled case series to be similar to those reported for oral medication. In a retrospective case study of 26 intra-tympanically treated patients, a 27.2-dB mean threshold improvement and a 25.4 percent mean improvement in speech discriminations were found.Another study found that intratympanic steroid therapy helped 14 of 21 patients (67 percent). [17]

Reduced systemic steroid exposure and accompanying systemic side effects are a potential benefit of intratympanic treatment versus oral medication. Oral steroid side effects are well-known and usually controllable. Changes in appetite, mood, or sleep patterns are among them as are weight gain, gastritis, and increased thirst. Hypertension, hyperglycemia, cataract development, and avascular necrosis of the hip are some of the most serious medical consequences. Pharmacokinetic investigations in animals have revealed that local steroid delivery to the ear does not result in high circulating drug levels, as previously stated. [14,15] As a result, the intratympanic treatment's expected side effects would all be local, such as ear pain, temporary caloric vertigo, tympanic member perforation, or infection (otitis media).

We conducted a randomised, noninferiority trial comparing the efficacy of oral prednisone to intratympanic methylprednisolone for primary treatment of idiopathic hearing loss, based on evidence of similar efficacy but other potential advantages of intratympanic over standard oral therapy. When two conditions are met, a noninferiority design is appropriate: (1) the standard or control treatment's efficacy is predicted to be similar, and (2) there may be secondary factors other than efficacy that prefer the experimental treatment over the control treatment. The known efficacy of oral prednisone and the proposed efficacy of intratympanic steroid shown in various retrospective case series were found to be similar in the current investigation. Because intratympanic treatment minimises systemic steroid exposure and its associated side effects, one could expect intratympanic treatment to have a better safety profile than oral prednisone. As a result, both noninferiority design requirements were met.

METHODS

STUDY DESIGN

A minimum age of 18 years was required, as well as a unilateral sensorineural hearing loss that began within 72 hours and lasted for 14 days or less. The pure tone average (PTA), computed as the arithmetic mean of the hearing thresholds in the affected ear at 500, 1000, 2000, and 4000 Hz, had to be 50 dB or greater, and the affected ear had to be at least 30 dB worse than the contralateral ear in at least one of the four PTA frequencies. Hearing must have been symmetric before to the commencement of sensorineural hearing loss, to the best of the participant's knowledge. Participants were not known or expected to have had any prior otolaryngological contacts because hearing loss is a spontaneous disorder with no known antecedents. The hearing loss had to be ruled out as idiopathic after a thorough otolaryngologic examination, which included a medical and otologic history, a thorough systems review, a head and neck, otologic and neurotologic physical examination, audiometry, and imaging to rule out structural or retro cochlear pathology like vestibular schwannoma, stroke, or demyelinating disease. Because oral steroid medication has long been the standard of care for abrupt hearing loss, many of the individuals who were screened for enrolment in the trial already had this treatment started by their referring physicians. The exclusion of these patients would have limited subject recruitment significantly. As a result, as long as audiometric criteria were met on the day of registration, pre-enrolment steroid use of less than 10 days was permissible.

This study was meant to rule out patients with ear disease that could be mistaken for idiopathic abrupt hearing loss, as well as those with systemic diseases who would be more susceptible to steroid side effects. Previous hearing loss in either ear, history of fluctuating hearing or Meniere disease, history of chronic inflammatory or suppurative ear disease or cholesteatoma, history of otosclerosis, prior ear surgery of any kind (except ventilating tubes), hearing asymmetry prior to onset, congenital hearing loss, physical trauma or barotrauma to the ear immediately

preceding hearing loss, history of luetic deafness.[18] History of tuberculosis or prophylactic therapy for a positive purified protein derivative skin test, insulin-dependent diabetes mellitus, rheumatoid arthritis, active atherosclerotic vascular disease, serious psychiatric disease, prior treatment with chemotherapy agents or other immunosuppressive drugs, pancreatitis, known human immunodeficiency virus, hepatitis C or B infection, chronic renal insufficiency, alcohol abuse, active her herpes zoster infection, severe osteoporosis, general anesthesia within 4 weeks of hearing loss onset, history of head and neck cancer, or history of radiation therapy.

