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# Intratympanic Corticosteroid Administration as a Primary Treatment for Idiopathic Sudden Sensorineural Hearing Loss

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## Abstract

A retrospective review of 34 patients was done who had idiopathic sudden sensorineural hearing loss and were administered intratympanic corticosteroid in the form of dexamethasone (4 mg/ml). The results were interpreted based on pure tone audiometry and speech discrimination score of the patient before commencing the treatment and after the treatment.

## Introduction

Idiopathic sudden SNHL usually defined as an acute unilateral deafness of more than 30 dB hearing loss involving three contiguous frequencies, with an abrupt onset, generally within three days or less. The pathology and treatment of sudden SNHL has always been controversial in the history of otology. The most common theories of the etiology of ISSHL include viral infection, vascular occlusion with microcirculatory disturbances, immunologic diseases, and intra labyrinthine membrane breaks [1-5]. Different treatments such as hyperbaric oxygen, agents that decrease blood viscosity (osmotic diuretics, pentoxifylline, procaine, and heparin), vasodilator drugs (histamine, papaverine, verapamil, and carbogen), free radical scavenging vitamins, gingko biloba, and magnesium have been used but were not found to be effective. However, researchers reported systemic corticosteroid therapy with high dose of prednisone taper to be effective. The reported success rate is around 50 to 80%, whereas the spontaneous recovery rate is approximately 30 to 60% [6-8]. Steroids are believed to reduce inner ear inflammation and autoimmune response and to be beneficial for recovery of nerve function. Steroid receptors have been found in the inner ear and may explain why steroid therapy is effective. But for patients with diabetes, tumors, peptic ulcers, tuberculosis, hypertension and other systemic disorders, steroid therapy may not be appropriate. Intratympanic steroids injection is a new treatment choice for these patients, and may also offer alternatives for cases that have failed to respond to typical medicine treatments.

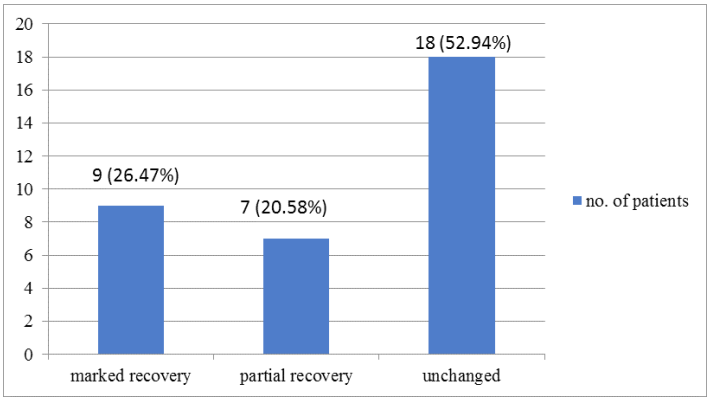
## Materials and Methods

The study period duration was 1 year starting from 1st April 2014 to 31st March 2015. A total of 34 patients who presented with unilateral idiopathic sudden sensorineural hearing loss were having 30 dB losses in pure tones over at least 3 contiguous frequencies within 3 days of onset and normal laboratory findings were included. Severity of hearing loss was graded as: Mild: (26-40 dB), Moderate: (41-55 dB), moderately severe: (5-70 dB), Severe: (71-90 dB) and Profound: (> 90 dB). he extent of hearing recovery was reported as Complete Recovery (R)-PTA in normal limits or at pre-illness level; Marked Recovery (MR)-PTA improvement ≥ 30 dB; Partial Recovery (PR) -PTA improvement 15 to 30 dB; And Unchanged (U)-PTA improvement ≤ 15 dB. The dexamethasone was delivered using 23 gauge spinal needles across the tympanic membrane, followed by fixed head position for 15 minutes to allow maximal exposure of the steroid to the round window.

## Observation

Out of 34 patients 20 (58.8%) were females while 14 (41.2%) were males. 6 (17.6%) of them belonged to age group 20-30 years, 12 (35.3%) between 30 to 40 years and 16 (47%) between 40 and 50 years. 4 (11.7%) had mild, 7 (20.58%) moderate, 15 (44.11%) moderately severe, 5 (14.7%) severe while 3 (8.8%) had profound hearing loss. On treatment with intra tympanic steroid injection 9 (26.47%) patients had marked recovery (>30db recovery), 7 (20.58%) had partial recovery (15-30db recovery),

and rest 18 (52.94%) patients had unchanged (<15db recovery) hearing. Treatment was started between 1 to 5 weeks in all the cases and response was seen between 40 and 160 days with mean of 100 days. Most of the recoveries (13, 81.25%) were seen when treatment was started within 2 weeks of onset.




**Figure**

## Discussion

Intra tympanic steroids are currently used for patients with sudden idiopathic SNHL or in case where systemic steroids can't be given or in failed systemic steroid therapy as a salvage treatment (Herr & Marzo 2005), Slattery et al. 2005) [9]. Incomplete response to oral steroids is not well understood and is speculative. One of many possible reasons is inability to reach adequate levels of steroids in the inner ear with conventional oral steroid treatment. Animal studies have shown a higher perilymph (inner ear fluid) concentration of steroids when installed in the middle ear as compared to their systemic use (Parnes et al. 1999). It is demonstrated that intra tympanic infusion of steroids leads to a much higher perilymphatic concentration, as compared to the systemic route. Moreover, a substantial basal-apical concentration gradient of steroid in the scala tympani perilymph has been found after round window application [10,11]. In our study we found improvement in 47.05% of patients which is higher than that found by Yao et al. (34.8%) [12].

## Conclusion

Our study showed that intra tympanic injection of corticosteroids can be safely and effectively administered as a primary treatment for sudden idiopathic sensorineural hearing loss in conjunction with the previous studies. Also outcome of treatment is better if the treatment is started as soon as possible and recovery prognosis decreases with the delay in treatment.

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