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MODERN STRATEGIES FOR THE TREATMENT OF SECRETORY OTITIS MEDIA IN PATIENTS WITH POST-COVID SYNDROME

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The purpose of the study was to evaluate the use of topical corticosteroid therapy as a promising method of treating patients with post-COVID secretory otitis media. A prospective, open-label study was conducted in 28 patients (mean age 36.4±8.7 years) with secretory otitis media lasting more than three weeks. Clinical outcomes were assessed using otoscopy, tympanometry, audiometry and symptom scales at baseline, 1 week, 4 weeks, 12 weeks and 6 months. During the observation period, it was proved that local administration of betamethasone dipropionate in the area of the tuberous roller is a promising additional treatment for secretory otitis media in patients with COVID-19 and demonstrates better clinical outcomes compared to standard therapy.

Key words: secretory otitis media, Eustachian tube, post-COVID syndrome, betamethasone dipropionate, corticosteroids, local therapy, mucociliary clearance.

М.І. Безега

СУЧАСНІ СТРАТЕГІЇ ЛІКУВАННЯ СЕРЕДНЬОГО СЕКРЕТОРНОГО ОТИТУ У ПАЦІЄНТІВ З ПОСТКОВІДНИМ СИНДРОМОМ

Метою дослідження було оцінити застосування локальної терапії кортикостероїдами як перспективного методу лікування пацієнтів з пост-ковідним секреторним середнім отитом. Було проведено проспективне відкрите дослідження за участю 28 пацієнтів (середній вік 36,4±8,7 років) з секреторним середнім отитом, що тривав більше трьох тижнів. Клінічні результати оцінювали за допомогою отоскопії, тимпанометрії, аудіометрії та шкал симптомів на початковому етапі, через 1 тиждень, 4 тижні, 12 тижнів і 6 місяців. За період спостереження було доведено, що локальне введення бетаметазону дипропіонату в ділянку тубарного валика є перспективним додатковим методом лікування секреторного середнього отиту у пацієнтів, які перенесли COVID-19 і демонструє кращі клінічні результати порівняно зі стандартною терапією.

Ключові слова: секреторний середній отит, слухова труба, постковідний синдром, бетаметазону дипропіонат, глюкокортикостероїди, локальна терапія, мукоциліарний кліренс.

The study is a fragment of the research project "Rehabilitation of patients after functional endoscopic rhinosinus surgery", state registration No. 0120U104016.

Secretory otitis media (SOM) is one of the most common middle ear diseases in the world and a leading cause of acquired hearing loss. To date, there are few systematic reviews on the prevalence of SOM in the literature. According to published data, the incidence of SOM in children remains consistently high at 31 %, leading to hospitalization in 65.7 % of cases. Up to 50 % of patients have SOM one month after acute otitis media [1, 7].

The global COVID-19 pandemic has altered the prevalence and impacted the treatment of many infectious ear diseases [11]. Since the beginning of the pandemic, an increase in complications related to inflammatory and immune changes in the middle ear, caused by the viral infection, has been observed. The SARS-CoV-2 'Omicron' variant has proven to be particularly threatening to the middle ear. It has been noted that with the emergence of this variant, the incidence of SOM has increased by 15 % compared to the pre-pandemic period [9, 12].

Recent studies have shown that in some patients, SARS-CoV-2 can persist in the mucosa of the nasopharynx and the Eustachian tube, causing chronic edema, impaired mucociliary clearance, and compromised middle ear ventilation [9]. In a healthy state, the Eustachian tube is responsible for ventilating the tympanic cavity, normalizing pressure, and preventing the entry of secretions. Inflammatory processes accompanying respiratory viral infections, including COVID-19, cause swelling of the mucosa, excessive mucus production, and impaired tube drainage. Furthermore, SARS-CoV-2 can directly infect the mucosa of the auditory tube via ACE2 receptors [3]. It is this group of patients that often forms the risk group for developing prolonged secretory otitis media.

The key components of the molecular pathogenesis of COVID-19 are the penetration and replication of the coronavirus, antigen presentation, humoral and cellular immunity, the cytokine storm, and immune evasion by the coronavirus [8]. Chronic oxygen deficiency causes the mucosa to produce thick, viscous secretions, and prolonged Eustachian tube blockage leads to the formation of transudate in the middle ear.

In patients with COVID-19, otologic dysfunction related to impaired Eustachian tube function can often be observed [5, 10].

