

Is an intratympanic injection of corticosteroids effective in the treatment of otitis media with effusion?

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Objectives

Chronic otitis media with effusion (OME) is a worldwide major health problem for both children and adults. The aim of this study is to test the effectiveness of intratympanic injection of corticosteroid in the treatment of chronic OME.

Study

The study was applied on 14 patients (24 ears) who had failed medical treatment and had recurrence after surgery or patients who refused surgical treatment.

Methods

These patients received 4 intratympanic injections of dexamethasone. Approximately 0.5 ml of dexamethasone was injected in each time. Subjective assessment for symptomatic improvement was done and objective assessment was done by pure tone audiometry and tympanometry 3 months after the last injection.

Results

At the end of follow up period, no patient had noticeable improvement in hearing, aural fullness nor tinnitus. Also, pure tone audiometry and tympanometry revealed no noticeable improvement in any patient.

Conclusion

It was found that intratympanic injection of dexamethasone is not effective in management of chronic OME.

Keywords:

corticosteroids, intratympanic injection, otitis media with effusion

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Introduction

The pathogenesis of chronic otitis media with effusion (OME) is more complex than can be explained by a single cause. It probably represents an interaction between genetic predisposition and triggering factors such as infection and allergy. The disease is defined by the presence of middle ear effusion for more than 3 months [1].

Pathologically, the disease is characterized by secretory transformation of the epithelium lining the middle ear cavity and subepithelial edema, and infiltration of phagocytes and lymphocytes. The fluid in the middle ear cavity may result from either transudation or exudation and active secretion from the epithelial cells [2].

Chronic Eustachian tube dysfunction is frequently encountered in middle ear effusion with associated symptoms and signs, including conductive hearing loss, tinnitus, and otalgia [3].

The causes of Eustachian tube dysfunction can vary, but the principal pathways involve mucosal edema, degeneration, and hypertrophy, which may be caused by allergic and reactive diseases [4].

Currently, middle ear aeration through tympanotomy and tube insertion is the management of choice for chronic effusion that does not respond to medical therapy [5].

Paksoy *et al.* [6] claimed that they have developed a technique for the treatment of chronic Eustachian tube dysfunction that involves a transtympanic approach to the Eustachian tube as a direct application of dexamethasone using a 28-G needle through the anterosuperior quadrant of tympanic membranes. They proposed that direct steroid application may serve to reduce mucosal hypertrophy and improve Eustachian tube function.

Materials and methods

This study was carried out on patients with a clinical diagnosis of chronic OME, recruited from Beni Suef University and Fayoum University Hospitals, in the period from August 2011 to April 2012. A total of 14 patients between 12 and 34 years of age were included.

Preoperatively, all patients were subjectively assessed for decrease in hearing, sense of aural fullness, tinnitus, or any other ear symptoms. Routine ENT examination was carried out for all patients. Objectively, pure tone audiometry and tympanometry were performed for all patients preoperatively. Tympanometry was type B in all these patients.

Also, diagnostic nasal and nasopharyngeal endoscopy was performed. Patients with a mass in the nasal cavity or the

nasopharynx, for example adenoid were excluded from this study.

This study included 14 patients (24 ears): 12 patients (20 ears) who had failed both medical (systemic antibiotic, corticosteroids, mucolytics, and nasal drops) and surgical treatment (myringotomy with ventilation tube insertion) with recurrent OME and two patients (four ears) who had failed medical treatment and refused surgery.

In this study, intratympanic injection of dexamethasone was used as a different line of management for OME, under local anesthesia, for patients who had recurrence after surgery or patients who refused surgery, to avoid surgical treatment, especially that most recurrent cases refused revision surgery.

These 14 patients (24 ears) received four intratympanic injections of dexamethasone. Approximately 0.5 ml of dexamethasone (8 mg/2 ml) was injected each time.

The procedure was carried out under local anesthesia. Each patient was in a supine position with the head tilted to the opposite side. The procedure was carried out under microscopic vision.

Topical anesthesia was administered in the form of a xylocaine spray (10 mg/dose pump spray). An antero-superior quadrant puncture was made for perfusion using a 20-G needle on a 1 ml syringe without aspiration of middle ear fluid.

The patients were instructed to avoid swallowing or moving from the supine position with the head tilted to the opposite side for at least 15 min after each injection. The injection was repeated once a week for 4 weeks.

Patients were advised to be seen every 2 weeks after the last injection for 1 month and then every month till the third month. A subjective assessment for symptomatic improvement was carried out and an objective assessment was carried out by pure tone audiometry and tympanometry 3 months after the last injection.

Results

Fourteen patients were included in this study with eight men (57%) and six women (43%). Ten (71.4%) of these patients had bilateral chronic OME and four patients (28.6%) had unilateral chronic OME.

A preoperative subjective assessment was carried out for all patients. All patients had complaints of hearing loss. Nine patients (64.3%) had a sense of aural fullness and six patients (42.9%) had tinnitus.

Pure tone audiometry indicated conductive hearing loss with air bone gap ranging from 15 to 25 dB HL. Nasal and nasopharyngeal endoscopy was carried out for all patients to exclude any patient with nasal or nasopharyngeal masses.

