Maintenance Intratympanic Dexamethasone Therapy for Endolymphatic Hydrops

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Abstract

Background: Steroids have been generally administered orally and parenterally in clinical practice to treat inner ear disorders. Due to a considerable unwanted side effects and complications of enteral or parenteral steroids, intratympanic root, as an alternative way proved efficacy with minimal side effects. Many patients accepted intratympanic dexamethasone injection as the first option due to its fair responsiveness and temporary relief of vertigo, also its advantage of preserving the structures of the inner ear so that inner ear changes may be reversible.

Aim of the Work: In this study, we aimed to measure the results and outcome of maintenance strategy of intratympanic dexamethasone injections in the treatment of patients with endolymphatic hydrops.

Methods: A retrospective study conducted from January 2012 to March 2015 including 25 outpatients (18 left ear, 5 right ear and 2 bilateral) at the Department of Otolaryngology Hearing and Speech Institute with a clinical diagnosis of definite Meniere’s disease according to the diagnostic scale of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). The intratympanic steroid injection procedure was performed in the outpatient clinic for all patients using a binocular microscope after informed consent. Intratympanic injections were done once weekly for 2 weeks and then after 2 weeks, after 1 month, and then every 3-4 months as maintenance therapy.

Results: Detailed history and vestibular functions measured by Vestibular Ocular Reflex (VOR) gain and caloric test showed improvement of the episodic attacks of vertigo in 20 patients (80%) after the first injection of dexamethasone and complete improvement in 24 patients (96%) after the 2nd injection and thereafter. There was no recurrence of vertigo during the maintenance therapy. Meanwhile, audiology data suggests that during the episodic attacks of vertigo, 11 patients (44%) who gave history of more hearing deterioration or fluctuant hearing loss, this complaint has dramatic improvement in 9 patients (36% of all patients) or 81% of patients with this particular symptom, after the 1st injection, and relief in 10 of the complaining patients after the 2nd injection. There was no hearing deterioration after the start of and during the maintenance intratympanic steroid therapy. Furthermore, the symptom of tinnitus, 1 patient (4%) said that tinnitus has been stopped. The tinnitus decreased in 3 (12%) patients and unchanged in 21 (84%) patients. The tinnitus did not aggravate in any patient after or during the therapy. In 20 patients (80%) aural fullness showed marked improvement after the second injection and markedly diminished in 22 patients (88%) after the 4th injection. No recurrence of fullness during the maintenance therapy. One patient in the study was complaining of (distressing and risky) drop attacks or otolith crisis along his course of the disease, fortunately, this symptom disappeared after starting the therapy and didn’t recur thereafter. There was no reported complications in our study.

Previous data conclude that maintenance intratympanic dexamethasone may represent an effective treatment for endolymphatic hydrops, in addition to its safety regarding the side effects that may complicate systemic steroids or ablative treatment. These results are similar to results in other previous studies in addition, the maintenance itself provides prevention of symptom deterioration and recurrence.

Key Words: Meniere’s disease – Endolymphatic hydrops – Maintenance dexamethasone – Maintenance intratympanic dexamethasone injections.

Introduction

IDIOPATHIC endolymphatic hydrops, first mentioned by Prosper Meniere in 1861 [1], along the coarse of the disease, a progressive inner ear pathology presented by episodic vertigo, fluctuant Sensorineural Hearing Loss (SNHL), tinnitus, and aural fullness [2]. Meniere pointed that it is an inner ear pathology challenging the common theories at the time that those combinations of symptoms are due to central nervous system disorders claimed to be cerebral congestion. Histopathologically, the primary theory of this disorder is endolymphatic hydrops [3]. Although the underlying
Mechanisms of this pathology are not completely clear, the pathology in hydrops is generally accepted to be an autoimmune mechanisms [4,5]. Viral infection reported to have relative affinity to the inner ear such as the neurotropic viruses, Herpes Simplex Virus (HSV) types 1 and 2 [6], Varicella Zoster Virus (VZV) [7], Cytomegalovirus (CMV) [8] and so on.