STUDY DESIGN AND PROCEDURES

The institutional review boardapproved the study protocol, manual of procedures, and informed consent form. The following month, recruitment began. A screening visit; a baseline visit to obtain informed consent, enrol, randomise, and begin treatment; 3 additional safety monitoring visits during the 2-week treatment interval; an immediate post-treatment follow-up visit; and a 2-month (primary) and 6-month (extended) follow-up visit to assess hearing and safety outcomes were all part of the study.

INTERVENTIONS

Patients who agreed to participate were randomised to receive either oral prednisone or intratympanic methylprednisolone sodium succinate after being screened for eligibility. A telephone call to the data coordinating centre was used to perform permuted block randomization stratified by trial site and baseline PTA (90 dB vs 90 dB). SAS software was used to produce the randomization codes (SAS Institute Inc, Cary, North Carolina). The codes were only accessible to those who worked at the data coordinating centre. Treatment was not hidden from the participants or the treating physicians. For a total of 19 days of treatment, the prednisone group received 60 mg/d for 14 days, followed by a 5-day taper (50 mg, 40 mg, 30 mg, 20 mg, and finally 10 mg). Over the course of two weeks, the intratympanic group received four 1-mL doses of 40 mg/mL methylprednisolone via injection through the tympanic membrane into the middle ear by an otolaryngologist using an operating microscope. Topical phenol was used to achieve anaesthesia. After the injection, patients were positioned supine with the afflicted ear slightly raised and maintained in this position for 30 minutes. For the duration of the therapy, they were told to keep water out of the treated ear.

OUTCOMES

At screening, after 1 and 2 weeks of therapy, and at 2 and 6 months of follow-up, hearing was assessed using air and bone conducted pure tone audiometry and speech audiometry. Audiologists were kept in the dark about the procedure. The highest proportion (0 percent -100 percent; usual 90 percent) of monosyllabic words correctly identified from digitally recorded standardised 50-word lists delivered to each participant's ear produces a word recognition score, whereas pure tone audiometry yields hearing threshold values. The change in hearing threshold (dB PTA) from the first audiogram to the 2-month follow-up audiogram was the study's major end point. Hearing, PTA at 6 months, difference in PTA between the afflicted and unaffected ears at 2 and 6 months, word recognition score at 2 and 6 months, and adverse events were all secondary outcome measures. At each appointment, a detailed review of systems questionnaire and a visual analogue pain scale were completed. At each appointment, safety monitoring laboratory studies comprised a complete blood cell count, serum glucose measurement, and urinalysis, in addition to evaluating vital signs and doing an otological physical examination. Other safety testing was done at the treating physician's discretion based on the patient's medical history. At each study visit, adverse events and major adverse events were examined.

