Intratympanic Steroid Therapy For Treatment Of Idiopathic Sudden Sensorineural Hearing Loss As Salvage Therapy.

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Abstract

Idiopathic sudden sensorineural hearing loss (ISSHL) is the sudden loss of unilateral hearing of unknown etiology. The standard treatment consists of a high dose oral steroid taper. This article serves to review the current study on the use of Intratympanic steroid injections for ISSHL.

Purpose- of the study to know the efficacy of Intratympanic steroid therapy in patients with idiopathic sensorineural hearing loss (ISSHL) who had not responded to intravenous treatment.

Materials and Methods-Our study consists of 110 patients with refractory ISSHL.

Results- overall 60 patients showed improvement in PTA. Conclusions-IST is an effective and safe therapy in sudden sensorineural hearing loss cases that are refractory to standard treatment.

INTRODUCTION

Sudden sensorineural hearing loss (SSNHL) is one of the most serious otologic emergencies that may have a deleterious and permanent effect on quality of life (1).

The annual incidence of SSNHL is highly variable ranging from 5 to 27 per 100,000 in the USA and upto 160 per 100,000 in Germany(2,3).
SSNHL is usually defined as a rapid detioration of hearing of 30 dB or more at three successive frequencies over 3 days or less (4). Hearing loss is usually unilateral and associated symptoms include feeling of ear fullness , tinnitus and dizziness/vertigo(5).

A number of different etiologies have been proposed to explain ISSNHL including viral infection, intracochlear membrane rupture, vascular insults, and autoimmune processes; however none of these have been proven definitively in humans (6).

A recent review article found that hypertension, diabetes, smoking history, heavy alcohol use and short sleep durations were common in patients with ISSHNL than controls (7).
Treatment strategies used for ISSHNL are nearly as diverse as the proposed etiologies. Cochrane reviews exist for the use of oral steroids, antivirals, vasodilators/vasoactive substances and hyperbaric oxygen (8,9,10,11).

Intratympanic injection of steroids is used to achieve a very high concentration of steroids inside the inner ear fluids with negligible systemic absorption and consequently, it is indicated in conditions where systemic steroids cannot be utilized (12).

The general procedure at this institution is similar to ones described in studies reviewed by this article. The patient is placed supine in a chair. Topical anaesthesia , often phenol is placed on the anterosuperior quadrant of the tympanic membrane. An aqueous solution of steroid (dexamethasone, methylprednisolone) is then injected through the anaesthetized region until the middle ear is full. The patient remains supine with the injected ear pointed up for 20-30 minutes, to facilitate passage of steroid across the round window membrane. Procedure is simple to perform and that is why most of Otolaryngologists are comfortable performing.

METHODS

Between January 2021 and December 2021, a nonrandomized prospective clinical trial was conducted on 55 patients with a diagnosis of ISSHL , with informed consent and study was carried out in GMC Jammu.

INCLUSION CRITERIA

Eligibility criteria included an age of at least 18 years and a unilateral sensorineural hearing loss that developed within 72 hours and was present for 14 days or less. Pure tone average (PTA), calculated as the arithmetic mean of the hearing thresholds at 500,1000,2000 and 4000Hz in the affected ear, must have been at least 30dB worse than the contralateral ear in at least 1 of the 4 PTA frequencies. The hearing loss must have been deemed idiopathic following a suitable otolaryngologic evaluation, including medical and otologic history and extensive systems review, head and neck and otologic and neurotologic physical examination, audiometry, and imaging to rule out structural or retrocochlear pathology, such as vestibular schwannoma , stroke or demyelinating disease. A study from china studied 65 patients who had been admitted for treatment of ISSHL and treated with IV prednisolone who showed no improvement in hearing (13). The authors recommended intratympanic steroid therapy for those who failed systemic steroid treatment for ISSHL. Another placebo controlled, blinded study compared intratympanic dexamethasone to intratympanic saline injections in patients who failed systemic steroid therapy (14).