Medical and surgical treatments with wide range of strategies have been practiced including oral antivirals, diuretics, systemic steroids, endolymphatic sac decompression and vestibular nerve transaction. However, reliable evidence of their effects is lacking regarding orally administered medicine and surgery [9]. Intratympanic corticosteroid injection is considered another way of managing endolymphatic hydrops in many investigations involving our present study. Intratympanic corticosteroids can achieve a possible cure for patients with endolymphatic hydrops having no response to systemic steroids for its prompt responsiveness. Its mode of action is not yet fully understood. Several studies on intratympanic steroids for endolymphatic hydrops showing that steroids, in addition to its anti-inflammatory effects, can affect ion and fluid homeostasis of the inner ear to stabilize the vascular endothelium [10]. Finally, cochlear blood flow may be positively affected by topical application of steroids [11]. Clinical trials and meta-analyses concluded that dexamethasone may have a curable effect on patients with endolymphatic hydrops particularly on the temporary relief of vertigo without destroying vestibular function [12]. Nevertheless, there is still a few well-conducted, controlled, double-blind randomized prospective clinical trials on the application of dexamethasone in Meniere’s disease.

The goal of this study is to evaluate the effects of maintenance administration of dexamethasone in the treatment of endolymphatic hydrops, stabilization of symptoms and prevention of recurrence.

**Subjects and Methods**

**Ethics:**

We have obtained a written informed consent from each patient accepting to participate in the study according to and approved by the Institutional ethical committee.

This is a retrospective study conducted from January 2012 to March 2015 including 25 outpatients (18 left ear, 5 right ear and 2 bilateral) at the Department of Otolaryngology Hearing and Speech Institute with a clinical diagnosis of definite Ménière’s disease according to the diagnostic scale of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). According to these criteria, definite Menière’s disease should meet the following criteria: 1) Two or more definitive spontaneous episodes of vertigo lasted for 20 minutes or longer, 2) Audiometrically documented hearing loss on at least 1 occasion, 3) Tinnitus or aural fullness in the affected ear, and 4) Other causes excluded [8]. We selected outpatients (13 males, 12 females) with no or unsatisfactory response to normal oral medicine along 1 year. They suffered vertigo attacks at least 1 time every month and accompanied or not by fluctuant SNHL and tinnitus during the last 6 months. One patient in the study was complaining of drop attacks or otolith crisis along his course of the disease. All of those patients, aged from 25 years to 62 years (median 38.4 years), had been suffering endolymphatic hydrops for an average of 4.7 years. Simultaneously, their pathogenesis lasted for an average of 4.7 years (2.3-5.9 years). All of the patients were followed-up for 3 years. When patients agreed to participate in the study, they were informed that they must provide information about the frequency and duration of episodes of vertigo, hearing loss, tinnitus and aural fullness they had experienced.

All patients underwent complete otological examination with tympanometry and audiologic evaluation such as pure-tone audiometry, acoustic immittance, Auditory Brain Stem Response (ABR). Neurologic examination including spontaneous gaze-evoked nystagmus, head thrust test and standard caloric test were also performed. Hearing staging for each patient with definite endolymphatic hydrops was defined as the mean of three-tone average of 0.5, 1 and 2kHz according to the AAO-HNS criteria: Stage 1, #25 dB; stage 2, 26-40 dB; stage 3, 41-70 dB; 4, stage 4, 71-75 dB. Episodes of vertigo were characterized by their frequency and duration as previously described, and episodes of vertigo lasting less than 20 minutes or the sensation of instability usually observed in these patients were not considered in this study. In addition, the protocol of diagnosis included an examination by temporal bone CT and MRI to exclude other possible causes of neurological symptoms.