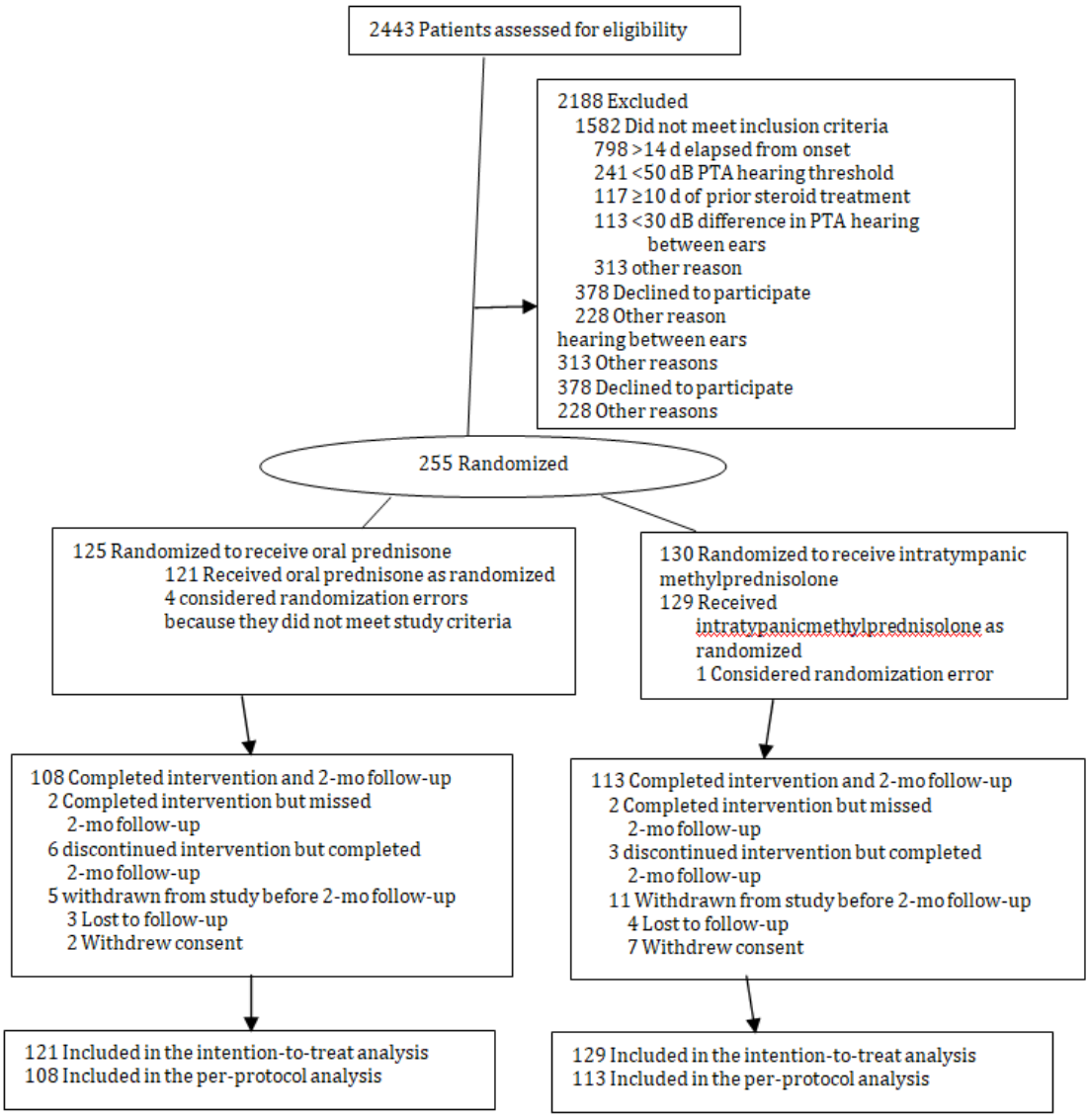
STATISTICS

The main hypothesis of the study was that intratympanic methylprednisolone is less effective than oral prednisone in treating hearing loss. If the mean post-treatment change in dB PTA of the oral group surpasses that of the intratympanic group by more than 10 dB, we consider intratympanic to be inferior. Patients' reports of communication problems and quality of life have been linked to changes in PTA. [19] Hearing loss is consistently linked to a decline in life quality. [20] For this investigation, a 10-dB PTA noninferiority threshold was chosen to give a conservative clinical change below which patient outcomes were not obviously distinguishable. Our 10 dB criteria is less than half of what was reported in a large study as the difference between two distinct groups created by quality of life indicators.[21] At the same time, the inherent variability expected by test-retest reliability must be exceeded by a noninferiority limit. This number is too little to be used for clinical noninferiority because it has been found to be one 5-dB audiometric step. [22] For clinical reporting of asymmetries and air-bone gaps for clinical test procedures, the next standard audiometric step (10 dB) is typically considered the lowest change border. [23]