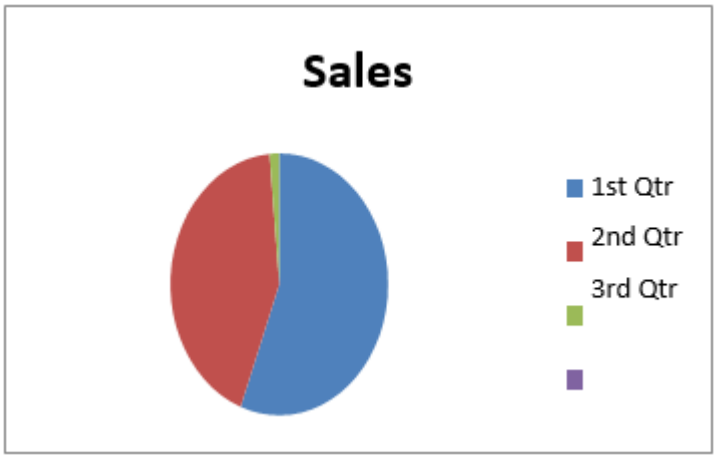
STATISTICAL ANALYSIS

Statistical analysis was carried out using the student's t-test for continuous variables and Fisher's test for categorical variables. A P value of less than .05 was considered statistically significant.
Results after inclusion and exclusion criteria were applied, 110 patients were available for the study.

There were 48 men (43.6%) and 62 women (56.4%). The mean age at enrolment for all patients was 49.7 years and ranged from 18-83 years. The mean age for the men was 53.2 years and for the women was 46.1 years.

Overall Hearing Recovery

60 patients (54.5%) showed improvement in PTA, 46(41.8%) had no change in hearing, and 4(3.6%) worsened.



Pie Chart showing, 1st quarter showed improvement, 2nd quarter didn't show any improvement and the 3rd quarter worsened.

Recovery related to severity of hearing loss

33 patients (30%) had hearing loss greater than 90dB with an improvement rate of 7.3%; 56 patients (50.9%) had hearing loss of 90dB or less and greater than to 50dB with improvement rate of 20.2%; 21 patients (19.1%) had hearing loss less than 50dB and greater than 30dB with an improvement rate of 46.6%.

DISCUSSION

Given the obvious morbidity associated with ISSHL, it is clear that effective treatments are needed. The gold standard in worldwide is high dose oral steroid therapy, but recent review articles have concluded that the efficacy of this treatment is questionable. (11,15)

Patients with uncontrolled diabetes or other medical problems may not be able to tolerate high dose systemic steroid therapy; making initial therapy with intratympanic steroids is a good choice. However in certain communities, patients may not have access to an ENT who performs intratympanic injections and patients need to be able to see this specialist as soon as possible and 3-5 times over a two week period for injections.

In 2002 Gloddek et al. demonstrated the immunologically mediated vasculitis relation with ISSHL pathogenesis. The role of endothelial cells in this mechanism is inferred, and these cells are thought to promote vasculitis by secreting cytokines(16).

Usually , intratympanic steroids are used in three main protocols, as initial treatment, as adjuvant treatment given concomitantly with systemic steroid and as salvage treatment after failure of standard therapy.
Since the intratympanic steroid spreads into the perilymph through the round window, it would be actually expected that hearing improvement might occurs in higher frequencies than in lower frequencies.

CONCLUSIONS

Due to multiple treatment protocols it is difficult in proving safwty and efficacy of a single modality of IST is present in all studies of ISSHL . Moreover, the hearing losses less than 90dB, the involvement of the lower frequencies and the earler the IST seem to influence positively the hearing recovery , although the success could be contributed to the natural history of the disease. All patients with ISSHL should be evaluated for retrocochlear pathology by MRI with contrast , even if the hearing loss recovers. Both intratympanic steroids or systemic steroids alone appear equally effective , however the use of both is likely superior to either used alone.

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