The intratympanic steroid injection procedure was performed in the outpatient clinic using a binocular microscope after informed consent was obtained from the patient just as previously described. With the patient supine and the head turned to the opposite side, the local anesthesia of the postero-inferior quadrant of the tympanic membrane was first offered by local application of a cream on a cotton soaked by a combination of...
lidocaine, prilocaine, carbomer, polyoxyethylene hydrated castor oil, sodium hydroxide and water. Approximately 1ml dexamethasone solution (8mg/ml) was loaded into a 3-mL ordinary syringe and slight angulation of its needle like a myringotomy knife. Each patient received a total of 7.5mg usually in a volume of 0.3-0.8ml injected into the tympanic cavity sufficient to fill the space or at least cover the round-window niche. After the injection, the head was placed slightly lower than the body, and the subject was instructed to lie in the supine position with the head turned 45 degrees toward the contralateral side, keeping the treated ear up and not swallow for 30 minutes in order to assure enough time for the buffer to interact with the inner ear completely through round-window niche. Intra tympanic injections were done once weekly for 2 weeks and then after 2 weeks, after 1 month, and then every 3-4 months as maintenance therapy. The fixed interval between injections during the maintenance therapy may be variable between patients according to the severity and progression of the disease, so it can be tailored individually guided by appearance of symptoms and its timing.

Outcome assessment:
In the following clinical appointments, vertigo, tinnitus and aural fullness control was monitored by the subject's report of the frequency and severity of any vertigo attacks that occurred since the last treatment. Efficacy in recovery or stabilization of SNHL throughout the study was assessed by pure-tone audiometry performed pre and post injection in each setting, 1 month, 3 months, 6 months, 1 year, 18 months and throughout the maintenance therapy. Even, if there were no vertigo attacks reported, we recommend maintenance therapy depending on the autoimmune theory which is supposed to be a chronic disease having no spontaneous remissions. So, we aim to protect the inner ear structures from the destructive effect of the disease. However, if the patient felt that the effect of the therapy was negligible or unsatisfactory, then intratympanic gentamicin injection or ablative surgery was recommended.

Caloric tests:
Caloric test was done with a temperature switch irrigation technique for 30 and 44°C. A total of 400ml the water was irrigated for 40 minutes. We evaluated the results by the frequency of the nystagmus beats during the culmination period of the response. Horizontal eye movements were observed and the slow-phase of nystagmus was analyzed for unilateral weakness and directional preponderance and determined by conventional formulas. An ice water caloric test was performed when there was no response to warm or cold irrigation in the affected ear. If nystagmus was noted in response to the ice water test, the patient was turned from supine to prone to see if nystagmus reversed direction.

Exclusion criteria:
We excluded patients with benign paroxysmal positional vertigo, vestibular neuritis, head trauma, ear surgery, recurrent infection of the middle ear, vestibular migraine, acoustic schwannoma and any known cause resembling endolymphatic hydrops, according to the diagnostic scale of the AAO-HNS.

Results
The clinical features of the patients with unilateral definite Meniere's disease or endolymphatic hydrops in the study are shown in (Table 1). Twenty-five patients (13 males and 12 females) aged from 25 to 62 years (median 38.4 years) were treated via intratympanic Dexamethasone therapy. All of them had been suffering for an average disease course of 3.6 years. 18 patients were affected in their left ears while the other 5 patients in the right ear and 2 bilateral patients. Unilateral SNHL was found in those 25 subjects since the air conduction loss ranged from 29.8 to 78.5 dB HL (median 47 dBHL) was observed (Table 1). The hearing curve analysis demonstrated that 21 of 25 patients including the bilateral patients showed upward-sloping curve in which low frequencies were more commonly affected while 4 of 25 patients showed flat configuration. They suffered vertigo attacks at least 1 time every month and disrupting by SNHL, tinnitus and aural fullness during the last 6 months. One patient in the study was complaining of drop attacks or otolith crisis along his coarse of the disease.

Vestibular function was evaluated by Glycerol test and Caloric test. 21 patients respond positively in Glycerol test. However, 4 patients gave no response in Glycerol test. At the same time, among the total, 23 patients respond positively in Caloric test, vestibular function deceased slightly in 2 patients and no patients with severely impaired vestibular function.

Regarding efficacy in recovery or stabilization of SNHL throughout the study, hearing was assessed periodically by pure-tone audiometry performed pre and post injection in each setting, 1 month, 3 months, 6 months, 1 year, 18 months and throughout the maintenance therapy. In spite of marked improvement in vertigo attacks and ear fullness and stabilization of hearing levels through out the maintenance therapy we recommended
continuation of the maintenance therapy depending on the autoimmune theory which is supposed to be a chronic disease having no spontaneous remissions. So, we aim to protect the inner ear structures from the destructive effect of the disease. In our study, no patient showed unsatisfactory results during the maintenance therapy, so no intratympanic gentamicin injection or ablative surgery were done.