The basic analysis was done with the purpose to treat in mind. The difference between the baseline and 2-month follow-up visits was used to compute the change in PTA. For individuals who withdrew early (11 intra-tympanic, 5 oral) or skipped the 2-month appointment, the most recent data were used (2 intratympanic, 2 oral). For study participants who did not complete any follow-up visits, the change in PTA was set to 0. (7 intratypanic, 2 oral). For those participants who did not finish the 2-month visit while

receiving therapy, we ran a second analysis in which the change in PTA was set to 0. (12 oral, 17 intratympanic). Because intention-to-treat studies may bias toward noninferiority, we also ran a per-protocol analysis, which included individuals who completed the 2-month visit while receiving therapy (108 oral, 113 intratympanic). A 1-sided t test was used to investigate the major hypothesis in each of these analyses. The primary result was also examined for the following subgroups: baseline hearing loss (90-dB PTA, 90-dB PTA), males, women, dizziness at baseline (yes, no), age (52 years, 52 years), days from onset (7, 7), and days of prior steroid usage (7, 7). (1, 1). The study protocol identified these groupings in advance. The analysis was carried out in the same way as the primary intention-to-treat study. Furthermore, a 2-way ANOVA with interaction was conducted to see if the interaction between the treatment group and the variable that defined each pair of subgroups was statistically significant. All other continuous outcomes were analysed using 2-sided 2-sample t tests for a conventional null hypothesis of no difference between groups at 2 months and all continuous outcomes at 6 months. 2-sided tests, Fisher exact tests for binary outcomes, or the x2 test for other categorical outcomes were used to compare categorical data between groups. For all statistical tests, SAS version 9.2 was employed.

The sample size calculation used a 10% withdrawal rate, a 5% one-sided effect, 90% power, a noninferiority margin of 10dB, and a standard deviation of 25.0 for the change in PTA. The actual standard deviation was 21.6, with an 11.6 percent withdrawal rate (29 of 250). The intention-to-treat analysis, on the other hand, included all participants. We utilised East 3.1 to create an interim monitoring rule for null hypothesis rejection based on a LanDeMets expenditure function with O'Brien-Fleming boundaries. The interim monitoring rule consisted of four equally spaced data glances with P value bounds of.0001,.0055,.0219, and.0479). Interim studies have resulted in 95.21 percent confidence intervals (CIs) being reported. A total of 254 randomised volunteers were required, with 127 in each group.



RESULTS

STUDY PATIENTS

Between October 2019 to September 2021, patients were enrolled from the ENT OPD of Hitech Medical College and Hospital, Bhubaneswar. The recruitment period was originally set to finish in June 2020, but it was extended due to COVID 19. Academic and community-based otology referral practises were both included in the study. There were 2443 patients who were screened in all (FIGURE 1). There were 1582 patients who were not able to participate because they did not match the eligibility requirements. 798 (50.4%) were excluded because it had been more than 14 days since the onset of hearing loss, 241 (11.1%) had a PTA of less than 50 dB, 117 (5.4%) had already received 10 or more days of steroid treatment, and 113 (5.2%) had a PTA difference between ears of less than 30 dB. The remaining participants either declined to participate or were ruled out for otologic or medical reasons.

