

Improvement of Methods of Conservative Therapy of Exudative Otitis Media in Children

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DOI : <https://doi.org/10.61796/jmgcb.v2i4.1194>



Sections Info

Article history:

Submitted: January 17, 2025

Final Revised: January 17, 2025

Accepted: January 17, 2025

Published: January 17, 2025

Keywords:

Otitis media exudative

Allergic rhinitis

Auditory tube dysfunction

ABSTRACT

Objective: To evaluate the clinical efficacy of antihistamines, antileukotrienes, and topical intranasal glucocorticosteroids in the complex therapy of exudative otitis media associated with allergic rhinitis. **Methods:** Patients with exudative otitis media and concurrent allergic rhinitis were treated with a combination of antihistamines, antileukotrienes, and topical intranasal glucocorticosteroids. Clinical outcomes were assessed through auditory evaluations, symptom severity scores, and quality of life measurements. **Results:** The therapeutic regimen demonstrated significant clinical efficacy. Patients experienced restored hearing, substantial symptom reduction, and notable improvements in overall quality of life. **Novelty:** This study highlights the synergistic potential of combining antihistamines, antileukotrienes, and intranasal glucocorticosteroids, providing a comprehensive approach to managing exudative otitis media in the context of allergic rhinitis.

INTRODUCTION

Exudative otitis media (ESR) is a polyetiological disease characterized by the presence of transudate or exudate in the cavities of the middle ear and the development of recurrent, sluggish neynoy inflammation in the auditory tube, the tympanic cavity and the cells of the mastoid process, which subsequently leads to a varying degree of hearing loss.

Allergic rhinitis is a disease that occurs after contact of the sensitized organism with the allergen and is caused by IgE-mediated inflammation of the nasal mucosa with characteristic symptoms (rhinorrhea, nasal obstruction, itching of the nose, sneezing), reversible spontaneously or under the influence of treatment [1], [2].

Allergic reaction takes place in three stages: the first immunological, the second - pathochemical, the third - pathophysiological. In the second stage of the cells are biologically active substances - mediators of allergic inflammation. The most significant of them are histamine and leukotrienes. Mediators cause certain clinical manifestations of the disease (table 1) [3].

Table 1. Mediators of clinical symptoms of allergic rhinitis.

Clinical symptoms	Pathophysiological mechanism	Mediators
Itch	Stimulation of nerve endings	Histamine (H1-), prostaglandins

Nasal congestion	Swelling of the mucous	Histamine (H1-), leukotrienes
Sneezing	Stimulation of nerve endings	Histamine (H1-), leukotrienes
Rhinorrhea	Stimulation of mucus secretion	Histamine (H1-), leukotrienes

As can be seen from table 1, lipid mediators – leukotrienes play an important role in the pathogenesis of allergic rhinitis along with histamines. The source of leukotrienes is arachidonic acid, formed from membrane phospholipids when their membrane is damaged. As recently established, leukotrienes play an important role in the pathogenesis of many inflammatory diseases, such as bronchial asthma, allergic rhinitis, allergic dermatitis, allergic conjunctivitis, atherosclerosis of the cardiovascular system, inflammatory bowel disease, multiple sclerosis and cancer.

ESR, developed against the background of allergic rhinitis, is an exudative inflammation of the middle ear mucosa due to dysfunction of the auditory tube [4]. ESR, combined with allergic rhinitis, can not be considered as a continuation of allergic lesions of the mucous membrane of the middle ear, the latter is isolated as a separate nosology – "eosinophilic otitis media" [5], [6]. The difference between the latter and exudative otitis media is the detection of eosinophils in the ear secret [7], [8], [9].

Adequate and timely treatment of allergic rhinitis and, as a consequence, the restoration of the function of the auditory tube, would contribute to the regression of symptoms of exudative otitis media. Purpose of research is development of effective methods of conservative treatment of exudative otitis media, occurring on the background of allergic rhinitis [10], [11].

RESEARCH METHOD

We observed 67 children with otitis media at the age of 3 to 18 years, including 39 (58.2%) – a boy and 28 (41.8%) girls. All patients were verified exudative otitis media and allergic rhinitis. The patients were divided into two groups, by sex and age [12], [13], [14]. The first group (main) included 35 patients who received receptor blockers H-1 histamine II generation – Fexofenadine or cetirizine, intranasal glucocorticoids – fluticasone mometasone or and to anti-leukotrienes – montelukast. The second group included 32 patients receiving antihistamines and antihistamines [15], [16].

The method of examination included the study of patients' complaints and medical history, otorhinolaryngological examination, multispiral computed tomography of the paranasal sinuses [17]. All patients underwent endoscopy of the nose and nasopharynx, audiometry, impedance. Diagnosis of exudative otitis media was verified according to classification N. S. Dmitrieva and co-authors (1996) [18]. Allergic rhinitis is classified according to who and ICD - 10 recommendations [19].

For the study mucociliary transport (MCT) function of MCT is selected of the nose, as the research is not technically difficult and is identical with mtst of the auditory tube.

Mtst of the nose was evaluated on the basis of the results of the saccharin test. The classification of B. V. Shevrygin (1985) was used to estimate the obtained data.): norm - to 15-20 min., 1 degree - 20-30 min., 2 degree - 30-60 min., 3 degree - more than 60 min.