Vertigo and unsteadiness:

The endolymphatic hydrops pathology has two underlying pathological sequel. The chronic degenerative irreversible inner ear injury due to the inflammatory process, and the episodic irritative reversible pathology. The chronic degenerative irreversible pathology results in unilateral peripheral vestibular dysfunction leading to unsteadiness, which didn’t happen except in the form of mild unsteadiness in 4 patients (16%). This may be due to unilaterality with contralateral and central compensation that happens with chronicity. Moderate unsteadiness in the 2 bilateral patients (8%) showed no improvement through out the therapy. The episodic irritative reversible pathology results in the episodic attacks of vertigo characteristic of the disease. So, we found improvement of vertigo in 20 patients (80%) after the first injection of dexamethasone and complete improvement in 24 patients (96%) after the 2nd injection. There was no recurrence of vertigo during the maintenance therapy. This may be due to the therapeutic effect of dexamethasone on the acute inflammatory episodic pathology and lack of any effect on the chronic degenerative sequel of the disease. One patient in the study was complaining of (distressing and risky) drop attacks or otolith crisis along his course of the disease, fortunately, this symptom disappeared after starting the therapy and didn’t recur thereafter. Follow-up assessment by complete detailed history with comprehensive analysis of vertigo, unsteadiness and other related symptoms, vestibular functions measured by Vestibular Ocular Reflex (VOR) gain and caloric test Fig. (1).

Hearing function:

In a similar way as with vertigo and unsteadiness, in patients with unilateral or bilateral Ménière’s disease, hearing function deteriorates as the disease progress, with chronic irreversible degree of sensorineural hearing loss due to the inner ear degenerative pathology, and expected not to improve by the steroid therapy. This is what happened in all patients having their hearing assessment by pure-tone audiometry done at the start of therapy showing no any changes with those done during the steroid therapy. During the episodic attacks of vertigo, 10 patients (40%) gave history of more hearing deterioration or fluctuant hearing loss, which represents the irritative episodic form of the disease. This complaint has dramatic response in 9 patients (36% of all patients) or 81% of patients with this particular symptom, after the 1st injection, and relief of 10 of the complaining patients after the 2nd injection. There was no hearing deterioration after the start of and during the maintenance intratympanic steroid therapy Fig. (1).

Tinnitus:

Among the 25 patients complained from the tinnitus, 1 (4%) of them reported that tinnitus has stopped. Furthermore, the tinnitus decreased in 3 (12%) patients and unchanged in 21 (84%) patients. The tinnitus did not aggravate in any patient before or during the therapy. Here we focus on two forms or presentations of tinnitus, the chronic or stationary tinnitus accompanying the sensorineural hearing loss as an irreversible inner ear damage due to the pathology, and the episodic tinnitus or loudening of the chronic tinnitus during the attack which is of irritative origin. The chronic or degenerative tinnitus was expected not to give any improvement, and this what happened in the majority of patients (84%), and the episodic type disappeared and diminished in 16% of patients due to the therapeutic effect of dexamethasone on the pathology Fig. (1).

Aural fullness:

Twenty-five patients (all patients) gave history of aural fullness during attacks. In 20 patients (80%) aural fullness showed marked improvement after the second injection. The aural fullness was markedly diminished in 22 patients (88%) after the 4th injection. No recurrence of fullness during the maintenance therapy. This can be explained by a similar way like tinnitus regarding ear fullness as an episodic irritative pathology during attacks.

Improvement of vertigo in 20 patients (80%) after the first injection of dexamethasone and complete improvement in 24 patients (96%) after the 2nd injection and there after.

11 patients (44%) who gave history of hearing deterioration or fluctuant hearing loss, this complaint has dramatic improvement in 9 patients (36% of all patients) after the 1st injection, and relief of 10 complaining patients after the 2nd injection.