There were 261 patients who agreed to take part in the study. Five patients (4 oral, 1 intratympanic) were later found not to meet eligibility requirements, thus 250 patients (121 oral, 129 intratympanic) were included in the intention-to-treat analysis (121 oral, 129 intratympanic). Up until the 2-month visit, 16 of the 250 participants (5 oral, 11 intratympanic) withdrew from the trial. Contact was lost (3 oral, 4 intratympanic) and consent was withdrawn as reasons for study withdrawal (2 oral, 7 intratympanic). Four people remained in the study but did not attend the 2-month visit (2 oral, 2 intratympanic), and nine participants (5 oral, 4 intratympanic) dropped out but agreed to return for follow-up. The per-protocol analysis included 221 patients (108 [89.3 percent] oral, 113 [87.6 percent] intratympanic) who completed the 2-month follow-up visit and persisted with the research regimen. Another 22 people dropped out after the two-month visit (13 oral, 9 intratympanic). Contact loss (10 oral, 8 intratympanic) and withdrawal of permission were among the reasons for the study's termination after two months (3 oral, 1 intratympanic). In terms of demographics, otologic history, physical characteristics, ear examination, tuning fork test results, neurological examination, cerebellar and vestibular testing, and audiometric measures of pure tone threshold and word recognition scores, there were no significant baseline differences between the two groups.[TABLE 1] The average age was 50. In both treatment groups, the male-to-female ratio was 3:2. In the afflicted and unaffected ears, the mean baseline PTA was 86.6 dB (95 percent CI, 84.0-89.1 dB) and 17.2 dB (95 % CI, 15.818.7 dB), respectively. In the afflicted and unaffected ears, mean word recognition scores were 15.0 percent (95 % CI, 12.3 % -17.6 %) and 97.9 percent (95 % CI, 97.3 % -98.4%) respectively.At the time of presentation, 44 percent of patients had dizziness or vertigo, 84 percent had tinnitus, and 69 percent had auditory fullness. Within 72 hours of commencement, 53 (21%) of the 250 patients were enrolled, 148 (59%) within one week, and 204 (82%) within ten days. In 136 (54.4%) of the participants, oral steroid use for 1 to 10 days prior to inclusion in the trial was detected.

HEARING RECOVERY

PRIMARY OUTCOME

The intratympanic methylprednisolone group's improvement in PTA at 2 months was comparable to the oral prednisone group's improvement.[FIGURE 2] PTA improved 30.7 dB in the oral prednisone group compared to 28.7 dB in the intratympanic group. At two months, the oral group's pure tone averaged 56.0 dB, while the intratympanic group's averaged 57.6 dB. The difference between the oral and intratympanic groups in the mean change in PTA from baseline to 2 months after randomization is 2.0 dB, according to the point estimate. The 95.21 percent upper CI is 6.6 dB for the final analysis, when an equals 0.0479. We rule out intratympanic steroid as being inferior to oral steroid since the upper CI is less than the 10-dB noninferiority margin. Using a 1-sided t test, the difference between the oral and intratympanic groups had a P value of 0.002. This study comprised 11 patients (5 oral, 6 intratympanic) who did not finish the 2-month visit and had their last observation used, as well as 9 people (2 oral, 7 intratympanic) who had no follow-up and had their PTA set to 0. The mean difference is 2.5 dB if the change in PTA is adjusted to 0 for all who did not finish the 2-month visit while receiving therapy (upper CI, 7.2). The mean difference in the per-protocol analysis is 2.2 dB. (upper CI, 7.0). As a result, all three analyses point to noninferiority. Subgroups. 2-way ANOVA tests of interaction revealed significant subgroup variations in treatment effects by baseline level of PTA (P=.03) and duration of beginning of hearing loss prior to enrollment into the study (P=.05) among the studied subgroups. For those with a PTA less than 90 dB at baseline, for men and women, for those with no dizziness at baseline, for those younger than 52 years or older than 52 years, for those with an onset of 7 days or more, and for those who used steroids for 1 or more days prior to study entry, intratympanic treatment is not inferior to oral treatment. A statistically significant interaction between centre and treatment effects was not found in a test.