During the procedure, 0.5 ml dexamethasone was injected into the anterosuperior quadrant of the tympanic membrane. There was no noticeable bleeding in any of

the patients, and the procedure was tolerated. A small amount of glue exited from the middle ear into the external auditory canal during the injection of dexamethasone into the middle ear. Suction of this small amount of glue from the external auditory canal was performed after the injection.

Postoperative follow-up was carried out both subjectively and objectively. The subjective assessment for symptomatic improvement was performed after 2 weeks of the last injection and every month for 3 months.

After the first injection, mild improvement occurred in hearing and sense of aural fullness in 10 patients (71.4%). The other four patients (28.6%) did not experience any difference. In terms of tinnitus, only two patients experienced a mild improvement.

After the fourth injection, only seven patients (50%) still experienced a mild improvement in hearing and aural fullness. Unfortunately, these patients, when subjectively assessed after 3 months, reported no noticeable improvement in hearing, aural fullness, or tinnitus.

Objectively, pure tone audiometry and tympanometry performed 3 months after the last injection indicated no noticeable improvement in any patient.

It is noteworthy that all injections were administered with ease and were well tolerated by the patients. Also, there were no signs of perforations or complications in these patients after the injections.

Discussion

Chronic OME in all its manifestations is a major health problem worldwide for both children and adults who have a lifelong history of Eustachian tube dysfunction [7].

Persistent bacterial infection and associated chronic inflammation cause Eustachian tube dysfunction, which leads to middle ear effusion [8]. Middle ear aeration through tympanotomy and tube insertion has been the main option for the management of chronic effusion that does not respond to medical therapy [9].

Steroids and nonsteroidal anti-inflammatory drugs have been used for many years for the treatment of inflammatory middle ear disease. The ability of steroids to inhibit inflammation and reduce edema has led to their use in the treatment of chronic OME [10].

An intratympanic injection of dexamethasone is administered in very severe cases of episodic vertigo such as in Meniere's disease, sudden hearing loss, or when autoimmune inner ear disease is suspected [11].

Recently, Han *et al.* [12], Chinese authors, have claimed that an intratympanic injection of dexamethasone can be used as a line of treatment in OME. In their study on 84 patients with OME of no more than 2 months' duration, it was reported that both oral administration and an intratympanic injection of glucocorticoid are effective for the treatment of OME.

Also, Paksoy *et al.* [6] reported that an intratympanic injection of dexamethasone is safe and effective for the treatment of OME or chronic Eustachian tube dysfunction. Their study was carried out on patients who had been treated previously by medical or surgical therapy without resolution.

The aim of this study was to determine the efficacy of an intratympanic injection of dexamethasone as a new treatment modality in chronic OME resistant to conventional therapy.

Patients selected for this study had chronic OME in one or both ears. Their symptoms were consistent with Eustachian tube dysfunction (hearing loss, aural fullness, and tinnitus). Twelve patients received medical treatment and insertion of a ventilation tube, but their ear problems had not resolved, and two patients received medical treatment without improvement, but they refused surgery.

All these patients received four intratympanic injections of dexamethasone under local anesthesia. After the first injection, there was a mild improvement in hearing and sense of aural fullness in 71.4% of cases, and then it decreased to about 50% after the fourth injection.

Unfortunately, these patients, when assessed subjectively and objectively by pure tone audiometry and tympanometry 3 months after the last injection, reported no noticeable improvement.

Our results are different from those of Han *et al.* [12], who divided their series of patients into three groups: group A received oral prednisone, group B received two to four intratympanic injections of dexamethasone, and group C was the control group. They found significantly higher improvement rates in both treatment groups compared with the control group.

In our opinion, mild improvement which occurred immediately after injection in our cases may be due to small amount of glue which exits from the middle ear into the external auditory canal during injection. But our cases did not improve after that, as they had chronic OME and they received medical treatment including prednisone as part of first line of treatment before injection. Also, patients who were resolved after oral prednisone did not undergo intratympanic injection from the start and were not included in this study. This goes with Han *et al.* [12] study, as they reported that there was no statistical significant difference between the two treatment groups. They recommended intratympanic injection of dexamethasone to patients who have contraindications to systemic steroids.

Our results are not in agreement with those of Paksoy *et al.* [6]. Their study was carried out on 64 patients who had been treated previously either by medical or by surgical therapy without resolution. Half of their patients had

received another course of medical treatment as a control group and the other half was administered 0.5 ml dexamethasone once weekly for 4 weeks. They noticed more improvement in patients in the study group than the control group. This may be attributed to the fact that their patients included both type C and type B in tympanometry. In addition, they did not administer steroids as part of the medical treatment to the control group.

Our study was carried out as a trial to avoid postoperative problems of ventilation tubes such as otorrhea, permanent perforation, and tympanosclerosis. The procedure was performed under local anesthesia, but unfortunately, it was not effective in patients with chronic OME.

Conclusion

This study found that an intratympanic injection of dexamethasone is not effective in the management of chronic OME, and we do not recommend it as a line of management of chronic OME.

Acknowledgements

Conflicts of interest

There are no conflicts of interest.

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