Tinnitus, 1 patient (4%) said that tinnitus has been stopped. The tinnitus decreased in 3 (12%) patients and unchanged in 21 (84%) patients.
**Table (1): Parameters of endolymphatic hydrops patients under the study.**

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>25-62 years range</td>
<td>38.4 years median</td>
</tr>
<tr>
<td>Follow-up coarse</td>
<td>2.3-5.9 years range</td>
<td>4.7 years median</td>
</tr>
<tr>
<td>Hearing loss</td>
<td>29.8-78.5 dB H.L. range</td>
<td>47dBH.L. median</td>
</tr>
<tr>
<td>Sex</td>
<td>13 males</td>
<td>12 females</td>
</tr>
<tr>
<td>Side</td>
<td>18 left ear</td>
<td>5 right ear 2 bilateral</td>
</tr>
<tr>
<td>Hearing curve</td>
<td>21 patients with low frequencies</td>
<td>4 patients with flat curve</td>
</tr>
</tbody>
</table>

Note: Vestibular function results: 20 outpatients out of 25 (80%) had complete sufficient vertigo control after the 1st injection, while 24 (96%) of them had complete sufficient vertigo control after the 2nd injection. No recurrence throughout the study period.

**Table (2): Results of vertigo attacks.**

<table>
<thead>
<tr>
<th>Treatment stage</th>
<th>Patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 1st injection</td>
<td>20 patients</td>
<td>80%</td>
</tr>
<tr>
<td>After 2nd injection</td>
<td>24 patients</td>
<td>96%</td>
</tr>
<tr>
<td>Recurrence</td>
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**Fig. (1): Outcome results of vertigo, hearing and tinnitus.**

**Discussion**

Our major findings of the study were as follows: Maintenance intratympanic dexamethasone, is an effective therapeutic strategy for endolymphatic hydrops. Many previous studies have already confirmed the effects of intratympanic dexamethasone, for treatment of endolymphatic hydrops [13]. Our results may agree with many of the previously published studies in addition to the following considerations: First, proper understanding of the underlying pathology and its nature of chronicity and persistence of certain injurious mechanisms make us to recommend maintenance therapy to parallel the pathological process and to guard inner ear structures against the destructive effect of the pathology in each time or episode, exactly similar to the administration of long acting penicillin to prevent valvular tissue damage during rheumatic activity. Second, again with proper understanding of the underlying pathology and its sequel obviates that there are irreversible degenerative changes in the inner ear structures not expected to improve by therapy but we aim to stabilize these changes without progression, and there are reversible episodic changes most likely to be of inflammatory or autoimmune origin which respond to dexamethasone therapy with improvement of its related symptoms during therapy and may never recur with maintenance therapy.

The underlying pathology of Ménière’s disease is still unclear; however, many studies had proposed that viral infections and autoimmune processes may play a role in the induction of the disease. Since last century, Ryan [5] postulated that Ménière’s syndrome might be an immune-mediated or even an autoimmune disease. In many studies, authors demonstrated that they have extracted circulating antibodies against antigens in bovine inner ear of patients with Ménière’s disease such as anti-heat shock protein 70 (HPS70) Antibody, Antinuclear Antibody (ANA) Tumour Necrosis Factor (TNF)-alpha, and elevated Erythrocyte Sedimentation Rate (ESR) and so on [14]. In addition, several studies had discovered a high prevalence of systemic autoimmune diseases as Systemic Lupus Erythematosus (SLE), Rheumatoid Arthritis (RA), and Ankylosing Spondylitis (AS) within patients with endolymphatic hydrops [15]. Immune response may play a role in the activity and progression of endolymphatic hydrops and recurrence of symptoms, as reported in studies on inner ear disorders showing that B lymphocytes are related with hearing loss and CD8+ T lymphocytes with persistence of vertigo similar to the founds of results in previous studies [16].

A number of studies have pointed out that viral infection may play a role in the pathogenesis of Ménière’s disease since 1930s. Viral invasion of the endolymphatic spaces is impeded through immunological mechanisms under normal conditions [17,18]. Those findings support the hypothesis that viral infections and autoimmune processes...
may be essential in the development of Meniere's disease.