OTHER HEARING OUTCOME

A comparison of hearing recovery in the oral and intratympanic therapy groups at 2 and 6 months also demonstrates that the two treatments are equivalent [TABLE 2]. Hearing recovery to normal (30-dB PTA) was 20.7 percent (25 of 121), and to hearing aid range (30-90-dB PTA) was 66.9% (81 of 121) in the oral therapy group vs 24.8 percent (32 of 129) and 62.0 percent (80 of 129) in the intratympanic treatment group, respectively (P=.69, 2). The number of steroid non-responders (2-month PTA) is quite high. Within

10 dB of baseline PTA) for the oral treatment group was 15.7 percent (19 of 121) vs 23.3 percent (30 of 129) for the intratympanic therapy group (P=.13, 2). Only one individual in the oral group had 2-month hearing that was 10 to 20 decibels lower than baseline. None of the intratympanic participants' hearing deteriorated significantly from baseline. Safety. During the research, there were 6 major adverse events in the intratympanic group and 5 in the oral group. These included toe osteomyelitis, leukaemia, myocardial infarction, bladder cancer, chest pain due to probable endocarditis, and worsening of pre-existing chronic obstructive pulmonary disease in the intratympanic therapy group. Myocardial infarction, cerebral haemorrhage, hyponatremia, hospitalisation for potential transient ischemic attack, and syncope were the major adverse events in the oral therapy group. Hyponatremia developed as a result of a study-related deterioration of pre-existing moderate renal insufficiency in a patient with type 2 diabetes. [TABLE 3] has a list of adverse events. The P values come from a test that compared the percentage of participants who reported at least one AE between treatment groups. There were 663 adverse events reported from the 121 participants who received oral treatment (5.5/participant) and 730 occurrences from the 129 participants who received intratympanic treatment (5.7/participant) at the 2-month follow-up visit. In the oral group, 87.6% (106 of 121) of individuals reported adverse events, while in the intratympanic group, 89.9% (116 of 129) reported adverse events. Adverse effects common to systemic steroid usage, such as mood, sleep, or appetite problems, increased thirst or dry mouth, high blood glucose levels, and abnormal complete blood count, were all tolerable in the oral therapy group. The intratympanic group had normal local injection side effects, such as temporary discomfort at the injection site and brief caloric vertigo. The intratympanic group had 3.9 percent (5 of 129) persistent tympanic membrane perforation, while the oral group had none (0 of 121). Otitis media was seen in 4.7 percent (6 of 129) of intratympanic therapy patients and 0.8 percent (1 of 121) of oral treatment patients. The majority of adverse effects have subsided by the 6-month follow-up. No patients in the intratympanic group withdrew consent due to injection site discomfort, but two patients in the intratympanic group withdrew consent due to injection site pain.

DISCUSSION

We compared the efficacy and safety of oral and intratympanic corticosteroids for primary treatment of idiopathic hearing loss in the randomised trial. Overall, we found that intratympanic steroid is noninferior to oral prednisone in the treatment of hearing loss. Although no subgroups (baseline PTA 90 dB, dizziness, days from onset 7, and no prior steroid use) failed to reject inferiority because their 95 percent upper CIs exceeded the 10-dB noninferioritymargin, several subgroups (baseline PTA 90 dB, dizziness, days from onset 7, and no prior steroid use) failed to reject inferiority because their 95 percent upper CIs exceeded the 10-dB noninferiority It's worth noting that two of these subgroups—baseline PTA of at least 90 dB and dizziness, both of which have a poor prognosis for hearing recovery—show a trend toward a better outcome with oral treatment rather than intratympanic treatment. At two months, there was no significant difference in the extent of improvement in word recognition scores between treatments. Between the 2-month and 6-month follow-up visits, there was no discernible difference in hearing. Both therapies were completely risk-free. Only one of the five significant adverse events in the oral group and six in the intratympanic group were linked to the study medication (oral prednisone). Patients taking oral prednisone reported some of the same side effects as those taking systemic steroids. [24] Constitutional symptoms such as sleep, mood, and appetite disturbances; increased thirst; and dry mouth, as well as raised blood glucose and an abnormal complete blood count, were among them. There were no major systemic side effects in the intratympanic methyl prednisolone group. However, there were some unpleasant local side effects, such as temporary injection site pain, brief caloric vertigo, and otitis media or persisting tympanic membrane perforation on rare occasions. Despite the fact that the two treatments are equally safe, intratympanic therapy causes more discomfort in the form of caloric vertigo, pain, or both. There were 16 people that dropped out of the study (5 oral, 11 intratympanic). Four of the 11 intratympanic withdrawals were lost to follow-up, and two of the remaining seven were specifically due to treatment pain. Intratympanic therapy is also inconvenient compared to oral treatment. Patients who receive oral treatment only require a single visit to the physician's office for evaluation and a prednisone prescription, whereas patients who receive intratympanic treatment require multiple visits to the physician's office and 30 minutes lying supine after each of the four injections. A key clinical issue is the time it takes to diagnose hearing loss. Aural fullness and muted hearing are common presenting symptoms that are misunderstood for less serious illnesses such cerumen impaction or congestion. More than 14 days had passed since the beginning of hearing loss in 50.4 percent (798 of 1582) of the 1582 screened patients were excluded for not fulfilling eligibility criteria. 601 (69.8%) of the 861 patients who met the trial's eligibility criteria declined enrolment, leaving 260 individuals (30.2%) who took part in the study. Both of the therapies used in this research are readily available. We discovered that 143 (23.8 percent) of the 601 individuals who declined to participate were expressly unwilling to accept random treatment assignment, stating that they had particular preferences for which treatment to receive, including some who wanted both treatments at the same time. A