The following symptoms of the disease were studied: itching, nasal congestion, sneezing, rhinorrhea. The dynamics of the above symptoms was evaluated according to a 4-point system. A survey and examination of patients before and after treatment (5 and 10 days), the presence of one symptom was evaluated by one point. The obtained data of the study were subjected to statistical processing. Evaluation of the results of MCT and the dynamics of symptoms was carried out before, on the fifth and tenth days of treatment.

Criteria clinical effectiveness of treatment was: normalizing the data of endo - and mikropotokami, tympanometry, improvement of hearing, regression of symptoms of allergic rhinitis.

RESULTS AND DISCUSSION

In the study of anamnesis, the following should be noted: in 25 (37.3%) cases from early childhood, there was a burdened allergic anamnesis (exudative-catarrhal or thymic - lymphatic diathesis), in 23 (34.3%) cases -accompanied by helminthic invasion, 19 (28.4%) patients were in the group of often ill children.

The results of endoscopy of the nose and nasopharynx showed that all patients had manifestations of allergic rhinitis, swelling of the nasal shells, cyanotic edema of the nasal mucosa and tubar rollers.

Before treatment, according to the results of tonal threshold audiometry - in 18 (26.9%) cases, the I degree, in 37 (55.2%) - II degree and in 12 (17.9%) - III degree of hearing loss. When performing impedance - 48 (71,6%) patients recorded tympanogram type b, 19 (28,4%) - type C.

All patients of the main and control groups were conducted pre - and post-treatment study of mucociliary clearance using a saccharin test, since the implementation of this study is not technically difficult and is identical to the MCT of the auditory tube. The results of this study are presented in table 2.

Table 2. Mucociliary transport function of the nose in patients of the main and control groups.

Groups	Mucociliary transport function (min.)			
	Before treatment	5 days	10 days	P
Main	45±1,0	22±0,5	14±1,0	<0,05
Control	44±0,5	23±1,0	15±0,5	

As can be seen from table 2, the average value of the MTC of the nasal mucosa in the dynamics, in patients of the main group did not differ significantly, compared with the control. Consequently, the use of itranazal glucocorticosteroids in the complex

therapy in both groups of patients improved the transport function of not only the nose, paranasal sinuses, but also the auditory tube, which, in turn, led to the evacuation of exudate from the tympanic cavity.

After a course of conservative therapy, hearing parameters were examined on day 14. Both groups showed positive dynamics. With tonal threshold audiometry in 58 (86.6%) patients, normalization of hearing was revealed, in 9 (13.4%) patients I degree of hearing loss. Impedance measurement was recorded - in 52 (77.6%) patients with tympanogram type - A, in 15 (22.4%) - type C.

Before and after treatment, all patients of both groups were surveyed and examined to determine the reliable clinical efficacy of the complex therapy.

The results of evaluating the effectiveness of treatment of the main and control group of patients are presented in table 3.

Table 3. Symptom scores (itching, nasal congestion, sneezing, rhinorrhea, and cough) in main and control groups before and after treatment.

Groups	Symptoms: itching, nasal congestion, sneezing, rhinorrhea and cough (score.)			
	Before treatment	5 days	10 days	P
Main	4	1,76	0,44	<0,05
Control	4	3,48	2,32	

As can be seen from table 3, during the survey, the number of points in the main group of patients is significantly reduced, compared with the control group, which indicates a regression of the main above symptoms that affect not only the physical condition of the patient, but also the quality of his life.

In the pathogenesis of exudative otitis media in combination with allergic diseases of the respiratory tract, along with h1-histamine, lipid mediators of allergy - leukotrienes play an important role. in this regard, the use of blokatorov h1 - histamines and antileukotrienes leads to the blocking of all mediators of allergy and, as a consequence, reduction or disappearance of the above symptoms. Thus, the results of our study showed that the complex treatment with the use of antihistamines, antileukotrienes and intranasa glucocorticosteroids leads to regression of the above symptoms of the disease, which in turn improves the quality of life of patients, starting from the fifth day of treatment.

CONCLUSION

Fundamental Finding : The study demonstrated that intranasal glucocorticosteroids, when used in combination with H1-antihistamine drugs and antileukotrienes, were highly effective in treating exudative otitis media caused by allergic rhinitis. The treatment significantly improved mucociliary transport function, ventilation, and auditory tube function, leading to the evacuation of fluid from the

tympenic cavity and the restoration of hearing. **Implication** : These findings imply that a combined approach, involving intranasal glucocorticosteroids and other relevant medications, can be considered a reliable treatment strategy for patients with exudative otitis media associated with allergic rhinitis, offering clinical benefits such as improved mucociliary function and hearing restoration. **Limitation** : One limitation of this study is the potential variability in individual patient responses to the treatment regimen, which was not extensively explored. Additionally, the long-term effects of this combination therapy remain unclear and require further investigation. **Future Research** : Future research should focus on exploring the long-term outcomes of intranasal glucocorticosteroids and the combination of H1-antihistamines with antileukotrienes in the treatment of exudative otitis media. Further studies could also investigate the optimal dosage and treatment duration to maximize clinical efficacy and minimize potential side effects.

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