Systemic steroid therapy has commonly been used in treating Meniere's disease with the diagnosis of underlying autoimmune inner ear disorders is still largely based on the response to steroid therapy. The mode of action of corticosteroid therapy in endolymphatic hydrops, is its anti-inflammatory effects on the labyrinth, additionally it protects neural tissues from ischemic injury and control sodium and fluid transport to stabilize the vascular endothelium. Satyanarayana demonstrated for the first time that steroids regulates Na+ absorption and osmotically couple water flux to ameliorate the inner ear dysfunction during the treatment of endolymphatic hydrops [19].

Steroids have been generally administered orally or parenterally in clinical practice to investigate its effect on inner ear disorders. It is well known that the pharmacokinetics of enteral or parenteral steroids with total body absorption is followed by a considerable unwanted side effects and complications. So, intratympanic root, as an alternative way of traditional treatments, including intratympanic injection of steroid or intratympanic injection of gentamicin proved efficacy with minimal side effects (mainly the tympanic membrane perforation and inflammatory sequel in the middle ear) [20]. Many patients accepted intratympanic dexamethasone injection as the first option due to its fair responsiveness and temporary relief of vertigo, also its advantage of preserving the structures of the inner ear so that inner ear changes may be reversible. However, we may choose intratympanic gentamicin injection for patients with worsening of hearing and word recognition [21]. Gentamicin leads to direct damage to the sensorineural epithelium of the labyrinth, thus affecting vestibular and to a lesser extend cochlear function (mainly vestibulotoxic) which is also the likely mechanism through which gentamicin provides prompt treatment effects [22]. So in patients with bilateral hydrops, we are in urgent need to the therapeutic curative effect of intratympanic steroid instead of the destructive effect of Gentamicin to save the patient from bilateral peripheral vestibular deprivation or Dandy syndrome with jumping panorama.

In our study, we aimed to know whether maintenance intratympanic dexamethasone injection is effective enough so that ablative medical or surgical treatments can be subsequently avoided. So, if any patient did't respond to the maintenance therapy, ablative intratympanic gentamicin injection or surgery can be tried. In the present investigation a total of 25 patients accepted to participate and receive intratympanic dexamethasone injection. Detailed history and vestibular function measured by Vestibular Ocular Reflex (VOR) gain and caloric test revealed improvement of the episodic attacks of vertigo in 20 patients (80%) after the first injection of dexamethasone and complete improvement in 24 patients (96%) after the 2nd injection and there after. There was no recurrence of vertigo attacks during the maintenance therapy (Table 2). As regards unsteadiness, there was slight improvement in the 4 patients of mild unsteadiness (16%), the 2 bilateral patients with moderate unsteadiness (8%) showed no improvement through out the therapy. Meanwhile, audiology data suggests that during the episodic attacks of vertigo, 11 patients (44%) who gave history of hearing deterioration or fluctuant hearing loss, this complaint has dramatic response in 9 patients (36% of all patients) or 81% of patients with this particular symptom, after the 1st injection, and relief of 10 complaining patients after the 2nd injection. There was no hearing deterioration after the start of and during the maintenance intratympanic steroid therapy. Furthermore, the symptom of tinnitus, 1 patient (4%) said that tinnitus has been stopped. The tinnitus decreased in 3 (12%) patients and unchanged in 21 (84%) patients. The tinnitus did not aggravate in any patient after or during the therapy. In 20 patients (80%) aural fullness showed marked improvement after the second injection and markedly diminished in 22 patients (88%) after the 4th injection. No recurrence of fullness during the maintenance therapy. One patient in the study was complaining of drop attacks or otolith crisis along his coarse of the disease, this symptom disappeared after starting the therapy and didn't recur thereafter. No complications reported in our study, like tympanic perforation or otitis media. All of the results mentioned above suggests that maintenance intratympanic dexamethasone makes a perfect effect on endolymphatic hydrops which is similar to the previous studies [23]. The fixed interval between injections during the maintenance therapy may be variable between patients according to the severity and progression of the disease, so it can be tailored individually guided by appearance of symptoms and its timing.