total of 128 people (21.3 percent) out of 601 said they were not interested in taking part. The use of audiometric eligibility criteria, medical and otologic exclusion criteria, and a large number of eligible patients all contribute to the results' overall generalizability. Based on preliminary literature on the pharmacokinetics of its distribution in the inner ear, methyl prednisolone was chosen for this study. [14] More recent research reveals that dexamethasone has excellent pharmacokinetics when administered intratympanically. [25-27]Intratympanic dexamethasone solution (10 mg/mL) caused less discomfort than methylprednisolone solution (40 mg/mL). Both dexamethasone and methylprednisolone have anti-inflammatory properties that are likely to be useful in the treatment of hearing loss. As a result, it's possible that these two medications will have similar efficacy at similar doses. Although patient compliance was high in this study, with only two patients withdrawing due to injection site pain, pain was a common complaint that might be alleviated in practise by using dexamethasone.

The costs of oral steroid therapy versus intratympanic steroid therapy are vastly different. Because the study's principal finding was noninferiority, cost reduction would be the appropriate economic analysis. Oral prednisone is usually less than $10 for a two-week treatment. Intratympanic therapy is covered at a rate of $172 per injection, according to the latest data from the Centers for Medicare & Medicaid Services. The cost of a four-dose course of treatment, as employed here, is $688. This does not account for the additional costs of four real visits to the doctor's office for treatment, such as transportation, lost earnings, or increased child care expenses. The current study leaves a number of basic questions about hearing loss treatment unsolved. We aim to look into our data more in the future to see if there are any possible predictors of treatment outcome. Although oral and intratympanic therapies were shown to be equally effective overall, our subgroup analyses revealed that specific subgroups might benefit more from one treatment than the other. For primary hearing loss treatment, a number of studies have looked into combining oral and intratympanic steroid (or other treatments) administration. [28-31] or the use of intratympanic steroid as a salvage treatment in patients who have failed to regain hearing after receiving oral steroid therapy.[32-37] Due to issues with study design, sample size, or both, none of these investigations have proved definitive. In general, intratympanic methylprednisolone was found to be no worse than oral prednisone in treating idiopathic abrupt sensorineural hearing loss. For several subgroups, noninferiority was also shown. Oral and intratympanic therapies are both safe, however they can have unfavourable side effects. Oral prednisone is more comfortable, less expensive, and more convenient than intratympanic therapy. If oral prednisone is contraindicated due to medical reasons, intratympanic therapy is a viable option.