Damage to sensory systems in COVID-19 often occurs later, after a certain period of time following recovery. This requires consideration of this possible etiological factor when providing care to patients. This applies, first and foremost, to combined hearing impairment problems [2]. Patients with secretory otitis media most often complain of hearing loss, a feeling of fullness in the ear, and autophony [4]. Mild discomfort and a feeling of pressure are sometimes observed. Otoscopic examination reveals a retracted, immobile, and sometimes fluid-filled tympanic membrane. Tympanometry shows a typical type B curve, and audiometry registers a conductive hearing loss. In patients with post-COVID syndrome, inflammatory markers (CRP, IL-6) may be elevated, and in some cases, viral RNA may even be detected in the middle ear [6].

This has necessitated the improvement of treatment strategies and the search for new treatment methods, in particular the application of local glucocorticosteroid therapy.

The purpose of the study was to evaluate the clinical efficacy of a single local injection of betamethasone into the region of the torus tubarius in patients with post-COVID secretory otitis media.

Materials and methods. Between January 2024 and February 2025, based at the ENT department of the Poltava Regional Clinical Hospital named after M.V. Sklifosovsky and the private clinic Bezega Clinic, we conducted an open, prospective study involving 28 patients (15 men, 13 women; mean age – 36.4±8.7 years) with diagnosed unilateral or bilateral SOM lasting more than 3 weeks. All patients were divided into two groups: the main group (n=14) – treated according to a unified clinical protocol with an additional injection of betamethasone into the region of the torus tubarius, and the control group (n=14) – treatment included only the measures specified by the unified clinical protocol.

Informed consent was obtained from all studied patients in accordance with the requirements of the Council of Europe's Convention on Biomedicine. Approval for the study was granted by the Bioethics Commission of the Poltava State Medical University.

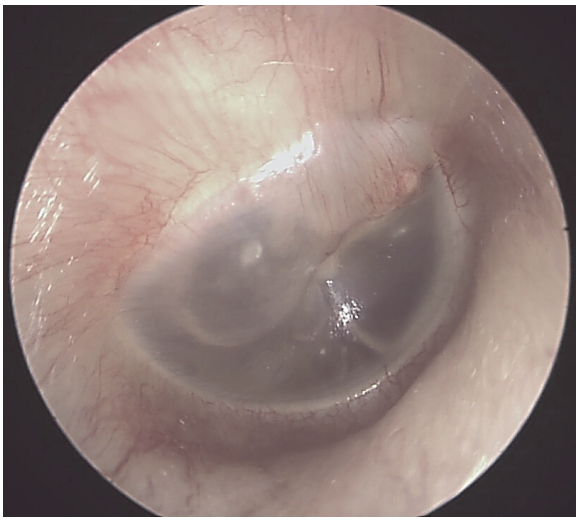

Fig. 1. Endoscopic image. Otoscopic picture of the left ear in a patient with secretory otitis media following COVID-19. The tympanic membrane is translucent, the light reflex is absent, and air bubbles are visible.

The study included patients who had previously contracted COVID-19 and presented with signs of SOM, whose main clinical manifestations were the presence of transudate in the middle ear and Eustachian tube dysfunction according to otoscopy (Fig. 1) and type B tympanometry.

Under local anesthesia, patients received a single injection of betamethasone (0.5 ml) into the region of the torus tubarius under endoscopic control.

Assessment was performed based on a subjective symptom scale, otoscopy, tympanometry, and audiometry. Follow-up examinations were conducted at 1, 4, 12 weeks, and 6 months.

Results of the study and their discussion. Significant reduction in the symptom of ear fullness was observed in 78.6 % of patients in the main group as early as 7 days after the betamethasone injection, whereas in the control group, improvement at this stage was recorded in only 42.9 % of patients. By week 4, otoscopic examination in the main group showed normalization of the tympanic membrane state (disappearance of retraction, transparency, absence of transudate) in 85.7 % of patients, compared to 57.1 % in the control group. By week 12, 92.8 % of patients in the main group had a type A tympanogram, indicating complete restoration of the ear's ventilatory function, while in the control group, this figure was 71.4 % (Fig. 2).

Audiometry results confirmed objective hearing improvement in the main group – the average gain was 11.3±4.8 dB, primarily in the 500–1000 Hz frequency range, compared to only 5.1±3.2 dB in the control group. An important finding is the fact that after 6 months, the therapeutic effect was maintained in 92.8 % of patients in the main group, and symptom recurrence occurred in only one patient (7.1 %).

In the control group, 4 patients (28.6 %) required a repeat treatment course due to the return of symptoms. Side effects in the main group were limited to one case of temporary dryness in the nasopharynx, which did not require any intervention.

The standard approach to treating SOM according to unified clinical protocols involves the use of intranasal corticosteroids, mucolytics, and physiotherapeutic procedures. Catheterization of the Eustachian tube and Politzer balloon insufflation are widely used. In cases where the disease has a prolonged course, surgical treatment methods are considered, namely tympanopuncture, paracentesis, or tympanic cavity shunting. In cases of persistent middle ear ventilation disorders, short courses of systemic steroids are sometimes prescribed; however, due to the risk of side effects, their use is limited [1, 5, 9].