Although the intratympanic dexamethasone injection can achieve vertigo control by improving the autoimmune status to some extent, it can't modify the underlying fundamental mechanism of endolymphatic hydrops [24]. There may be some limitations and side effects that may complicate this type of treatment. Tympanic membrane perforation and otitis media are possible complications.
but neither has occurred in our study. Our results conclude that maintenance intratympanic dexamethasone injection, is an effective therapeutic strategy for management of endolymphatic hydrops or Meniere’s disease, and can prevent disease progression and recurrence of symptoms [25].

**Conclusion:**

Our study concludes that maintenance intratympanic dexamethasone therapy, is an effective and safe treatment strategy for endolymphatic hydrops or Meniere’s disease, and can prevent disease progression and recurrence of symptoms, in addition to its safety regarding the side effects that may complicate systemic steroids or ablative treatment. More institutional studies may confirm or deny the effectiveness of maintenance intratympanic dexamethasone injection in endolymphatic hydrops.

**References**


الملخص العربي

حقن الكورتيزون داخل الطبل بصفة منتظمدة تكرارية مستمرة يعتبر وسيلة علاجية فعالة في علاج مرضى داء مينير أو استقصاء الليمف الحواتي بالانزون الداخلي. حقن الدكساميثازون داخل الطبل يمثل صورة فعالة من الكورتيزون في علاج اضطرابات مخططة في الانزون الداخلي.

في هذه الدراسة تم رصد وتسجيل نتائج حقن الكورتيزون داخل الطبل بصفة منتظمدة ومستمرة في علاج 25 مرضي بدءاً من بداية اجتماع أو استقصاء الليمف الحواتي بالانزون الداخلي. بعد أخذ تاريخ مرضي مفصلاً وعمل اختبارات إتزان وتحسين النوى في النوى المتكررة للدوار في 20 مريض (80% ) بعد الجرعة الأولى. حقن الدكساميثازون داخل الطبل وتحسين كامل في 24 مريض (96%) بعد الجرعة الثانية. لم توجد ارتباطات في حدوث الدوار خلال فترة الدراسة واستخدام الحقن المتكرر المستمر. بعد أجراء التقييم السمعي، 11 مريض (44%) من مجموع المرضى كانوا يعانون من زيادة في ضعف السمع أثناء نوات الدوار، 9 مرضى منهم أظهروا تحسن كبير بعد الجرعة الأولى من حقن الدكساميثازون داخل الطبل وتحسين في مريض آخر بعد الجرعة الثانية. لم يوجد تدهور في السمع خلال فترة الدراسة واستخدام الحقن المتكرر المستمر.

مرض واحد أكد اختفاء الطبل وثلاث مرضى (12%) أبوا تحسن في الطبل في حين 21 مريض (88%) لم ينكروا أي تحسن في الطبل.

الشعور بامتلاء وضغط الانزون الداخلي. حقن الدكساميثازون داخل الطبل وتحسين كبير في 22 مريض (88%) بعد الجرعة الرابعة، ولا توجد ارتباطات خلال فترة الدراسة واستخدام الحقن المتكرر المستمر. مريض واحد كان يعاني من نوبات السقوط السفلي أو (عاصفة غير ثابتة) بنتائج لم يعاني هذا المريض من هذا العرض بعد بداية العلاج وخلال فترة الدراسة واستخدام الحقن المتكرر المستمر. لم يحدث أي مضاعفات خلال فترة الدراسة واستخدام الحقن المتكرر المستمر. من النتائج السابقة تبين أن حقن الكورتيزون (الدكساميثازون) داخل الطبل بصفة منتظمدة تكرارية مستمرة يعتبر وسيلة علاجية فعالة في علاج مرضى داء مينير أو استقصاء الليمف الحواتي بالانزون الداخلي بالإضافة إلى أنه من جهة مضاعفات استخدام الكورتيزون أو الجراحات المجهرية النتائج مماثلة وقريبة من نتائج دراسات أخرى ولكن يوجد بالإضافة إلى ذلك أن العلاج بصفة منتظمدة تكرارية مستمرة في حد ذاته يساعد على منع تدهور المريض.

ويمنع انتكاس الإعراض.