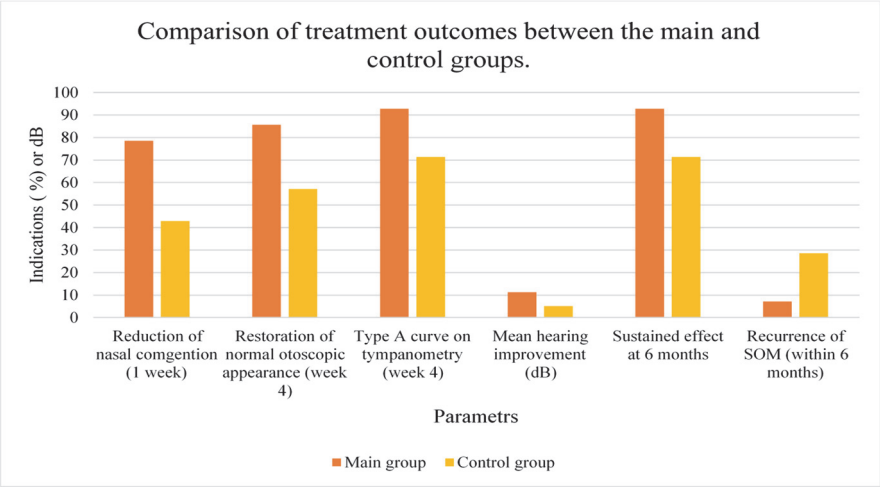

Fig. 2. Comparison of treatment outcomes between the main and control groups.

The application of betamethasone provides a pronounced and long-lasting anti-inflammatory effect. Administering the drug locally, directly into the tissues of the torus tubarius, ensures maximum concentration of the medication at the site of the lesion. This leads to a reduction in edema, blockade of inflammatory mediator release, improved Eustachian tube patency, and restoration of tympanic cavity ventilation. This treatment method, unlike protocol therapy, significantly reduces the likelihood of systemic side effects and promotes a more sustainable outcome with a minimal number of injections [12].

The main advantages of the local administration of betamethasone are its direct clinical impact on the affected area, reduced systemic effect on the body, long-lasting result after a single injection, and the potential to avoid surgery in the early stages of the disease. However, the method is associated with certain risks: an insufficient number of large-scale clinical studies, the technical complexity of the procedure, the potential for damage to surrounding anatomical structures, the formation of fibrosis and adhesions at the injection site, and the risk of infection.

Given the theoretical rationale for the use of betamethasone in the local therapy of SOM, this method currently lacks supporting conclusive evidence. Randomized controlled clinical trials are needed to determine the efficacy, safety, and long-term outcomes of such treatment. The development of clear procedural protocols, patient selection criteria, and outcome assessment measures should be a priority for modern otorhinolaryngology [2].

The obtained data indicate a positive effect of local betamethasone administration in the treatment of SOM. Significant concentrations of the glucocorticosteroid directly at the site of action contribute to the reduction of Eustachian tube edema, restoration of its functionality, and normalization of pressure in the middle ear. The use of this method avoids the systemic effects of steroids on the body and the need for surgical intervention.

Local betamethasone administration proved to be more effective than traditional therapy, ensuring rapid symptom relief, restoration of Eustachian tube function, and a reduction in the number of recurrent exacerbations. In the control group, 28.6 % of patients experienced a recurrence of symptoms that required additional medical intervention. The obtained results highlight the potential benefit of the new treatment technique for reducing the need for surgical operations.

Conclusion

Eustachian tube dysfunction is a fairly common pathological condition that occurs against the background of diseases accompanied by edema of the nasal cavity and nasopharyngeal mucosa. Providing care to patients who have suffered from a common cold in most cases does not present difficulties. However, the course of SOM in patients who have had COVID-19 is characterized by persistent symptoms and a significantly lower clinical efficacy of traditional treatment methods.

Local injection of betamethasone into the torus tubarius region represents a potentially promising technique for the treatment of secretory otitis media, particularly in patients with post-COVID complications. Compared to standard therapy, this method provides better symptom control and hearing recovery. The recurrence rate in the control group was 28.6 %, while the use of betamethasone reduced this rate to 7.1 %. No serious side effects associated with the drug were observed.

Implementing this technique requires a high level of professional skill in performing endoscopic procedures. To scale this practice, further detailed clinical studies are needed to evaluate its efficacy and safety compared to traditional approaches. The method is recommended for further multicenter studies to standardize its application.

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